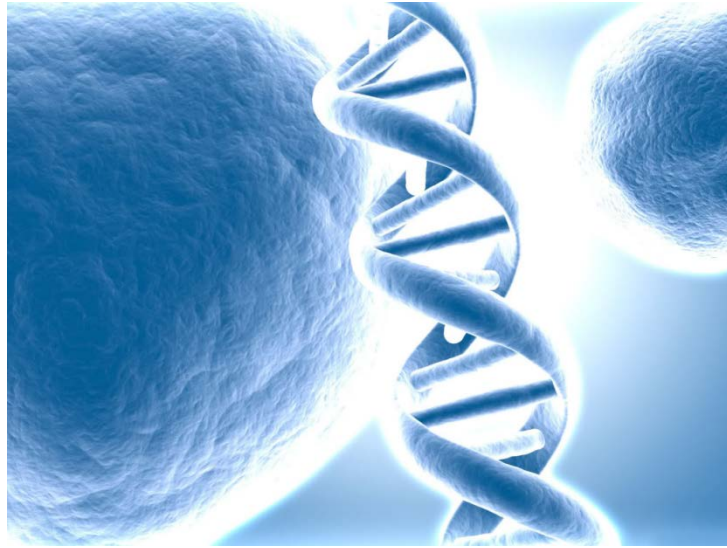


Final Report of the Biotechnology Program Review Panel

August 15, 2016



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Program Name and History

1) Program name

This report is a review of the bachelor of science in biotechnology degree at Ferris State University.

2) History

The biotechnology program accepted its first students in 1989. It was designed to provide intensive hands-on laboratory experience to feed a growing biotechnology industry. It was designed to have a very focused curriculum, oriented towards understanding both the principles and theories of the disciplines that compose biotechnology and the ability to perform relevant procedures in the laboratory. To maintain this focus, the biotechnology program was designed to be small, with a maximum capacity of 13 students per year. Numbers beyond this are unsound from both a physical (laboratory space) and academic (loss of personalized hand-on experience) perspective. Since 1989, the program has continued to evolve as the biotechnology industry has evolved. For instance, many biotechnology students now directly enter graduate school rather than entering the biotechnology industry upon graduation. Personalized medicine, gene editing, individual genome analysis, and stem cell therapies will only be a few of the new areas that biotechnology and biotechnology graduates will explore in the next decade. However, no matter what the “hot biotechnology topic” of the moment becomes, the hands-on, rigorous nature of the biotechnology program will still be the fundamental guiding principle for both the biotechnology faculty and students.

Program Mission

1) Mission statements

Ferris State University mission statement: Ferris State University prepares students for successful careers, responsible citizenship, and lifelong learning. Through its many partnerships and its career-oriented, broad-based education, Ferris serves our rapidly changing global economy and society.

College of Arts and Sciences mission statement: Through academic programs, general education, and outreach activities, the College of Arts and Sciences provides a learning-centered education that prepares students to contribute to a complex and diverse world.

Department of Biological Sciences mission statement: The Department of Biological Sciences provides excellent teaching, quality advising, and exposure to relevant experiences, setting a solid foundation of knowledge and skills that will allow students to become productive citizens and pursue successful careers.

Biotechnology program mission statement: The mission of the biotechnology program is to provide a quality undergraduate education and a strong foundation in the principles of biology, chemistry, and the biomolecular sciences. The goal of the program is to provide graduates a high degree of advanced technical laboratory skills and the ability to translate these skills in written and oral forms into careers in the biotechnology industry, graduate, or professional school.

2) Incorporation of missions into the biotechnology program

The biotechnology program was originally founded on the Ferris ideal of a career-based education and it continues to revolve around this ideal. Lecture and laboratory courses are designed to approach material in a way that will best prepare students for working independently in their future careers as laboratory researchers.

Consultation with the external advisory board, program alumni, and internship advisors give program faculty constant feedback on the relevance of the curriculum and the best way to prepare graduates for the rapidly changing biotechnology industry.

The biotechnology faculty constantly strive to make the biotechnology program the premier program within Ferris State University with respect to preparing students for a career in the biomolecular laboratory sciences. Program graduates have completed graduate and professional degrees and have also advanced to managerial positions at biotechnology companies. The achievements of our graduates speak very well to the quality of the program and the ways in which the biotechnology program fits with the missions of the university (successful careers), the College of Arts and Sciences (contribute to a complex and diverse world), the department of Biological sciences (allow students to become productive citizens and pursue successful careers), and the biotechnology program (the ability to translate these skills...in the biotechnology industry, graduate, or professional school).

Program Goals

1) Biology Departmental strategic plan

Because the biotechnology program is contained within the department of biological sciences, the basic strategic plan followed by the biotechnology program is the strategic plan of the biology department. A copy of the departmental strategic plan, which was created and periodically reviewed by the departmental planning committee, is found in Appendix A. Here are the six primary goals contained within the departmental strategic plan:

- Centralize and improve advising of Biology majors within the department
- Revise procedures for selecting biology award recipients
- Increase learning opportunities for students outside of class
- Enhance department recruitment activities
- Strengthen assessment activities in the department

2) Biotechnology program strategic plan

In addition to these departmental goals, the biotechnology program faculty have also created additional strategic plan goals specific to the biotechnology program:

1. Increase exposure of biotechnology students to advanced scientific instrumentation and the analysis of data from these instruments.

2. Focus on incorporating more activities in the classroom and laboratory that reinforce good oral and written communication skills.
3. Increase student exposure to primary scientific literature earlier in the biotechnology program curriculum. Special focus should be placed on analysis of the data and results from primary literature.

These specific goals were derived from items contained within the biotechnology program mission statement and program outcomes. The mission statement and program outcomes were developed by the internal biotechnology advisory board. The internal advisory board consists of all faculty and staff that instruct biotechnology lecture or laboratory courses, along with the department chair for the biology department and the department head for the physical sciences department. The mission statement for the biotechnology program and all program outcomes were carefully developed to focus on the interdisciplinary and laboratory based nature of the biotechnology program.

Biotechnology mission statement: The mission of the biotechnology program is to provide a quality undergraduate education and a strong foundation in the principles of biology, chemistry, and the biomolecular sciences. The goal of the program is to provide graduates a high degree of advanced technical laboratory skills and the ability to translate these skills in written and oral forms into careers in the biotechnology industry, graduate, or professional school.

Biotechnology program outcomes

1. **Molecular biology and genetics** - Students will be able to recognize, recall, and apply knowledge of the basic processes associated with the transfer and expression of genetic material.
2. **Biochemistry and cell energetics** - Students will be able to recognize, recall, and apply knowledge of chemical processes associated with bioenergetics and metabolism.
3. **Cellular structure, organization, and function (cell biology)** - Students will be able to recognize, recall, and apply knowledge of the composition, formation, and maintenance of cellular structure and function.
4. **Proficiency in a laboratory setting** - Students will be proficient in the performance, careful observation, data collection, and analysis of data from advanced laboratory procedures in the areas of chemistry, biochemistry, molecular genetics, microbiology, and immunology.
5. **Analysis of scientific literature** - Students will have the ability to analyze, evaluate, and present information from peer-reviewed scientific publications in written and verbal form.
6. **Application of knowledge in internships and independent study projects** - Students will have the ability to apply learned biotechnology skills and laboratory techniques in extramural internships and independent study projects.

3) Incorporation of program goals

The program goals are communicated to faculty and staff during internal advisory board meetings. Program goals are communicated to stakeholders via external advisory board meetings and discussions with alumni and internship supervisors. Program goals are reevaluated during our discussions with both of these advisory boards. Program goals have not drastically changed during the past APR cycle, but there have been some changes in

program focus, with increased focus being placed on communication skills, increased use of advanced scientific instrumentation, and scientific publication analysis.

4) Review of program goals

Progress has been made on the three specific goals for the biotechnology program:

- **Increased exposure of biotechnology students to advanced scientific instrumentation and the analysis of data from these instruments.** Over the past six years, the department has made significant investments in new scientific instrumentation. As these instruments have been purchased, their use has been incorporated into upper level biotechnology lectures and laboratories. With the recent opening of the Shimadzu Core Research Facility, the instrumentation capabilities of the university have been greatly increased. Biotechnology program faculty are currently discussing ways in which instrumentation found in the core facility can be incorporated into the program curriculum.
- **Focus on incorporating more activities in the classroom and laboratory that reinforce good oral and written communication skills.** In the past six years, changes in the composition of biotechnology program faculty has led to changes in instruction of upper level lecture courses. As part of the inevitable changes that occur in courses when new faculty take over instruction of these courses, new faculty have taken care to incorporate more written and oral communication based activities in these courses. As new faculty continue to revise these upper level courses (which are only offered on an every-other year basis), incorporation of these activities will continue.
- **Increase student exposure to primary scientific literature earlier in the biotechnology program curriculum. Special focus should be placed on analysis of the data and results from primary literature.** As mentioned above, new faculty have recently taken over instruction of upper level biotechnology lectures. As new faculty evaluate their instruction of these courses, care has been taken to investigate ways in which to incorporate more analysis of scientific literature into these courses. While this endeavor is still in an early stage, progress has been made on this goal.

Progress towards these goals will be assessed using standard course-level and program level assessment tools.

Curriculum

1) Overview

The biotechnology program curriculum is divided into two distinct parts: the pre-professional curriculum (years one and two of the program) and the core biotechnology curriculum (years three and four of the program).

- **Pre-professional curriculum.** Because the curriculum is focused on the area of biotechnology and the biomolecular sciences, there is little room for flexibility in course selection. The biotechnology program is similar in level of sophistication to pre-professional programs such as pre-pharmacy, pre-optometry, pre-medicine, and pre-dentistry. The biotechnology program shares first and second year course requirements with these programs. This allows students who enter Ferris State to reserve a final decision on their major field of study until their third year of coursework. Students in all of these programs begin

with a year of general biology (Biology 121 and 122) and general chemistry (Chemistry 121 and 122), followed by a year of organic chemistry (Chemistry 321 and 322) and anatomy and physiology (Biology 321 and 322 or 205). Students will also usually take one semester of physics (Physics 211), analytical trigonometry (Math 130), and statistics (Math 251) in these first two years. The only exception to the guidelines listed above is with quantitative analysis (Chemistry 231), which is not offered at most community colleges and should be completed before proceeding into the third year of the program. The pre-professional curriculum is completed with general education electives to satisfy the requirements for cultural enrichment, global consciousness, and communications competence.

Core Biotechnology Courses		
<u>Third Year</u>		
Fall		
BIOL 375	Principles of Genetics	3 cr.
CHEM 332	Biochemistry Lab 1	2 cr.
CHEM 364	Biochemistry	4 cr.
Spring		
BIOL 386	Microbiology and Immunology	5 cr.
CHEM 333	Biochemistry Lab 2	2 cr.
BIOL 474	Advanced Cell & Molecular Biology*	3 cr.
BIOL 475	Bioinformatics*	3 cr.
<u>Fourth Year</u>		
Fall		
BIOL 476	Advanced Techniques in Biotechnology	2 cr.
BIOL 473	Proteins Laboratory	3 cr.
BIOL 472	Proteins*	3 cr.
Spring		
CHEM 474	Advanced Biochemistry	3 cr.
BIOL 471	Recombinant DNA Laboratory	3 cr.
BIOL 470	Molecular Genetics*	4 cr.
*These courses are offered every other year. Depending on their year of entry into the core sequence, students may take these courses in reverse order from what is listed here.		

- **The core biotechnology (professional) curriculum.** The biotechnology core courses of the third and fourth years of the program are designed to address the major areas of both biotechnology theory (lecture) and laboratory skills (see table below). The primary areas of the core biotechnology sequence are: recombinant DNA, database analysis and bioinformatics, protein purification, microbiology/immunology, and animal care and handling. Therefore, the lecture requirements for this core sequence include one semester of general genetics (Biology 375), biochemistry (Chemistry 364), microbiology and

immunology (Biology 386), advanced cell and molecular biology (Biology 474), molecular genetics (Biology 471), proteins lecture (Biology 472), bioinformatics (Biology 475), and advanced biochemistry (Chemistry 474 - which serves as our capstone course). Also included in this core sequence are a number of laboratory courses beginning with a full year of biochemistry laboratory (Chemistry 332 and 333), followed by one semester of proteins laboratory (Biology 473), an advanced techniques course in immunology and animal care and handling (Biology 476), and finished with a course in recombinant DNA analysis (Biology 471). Usually during the summer between their third and fourth years in the program, students will apply for and obtain a biotechnology internship (Biology 491). Emphasis is placed on assisting students with obtaining external (off-campus) internships, as these opportunities have the most profound benefit to the development of a young biotechnologist. However, when either unable or unwilling to perform their internship off-campus, students are allowed to finish their internship performing an independent research project under the supervision of a Ferris faculty member.

A copy of the current biotechnology checksheet can be found in Appendix B.

Copies of syllabi for core biotechnology courses can be found in Appendix C. Copies of syllabi for pre-professional courses can be found in Appendix D.

2) Program Policies and Procedures

Discussions regarding the biotechnology program curriculum are first handled via the biotechnology internal advisory board. The program coordinator is responsible for bringing curricular changes agreed upon by the internal advisory board to the biology department curriculum committee. Any curricular issues are then brought to the attention of the department via the active role played by the curriculum committee in monthly departmental meetings.

The hiring of two full time professional advisors that advise first and second year biology students (they only advise biotechnology students for their first year) has been a great help to the curriculum process, as these advisors have a wider view of the needs of all students within the biology department.

3) Experiential Education

The biotechnology program requires the completion of an internship experience before graduation. Most students will complete their internship off-campus during the summer between the third and fourth years of the program. However, due to student inability to move off-campus or their inability to secure an off-campus internship, some students will complete their internship requirement by working with faculty members at Ferris on an independent research project.

Program advisors begin to work with students on resume preparation and investigation of internship opportunities during their second year in the program. Beginning in their second year, students are also encouraged to work with a Ferris faculty member in a research laboratory, as the extra independent laboratory experience greatly aids their pursuit of an off-campus internship experience.

4) Previous Curricular Changes

Only one formal curricular change has been specifically made to the biotechnology curriculum in the past six years:

- **Increase in the mathematics requirements for graduation.** The biotechnology program previously only required MATH 130 (Advanced Algebra & Analytical Trigonometry). This has always presented a problem for the 50% of biotechnology graduates that proceed to graduate school, as many graduate programs require at least one undergraduate calculus course for admission. The MATH 130 requirement was placed in the biotechnology program many years ago during a time when Calculus I was only offered as a 5 credit course. With the reconfiguring of calculus courses that occurred several years ago and the reduction of MATH 220 (Analytical Geometry - Calculus 1) to a 4 credit course, there is now room in the biotechnology curriculum to include MATH 220. The increase of MATH requirements also fits well with many of the Bachelor of Science in Biology concentrations and the Pre-Pharmacy requirements, which have also increased their MATH requirements to MATH 220. This curricular change will go into effect fall 2016.

Several curricular changes have also been made to all programs in the department of biological sciences (which also impacts the biotechnology program):

- **General biology and chemistry requirements.** It was noted by the professional advisors and general biology instructors that the subset of FTIAC students that entered Ferris with a MATH 115 placement were underperforming in BIOL 121 and 122. Traditionally, these students were permitted to begin the general biology sequence immediately upon entrance to Ferris, but were required to complete a lower-level chemistry course (CHEM 114) before beginning the general chemistry (CHEM 121 and 122) sequence. This placed these students in a situation where they their general biology and chemistry progression was out of sync. In addition, the addition of CHEM 114 to their course load did not seem to greatly increase their performance in either general biology or chemistry. To bring these students into sync with their general biology and chemistry courses, and to aid in their progression through later biology and chemistry courses, it was decided to eliminate the use of CHEM 114 as a “preparatory” course and require all students to complete MATH 115 before beginning the general biology and chemistry sequence in the spring semester of their first year. This curricular change has been in place for several years and student performance in general biology has been notably increased in this cohort of students.
- **Increase the transfer requirements for students entering biology programs and concentrations to 2.5 GPA.** Previously, the biology department required students have a minimum 2.0 GPA to transfer into biology programs from other programs at Ferris. This was one of the lowest transfer GPA requirements for any program at Ferris State. In addition, an analysis of success and graduation data for students transferring into biology programs with a GPA of 2.0-2.5 showed that, once in a biology program, these students had a greater failure rate in BIOL courses, a poorer completion rate of program all requirements, and a slower time to graduation. This curricular change will go into effect fall 2016.
- **Increase the ACT requirement for admission into biology programs and concentrations to a composite or MATH ACT of 20.** Previously, 19 was the minimum allowable score on the composite ACT or MATH ACT subsection for students to enter directly into a biology program. Students with a score of 18 or below were admitted with pre-science as their primary program and their biology program/concentration as their secondary program. Once these students passed entry level MATH/READ requirements, they were moved from pre-science as their primary program to their selected biology program/concentration. Students with a 19 or greater on the composite or MATH ACT were admitted

directly into a biology program/concentration. An analysis of success and graduation data for students that score a 19 on their ACT compared to students that score 20 or above showed that these students had a greater failure rate for entry level MATH courses, BIOL 121/122, and CHEM 121/122. These students also had a poorer completion rate and slower time to graduation. There is a large difference in success data for students that score 19 or below versus those that score 20 or better on the ACT. Students that score a 19 on the ACT more closely resemble those that score 18 or below in terms of their advising needs. This curricular change will go into effect fall 2016.

5) Future Curricular Changes

There is only one curricular change that is currently being seriously discussed by the biotechnology faculty.

- **Addition of an introductory laboratory course for third year students.** As the curriculum is currently configured, students do not get extensive hands-on laboratory experience until the fourth year of the program. This puts third year students that did not work in the laboratory of a Ferris faculty member at a distinct disadvantage when applying for external internships. It has been proposed we add an introductory biotechnology laboratory course to the first semester of the third year of the biotechnology program to give all third year students some basic upper-level laboratory experience in preparation for application for external internships. This would also be an excellent place to begin introducing students to the reading and analysis of primary literature.

Assessment of Student Learning

In the past, outcomes assessment was implemented at the individual course level. Biology and biotechnology faculty have utilized a variety of means to measure and track student learning, including: pre/post tests, assessment questions embedded into exams, research projects, laboratory experiments and notebooks, and “clicker” assignments. These data have been collected and archived for many years.

Biotechnology faculty have modified all course syllabi to include measurable outcomes. Course outcomes have been integrated with the mission statement and program outcomes that were agreed upon by the biotechnology faculty in 2009 and are recorded on the TracDat system for the core biotechnology courses (see Appendix E).

Biotechnology program outcomes

1. **Molecular biology and genetics** - Students will be able to recognize, recall, and apply knowledge of the basic processes associated with the transfer and expression of genetic material.
2. **Biochemistry and cell energetics** - Students will be able to recognize, recall, and apply knowledge of chemical processes associated with bioenergetics and metabolism.
3. **Cellular structure, organization, and function (cell biology)** - Students will be able to recognize, recall, and apply knowledge of the composition, formation, and maintenance of cellular structure and function.
4. **Proficiency in a laboratory setting** - Students will be proficient in the performance, careful observation, data collection, and analysis of data from advanced laboratory procedures in the areas of chemistry, biochemistry, molecular genetics, microbiology, and immunology.

5. **Analysis of scientific literature** - Students will have the ability to analyze, evaluate, and present information from peer-reviewed scientific publications in written and verbal form.
6. **Application of knowledge in internships and independent study projects** - Students will have the ability to apply learned biotechnology skills and laboratory techniques in extramural internships and independent study projects.

For several years, the biotechnology program has used a national standardized test (Major Field Test in Biology – Educational Testing Service) to measure academic achievement and to assess the educational outcomes of our students. Beginning in spring 2008 and continuing every subsequent spring semester, graduating biotechnology students have also been administered the Biology Field Exam. The Field Exam is administered by approximately 400 universities and colleges nationwide, which allows us to compare our students to similar institutions across the country. Each student who completes the Field Exam receives a total score and subscores in four areas: cell biology, molecular biology and genetics, organismal biology, and population biology, evolution, and ecology. In addition, faculty receive cohort data (per semester) and percentiles for student achievement in seven specific subject areas, which are more specific partitions of the subscores described above. These subject areas are biochemistry and cell energetics, cellular structure, organization, and function, molecular biology and molecular genetics, diversity of organisms, organismal - plants, organismal - animals, population genetics and evolution, ecology, and analytical skills.

Biology Field Exam Subscore Data						
	Spring 2011	Spring 2012	Spring 2013	Spring 2014	Spring 2015	Spring 2016
Number of Students	10	2	10	10	9	10
Total Score Percentile	85	84	95	80	93	96
Cell Biology Subscore Percentile	95	94	95	81	91	96
Molecular Biology Subscore Percentile	85	87	99	95	99	99
Organismal Biology Subscore Percentile	75	70	86	49	88	95
Ecology Subscore Percentile	60	76	83	68	78	88

A comparison of our biotechnology graduate data to national average and percentile data is quite exciting. In the subscore areas that correspond with our programmatic learning outcomes (**cell biology, molecular biology**), our biotechnology graduates scored well above national averages, in the 80th-99th percentile. Those areas where biotechnology graduates received lower scores generally corresponded to subscore areas that are not a focus of the biotechnology curriculum (**organismal biology, ecology**).

Biology Field Exam Subject Area Data						
	Spring 2011	Spring 2012	Spring 2013	Spring 2014	Spring 2015	Spring 2016
Number of Students	10	2	10	10	9	10
Biochemistry and Cell Energetics Percentile	95	*	96	76	97	97
Cellular Structure, Organization, and Function Percentile	85	*	93	88	51	93
Molecular Biology and Molecular Genetics Percentile	90	*	99	95	96	99
Diversity of Organisms Percentile	35	*	66	61	99	73
Organismal - Animals Percentile	10	*	94	65	88	93
Organismal - Plants Percentile	5	*	80	12	98	97
Population Genetics and Evolution Percentile	55	*	90	54	32	87
Ecology Percentile	30	*	68	78	59	86
Analytical Skills Percentile	70	*	95	94	91	96

* Subject area percentiles were not available for this semester, as the sample size was below the threshold required for analysis of student data for subject areas.

An analysis of the Field Test results for the subject area data shows similar results to that of the subscore data. Subject areas stressed in the biotechnology program include biochemistry and cell energetics (76th-97th percentile), cellular structure (51th-93th percentile), molecular biology and genetics (90th-99th percentile), and analytical skills (70th-96th percentile). In the majority of these areas, biotechnology graduates scored incredibly high, well within the top 25% of all students taking the Field Exam nationwide.

From these results, it appears that our rigorous, directed curriculum is preparing our biotechnology students at a higher level than students in comparable programs across the country. The use of the Biology Field exam as a program-level assessment tool has given us a informative view into the true quality of our graduates and is a testament to the quality of instruction in the biotechnology program.

Program Profile

1) Applications, admits, and enrolled

Number of Applications, Admits, and Enrolled Students by Semester					
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015
Applications	19	22	27	20	14
Admits	14	16	21	20	13
% Admitted	73.6%	72.7%	77.7%	100%	92.8%
Enrolled	2	3	6	8	3

The number of applications to the program has stayed fairly consistent over the span of this report, with an increase in the percentage of applications that were actually admitted. The number of FTIACs that initially enroll in the biotechnology program is consistent but low. The program coordinator actively recruits incoming students via collaborative efforts with admissions, the honors program, and the camps office (summer biotechnology camp for high school students). As will be observed in the tables below, many students that complete their time at Ferris by graduating with a degree in biotechnology actually transfer into the program while enrolled in other programs during their first and second years.

2) Headcount

Student Headcount by Semester						
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Average
Total Headcount	37	34	41	49	44	41
Third Year Headcount	9	13	10	13	9	10.8

The overall number of students enrolled in the biotechnology program has trended up in the past five years.

We have also included data regarding the number of students entering the third year of core biotechnology courses: these numbers have remained consistent. The consistency of the third year headcount is an important indicator of the biotechnology program, as in some respects, the biotechnology program is a two-year program. A comparison of the program checklist of the biotechnology program with that of other biology-related programs and concentrations (pre-medicine, pre-pharmacy, pre-optometry, etc.) shows that the series of courses taken by first and second year students in all of these programs and concentrations are almost identical. It is in the third and fourth years of the biotechnology program that students move into upper-level, program specific core biotechnology lecture and laboratory courses. Faculty resources and biotechnology program costs are concentrated in the final two years of the program, since the costs of the first two years of the program are shared with other biology related programs (of which biotechnology is only a small contributor). The biotechnology program is designed to be a small, focused program, with an emphasis on hands-on laboratory training in the final two years of the program. To maintain these standards, laboratory sizes of the core biotechnology courses have a maximum of approximately 13 students. Laboratory sizes larger than this would result in a loss of the individual, hands-on approach that is fundamental to the biotechnology program, besides being greater than the physical space in biotechnology laboratories. Enrollment in third and fourth year classes is capped at this level and our

programmatic goal is to maintain the number of students entering the core sequence at this level, which we have done over the past five years. Also, because the biotechnology program actively recruits students from other biology and physical science programs during their first two years at Ferris, many students do not even enter the program until they are ready to begin their core series of biotechnology courses in their third year. While we continue to recruit FTIAC students via our relationship with other entities on campus, we place great emphasis on recruiting students from related programs at Ferris to fill the biotechnology core courses. Our goal is to keep the biotechnology core courses at their capacity with quality students that entered the program as FTIACs and as transfers from other Ferris programs.

3) Student Credit Hours

Student Credit Hours by Semester					
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015
Total SCH	467	424	514	628	558

The SCH data parallels that of the headcount data and shows a general upward trend.

Note that we were not provided with fall, spring, and summer SCH data.

4) Productivity

Student Credit Hours/Full-Time Equated Faculty – BIOL prefix				
Year	Summer	Fall	Spring	Fall + Spring
2010-11	155	338	331	669
2011-12	160	313	265	575
2012-13	158	324	297	620
2013-14	156	322	319	641
2014-15	154	314	310	625

Campus Average - Student Credit Hours/Full-Time Equated Faculty				
Year	Summer	Fall	Spring	Fall + Spring
2010-11	142	238	228	466
2011-12	150	233	222	455
2012-13	148	235	228	463
2013-14	141	238	231	469
2014-15	144	236	224	460

Productivity numbers have been consistent over time and are significantly higher than those of the university as a whole.

Note that biotechnology courses do not have their own specific prefix, so data shown includes all courses with a BIOL prefix.

5) Enrollment-Residency

Student Residency Status by Semester						
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Average
Michigan Residents	35	29	39	44	40	37
Non-Michigan Residents	2	5	2	5	4	4
% Non-Residents	5%	15%	5%	10%	9%	9%

The majority of biotechnology students are Michigan residents, even though there appears to be slight trend of more non-resident students enrolling in the program. We attribute this primarily to the expansion of the Midwest Compact and increased recruitment activity by the admissions office in surrounding states.

Average Student Age by Semester					
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015
Age	22	22	21	21	21

The average age of biotechnology students has remained consistent over the past five years. The average age of biotechnology students skews towards the upper-end of the typical four-year undergraduate age range (18-23). A comparison of the data from this table with headcount data verifies that many biotech students do not enroll in the program until their second year at Ferris and then remain in the program until graduation.

Average GPA and ACT Scores by Semester						
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Average
FSU GPA	2.98	3.10	3.18	3.17	3.21	3.12
ACT	24.11	25.52	25.50	26.64	26.35	25.62

The average FSU GPA and ACT scores show a gradual increase over the past five years. We attribute this primarily to increased admission standards for the university as a whole, an increase in math ACT requirements for entrance into the BIOL 121/122 sequence, and more careful advising during the latter parts of the second year and first semester of the third year when students enter into the rigorous core sequence of biotechnology courses.

While the GPA for biotechnology students is improving, the average GPA still lags behind that of some pre-professional concentrations such as pre-medicine and pre-optometry (even though the gap has narrowed significantly in the past six years). The biotechnology program is rigorous. Lecture courses in the final two years of the program are taught at a graduate school level. The biotechnology program attracts excellent students, but the difficulty of the program tends to somewhat depress the average GPA of students from what would be expected from studying their ACT scores in comparison to other programs in the department of Biological Sciences. However, we do not see this as an indicator of a weakness in the program, but as a strength in the program. Rigorous courses produce students that are qualified to enter the very challenging biotechnology industry immediately after graduation.

6) Enrollment-Gender and Ethnicity

Enrollment by Gender						
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Average
Male	17	18	15	17	16	17
Female	20	16	26	32	28	24
% Female	54%	47%	63%	65%	64%	59%

We have observed an upward trend with respect to the number of female students enrolled in the biotechnology program over the past five years. In fact, a look at the 2010 biotechnology APR shows that this trend actually began in earnest in 2009. This is a trend that has appeared in biology departments across the country, along with the biotechnology industry as a whole.

Enrollment by Ethnicity						
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Average
Black	0	0	0	0	0	0
Hispanic	0	0	1	1	1	1
Native	0	0	0	0	0	0
Asian	1	2	2	5	3	2
White	34	26	35	40	36	34
Hawaiian	0	0	0	0	0	0
Multi	0	0	1	1	2	1
Foreign	1	4	1	2	2	2
% White	94%	81%	88%	83%	82%	86%

The majority of students enrolled in the biotechnology program are white. These trends mirror those of Ferris State and the STEM fields as a whole.

Enrollment by Full Time or Part Time Status						
	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Average
Full Time	32	29	35	42	41	36
Part Time	5	5	6	7	3	5
% Full Time	86%	85%	85%	86%	93%	87%

Because of the rigorous nature of the program, very few students are enrolled as part-time students. Of students that do enroll part-time, the majority will be first and second-year students, students finishing their internship requirements, or students finishing courses required for a dual major.

7) Retention

Second Year Retention Data by Semester Student Entered Ferris State						
	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Average
% Retention	63%	100%	67%	83%	100%	83%
Number of Students	8	2	3	6	5	5

Second year retention data looks quite good for the biotechnology program, which is a testament to diligent advising and the determination of most students to remain biotechnology students once they have entered the program. However, over-analysis of these data should be cautioned, as the reader should note the drastic swings in retention values from year to year and the incredibly low sample size associated with this data set.

Student retention has been a focus of Ferris State, the College of Arts and Sciences, and the biology department for several years now. The addition of professional advisors that advise all first year biotechnology students has been a great aid to the retention numbers. The increasing number of SLA sections for first and second year courses has also greatly increased student success and retention.

8) Program Graduates

Number of Graduates Per Year						
	2010-11	2011-12	2012-13	2013-14	2014-15	Average
Graduates	8	4	5	10	6	7

The number of biotechnology program graduates has remained fairly consistent over the past five years. A comparison of this table to the headcount data table shown above infers that approximately three students in every third year cohort will not complete the biotechnology program. Most of these students transfer after the second semester of their third year, which is the first semester in which they are fully tested with incredibly rigorous classes. Careful advising is an important aspect of the biotechnology program and delicately advising students that another program might best fit their skill set is an uncomfortable but important part of being an academic advisor. The overwhelming majority of these students remain at Ferris State and complete a B.S. Biology degree.

9) Six Year Graduation Rate

Six Year Graduation Data by Semester Student Entered Ferris State			
	Fall 2005	Fall 2006	Fall 2007
Six Year Graduation %	20%	70%	80%
Number of Students	5	7	5

The limited six-year graduation data shows a general trend of increasing graduation rates. However, as with the retention data shown above, the small sample size makes a detailed analysis of these data quite problematic. Please read the “program graduates” section above for a more detailed discussion of program graduate data.

10) Graduate Average GPA and ACT

Average GPA and ACT Scores by Year						
	2010-11	2011-12	2012-13	2013-14	2014-15	Average
FSU GPA	3.25	3.22	3.24	3.27	3.04	3.20
ACT	24.00	25.50	23.20	25.14	24.33	24.43

Average GPA values and ACT scores of biotechnology graduates have remained fairly consistent over time and is at an acceptable level. When comparing this table to the enrollment table shown above, it is interesting to note that the average GPA of graduates is a bit higher than the GPA of biotechnology students overall, but the average ACT score of those students that graduate with a biotechnology degree is a bit lower than that of the overall population of biotechnology students.

11) Certification and Licensing Exams

Biotechnology students do not take certification or licensure exams.

Program Value Beyond Productivity and Enrollment Numbers

The biotechnology program brings to the campus community many well-qualified students. Their level of scholarship helps “raise the bar” in the courses they take. Through the research projects carried out by the students and faculty, and through the quality of the courses that are taught, the biotechnology program contributes to academic excellence in the community at large.

To attract quality students, awareness of the biotechnology program is promoted through outreach to community colleges and the annual biotechnology camp for high school students. Through contact with alumni, past internship supervisors, and the external advisory committee, the program strives to maintain a high visibility in the state of Michigan. Industry representatives and visiting scientists present seminars that contribute to student and faculty development. Activities of the biotechnology club (Delta Nu Alpha), not only fosters a sense of identity among biotechnology students, but also contribute to the quality of campus life through service and events.

The biotechnology program contributes to the state and nation through the training of students in an area that has often minimized in the academic community at large: hands-on laboratory experience. Our graduates find employment because of the high demand for this training. Many of graduates, having demonstrated success in laboratory settings have moved into managerial positions and turn to our graduates to fill new positions with their companies.

Program Flexibility and Access

By its very nature as a small, laboratory-intensive program there is very little room for flexibility in the core biotechnology curriculum. Four upper-level lecture courses (BIOL 470, BIOL 472, BIOL 474, and BIOL 475) are offered on an every-other year basis to maximize enrollment, which also greatly limits flexibility. The program also does not offer off-campus, online, or evening/weekend courses because of the limiting nature of the scientific instrumentation requirements of the program.

The key to maximize access and flexibility for biotechnology students is careful advising. It is very important that all biotechnology students understand the every-other year sequence of upper-level courses before they register for third year courses to prevent confusion and delays in missing the offering of one of these courses. Careful advising is also quite important when impressing on students the need to perform as well as possible in these alternate-year offering courses, as they would need to delay graduation two years to wait and repeat the course.

Visibility and Distinctiveness

The biotechnology program at Ferris State is very distinctive. The level and depth of material covered in the biotechnology program is much greater than the biology or biochemistry program here at Ferris or other schools. The core biotechnology lectures are taught at a graduate level, which is at a greater level than similar programs at other four year universities. The biotechnology program at Ferris State was the first B.S.-level program in the state of Michigan. Before starting their Biotechnology program in the 1990's, Lansing Community College consulted with Ferris based on the reputation of our biotechnology program. Grand Valley has a professional M.S. degree in biotechnology that resembles the B.S. degree at Ferris, except with a more detailed research component.

The biotechnology program at Ferris State is currently one of only two bachelor's level biotechnology program in the state of Michigan. The other B.S. biotechnology program is found at Alma College. However, growth in the field has prompted the creation of a number of two-year associates biotechnology programs at other institutions in Michigan, notably Lansing Community College and Henry Ford Community College. Because these biotechnology programs are contextually quite different from ours at Ferris (Alma is a private liberal arts college, the community colleges only offer associates degrees), we see little competition with these institutions with respect to student recruitment. However, the biotechnology program at Ferris is very similar to many molecular and cellular biology programs at a variety of nearby institutions: Grand Valley, Calvin College, Hope College. In addition, many of the high-achieving students that find the idea of a rigorous science-based program (such as biotechnology) appealing are also the same types of students that are very interested in attending a large research institution such as Michigan State or the University of Michigan. It is these institutions that are our greatest competition when recruiting incoming biotechnology students.

Because of this competition, the efforts of the biotechnology faculty to promote the program, maintain quality classroom and laboratory instruction, operate summer camps for high school students, and to work with the external advisory committee and alumni to keep the program familiar to employers and prospective students is imperative to the success of the program. When recruiting against either large research universities or small liberal arts colleges, the biotechnology faculty tout the small class sizes and excellent student: faculty ratio at

Ferris State that is offered at a state school price. We also highlight the fact that at Ferris, you will never be taught by teaching assistants as you will be at large research institutions.

With the competition increasing for high caliber students, even more effort should be made to recruit and guide our biotechnology students. For several years, the program has been a member of MichBio, a statewide organization of biotechnology related entities, including biotechnology companies and large universities. The association with MichBio presents the program with useful networking contacts within the local biotechnology community. It would also be a great advantage to the biotechnology program if Ferris State would more frequently perform program-level marketing, rather than only marketing the university or specific colleges as a whole.

Demand

Students enroll in the biotechnology program at Ferris State because they wish to pursue a rigorous, lab-based research career in the molecular biosciences. Even though the biotechnology program is quite rigorous, students are still quite glad they chose the biotechnology program upon graduation. Data obtained from the graduating student surveys shows that students feel very prepared with respect to their laboratory skill training (N=37, 4.54 on a 5-point scale where 5 = very satisfied) and they were intellectually challenged in the program (N=37, 4.57). Similar data is obtained from the alumni survey, where 82% of alumni were very satisfied with the biotechnology program (N=17) and 76.5% of alumni would recommend the program to prospective students (N=17). Annual discussions with the external advisory board also verify the continued demand for the type of students trained by the biotechnology program.

Demand for students trained as researchers in the biomolecular sciences is projected to remain strong based on predictions by the US Department of Labor (<http://www.bls.gov/ooh/life-physical-and-social-science/biological-technicians.htm>). The ten-year job growth is predicted to be 5%, with an increase in 4100 jobs during this period. Of course, this a nationwide projection and most of our students wish to remain in Michigan following graduation. The Great Lakes states have never been a hotbed of life science jobs compared to regions such as the San Francisco Bay area and New England, but projections show an increase in employment of life science researchers of approximately 9.2% over the next ten years.

Student Achievement

The typical biotechnology student is intelligent, with a good work ethic, a thirst for exploring the modern frontiers of the molecular biosciences, and the ability to work independently. These are also the attributes requested by employers and graduate advisors when looking for employees or graduate students to work in the field of biotechnology. A large number of biotechnology students are also members of the Honors Program. The formal requirement for admission into the core sequence of biotechnology courses is a GPA of 2.7 or higher in the pre-professional sequence of courses. The selective group of students is generally self-motivated, hardworking, and intelligent. They are capable of meeting the challenges of the program and thriving within.

The academic excellence of Biotechnology students has also been recognized by the campus community as a whole, with the acceptance of several important awards. Abigail Solitro was named the outstanding graduate of the Honors program in April 2013. Two of the past five outstanding biology graduate awards have also been awarded to biotechnology students: Jeff Ackroyd (2012) and Abigail Solitro (2013).

The quality of biotechnology students is also apparent in their work outside of the classroom in the laboratory. In the past five years, biotechnology students have assisted with research projects with the following Ferris State faculty:

- Dr. Tracy Boncher – The synthesis and characterization of organic compounds with anti-diabetic activity.
- Dr. Kim Colvert – Expression and characterization of mutagenized bacterial ATPase subunits. Expression, characterization, and enzyme kinetics of recombinant yeast proteins.
- Dr. Scott Herron – Phylogenetic analysis of wild rice cultivars.
- Dr. James Hoerter – The effect of ultraviolet radiation on skin cell growth and repair in zebrafish.
- Dr. Bradley Isler – The association between anophthalmia and genetic polymorphism in rats.
- Dr. Anne Spain – Isolation, classification, and motility characterization of soil bacteria.
- Dr. Chris Westerkamp – Mechanisms of muscle physiology in rats. Anatomical and physiological adaptations to anophthalmia in rats.
- Dr. Changqi Zhu – Molecular mechanisms of aging in fruit flies.
- Dr. Beth Zimmer – The control of respiratory mechanisms in rodents. The relationship between spinal injury and memory in rodents.

As mentioned previously, all students in the biotechnology program are also required to perform an internship before graduation. Some of the students have fulfilled their internship requirement by working with the Ferris State faculty listed above. However, students are encouraged to seek off-campus internships to facilitate networking and skill development. The program coordinator has placed special emphasis on helping students obtain off-campus internships and the number of these placements has increased in the past five years. Students have performed off-campus internships in the following locations:

- Albert Einstein School of Medicine
- Cayman Chemical
- Eastern Virginia University
- Enzo Life Sciences
- Forensic Fluids, Inc.
- Henry Ford Hospital
- MD Anderson Cancer Center
- Michigan State Police Forensic DNA Laboratory
- Michigan State University
- Pioneer Hi-Bred
- Sarasota Florida Mosquito Management
- Wayne State University
- Washington State University

- United States Department of Agriculture
- The University of Minnesota
- Zoetis

Approximately 75% of the biotechnology students are a member of Delta Nu Alpha-Biotechnology, which is an RSO for students interested in a career in the research sciences. This RSO has been awarded four-star status 3 times in the past 5 years. Most biotechnology students (even those that are not part of Delta Nu Alpha) belong to more than one RSO, with many of them taking leadership roles in those RSO's to which they belong.

Employability of Graduates

1) Employment Post-Graduation

Graduate employability data comes from two primary sources: the university's annual graduate follow up survey and the alumni survey administered as part of the APR process.

Annual Graduate Follow Up Survey Data			
	Number Responded	Placement Rate	Average Salary
2010-11	1	100%	N/A
2011-12	0	N/A	N/A
2012-13	1	0%	N/A
2013-14	5	60%	\$31,500
2014-15	1	100%	N/A

Response rates for the annual graduate follow up survey are quite poor, with only eight graduates responding over a span of five years:

A much richer source of graduate employability data comes from the alumni survey that was administered as part of the APR process. An alumni survey was sent to 37 alumni that graduated with a biotechnology degree in the past 5 years. Seventeen alumni completed and returned the survey, for a response rate of 46%. The low response rate of this survey was primarily due to the constantly changing nature of contact information for alumni. The following survey questions were helpful with respect to addressing the employability of our students:

- *Currently, I am...* Of the 17 responses, 2 alumni are currently attending graduate school full time, 13 are currently employed in a position related to their major, 1 is working in a field unrelated to their major but is looking for a related position, and one is transitioning from a full time job to a graduate program associated with their major.
- *Who is your employer?*
 - Biosolutions LLC
 - Dow Chemical/Kelly Services
 - Eurofins Lancaster Labs

- Finished Basement Company
 - Kalamazoo Valley Community College
 - Mercy Health Saint Mary's Hospital
 - MPI Research
 - Oxford Genetics
 - Pfizer/Aerotek
 - Pinnacle Foods- Vlastic
 - The University of Pennsylvania
 - University of Michigan, Pharmacology Dept
 - Van Andel Research Institute
 - Virtue Cider
- *How long did it take to find a job after receiving your terminal degree?* There were a variety of answers for this question. Five alumni started their job/graduate program immediately following graduation, 6 alumni required between 1-3 months, 1 alumnus required 8 months, and 1 alumnus is still looking for a job related to their degree.
 - *What was your starting annual salary?* Of the 17 responses, 9 earned less than \$30,000 in their first position, 7 earned between \$30,000 and \$40,000, and one earned between \$40,000 and \$45,000.
 - *What type(s) of graduate program(s) have you attended or are you currently attending?* Of the 7 respondents that are attending or have attended graduate school, 5 pursued a master's degree and 2 pursued a PhD program.
 - *What are the name of the graduate school(s)?*
 - MD Anderson Cancer Center/ UT Houston
 - Michigan State University
 - University of Tennessee Health Science Center
 - Van Andel Research Institute
 - Washington State University
 - Western Michigan University

2) Alumni perceptions of the employability of graduates

Alumni perceptions of the employability of graduates are best discussed by looking at the results of the alumni survey:

Question #14: Please indicate your level of satisfaction with your background in the following areas when compared to other B.S. entry-level lab personnel or graduate/professional students.

	Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
Biology	11	5	0	0
Chemistry	8	8	0	0
Mathematics	2	11	3	0
Preparation for Laboratory Work	16	14	2	0
Problem Solving and Critical Thinking Skills	3	14	0	0
Computer and Database Usage	2	8	6	0
Scientific and Technical Writing	1	1	5	9
Oral and Interpersonal Communication	7	10	0	0

The overall level of alumni satisfaction in these critical areas for employment is high. The only significant area of concern is in “scientific and technical writing”. This has also been identified as an area of concern by the biotechnology faculty and has been included as an improvement goal for the next review cycle.

Question #15d: My satisfaction with the ability of my degree in biotechnology to help me achieve my career goals is:

	Frequency	Percent
Somewhat Satisfied	7	41.2
Very Satisfied	10	58.8

Alumni are overall quite satisfied with the ability of the biotechnology degree to help them achieve their career goals.

3) External advisory board perceptions of the employability of graduates

During external advisory board meetings, much discussion focuses on ways to maximize the employability of our graduates. Overall, the external advisory board is pleased with the preparation our students receive during their time in the biotechnology program. Concerns of the external advisory board mirror that of the concerns of the alumni in the area of scientific and technical writing.

Faculty Composition and Engagement

1) General Composition

The following are a listing of all faculty who teach core biotechnology courses:

Name	Date of Entry into Program	Current Rank
Kim Colvert, Ph.D.	1992	Professor
Mr. Frank Hartley	1995	Administrative Associate
Bradley Isler, Ph.D	2005	Professor
Mr. Richard Marble	2009	Director, Animal Care Facility
Roger Mitchell, Ph.D.	1996	Professor
Changqi Zhu, Ph.D.	2010	Professor

Curriculum vita and resumes for all biotechnology faculty are found in Appendix F.

The biotechnology program makes primary use of faculty within the biology and physical sciences departments. The biotechnology faculty include the program coordinator Dr. Bradley Isler (Biology), Dr. Kim Colvert (Physical Sciences), Mr. Frank Hartley (Biology), Mr. Richard Marble (Biology), Dr. Roger Mitchell (Biology), and Dr. Changqi Zhu (Biology). These faculty, along with the department chair of the biology department (Dr. Joe Lipar) and head of the physical sciences (Dr. David Frank) departments are also members of the internal biotechnology advisory board. All biotechnology faculty teach at least one core biotechnology course, along with other non-biotechnology courses.

The following table identifies which faculty member teaches each core biotechnology course.

Core Biotechnology Courses			
<u>Third Year</u>			
Fall			
BIOL 375	Principles of Genetics	3 cr.	Isler, Various Faculty
CHEM 332	Biochemistry Lab 1	2 cr.	Colvert
CHEM 364	Biochemistry	4 cr.	Various Faculty
Spring			
BIOL 386	Microbiology and Immunology	5 cr.	Ryan
CHEM 333	Biochemistry Lab 2	2 cr.	Colvert
BIOL 474	Advanced Cell & Molecular Biology*	3 cr.	Zhu
BIOL 475	Bioinformatics*	3 cr.	Isler
<u>Fourth Year</u>			
Fall			
BIOL 476	Advanced Techniques in Biotechnology	2 cr.	Hartley, Marble

BIOL 473	Proteins Laboratory	3 cr.	Colvert
BIOL 472	Proteins*	3 cr.	<i>Unfilled</i>
Spring			
CHEM 474	Advanced Biochemistry	3 cr.	Colvert
BIOL 471	Recombinant DNA Laboratory	3 cr.	Mitchell
BIOL 470	Molecular Genetics*	4 cr.	Isler
*These courses are offered every other year. Depending on their year of entry into the core sequence, students may take these courses in reverse order from what is listed here.			

2) Service

All tenured biotechnology faculty are members of various departmental, college, and universities committees. Isler and Zhu also serve as the academic advisors for all second, third, and fourth year biotechnology students.

3) Research

Several tenured biotechnology faculty are involved in independent research activities.

- **Kim Colvert** works in a research lab every summer at the University of Kansas and brings portions of this research back to Ferris to involve a number of undergraduates in independent research projects every academic year.
- **Changqi Zhu** collaborates with a researcher at the University of Minnesota on his fruit fly research and consistently works with 5+ undergraduates in his research laboratory at Ferris.
- **Bradley Isler** usually works with 1-2 students per year on the development of genomics-based lab exercises that can be incorporated into the annual summer biotechnology camp for high school students.

Several faculty have also been the recipient of either Ferris Foundation or Faculty Research funds to support their research activities.

4) Non tenure-track and adjunct faculty

In general, faculty must have a Bachelor's degree in the Biological Sciences to teach laboratories for the department. If faculty have a Master's degree, they can teach lectures, although this is generally limited to non-majors classes. In general, assignment to a majors-class lecture requires a Ph.D. and this is typically limited to faculty hired on 1 or 2 year contracts, rather than 1 semester contracts. Only tenured and tenure-track faculty teach core biotechnology lectures and the majority of core laboratories. Biology 476 (Advanced Techniques in Biotechnology) is the only core biotechnology laboratory not taught by tenured or tenure-track faculty, due to the extensive expertise of Mr. Frank Hartley (immunology and cell culture) and Mr. Richard Marble (animal care and handling).

5) Alumni perceptions of the quality and composition of faculty

Alumni perceptions of the faculty and faculty advising are best discussed by looking at the results of the alumni survey:

Question #15a: My satisfaction with the level of expertise of the biotechnology program faculty in their professional area is:

	Frequency	Percent
Somewhat Satisfied	3	17.6
Very Satisfied	14	82.4

Overall alumni satisfaction with the expertise of the biotechnology faculty is quite high, with all respondents being satisfied with faculty.

Question #15b: My satisfaction with the academic advising I received while in the biotechnology program is:

	Frequency	Percent
Very Dissatisfied	1	5.9
Somewhat Dissatisfied	1	5.9
Very Satisfied	15	88.2

While the majority (88%) of the alumni respondents were very satisfied with academic advising, there was a surprising minority that were not pleased with their advising. This was the most surprising result of any of the survey data, as careful advising is something that the biotechnology prides itself upon.

6) Graduating seniors' perceptions of the quality and composition of faculty

Graduating seniors' perceptions of the faculty and faculty advising are best discussed by looking at the results of the graduating seniors survey. Data obtained from these surveys shows that students feel that their advisor was very helpful in planning their course selections and completing their degree (N=37, 4.57) and their advisor was also very helpful in providing advice about their future career (N=37, 4.41).

7) External advisory board perceptions of the quality and composition of faculty

The external advisory board is very complimentary of the biotechnology faculty and are pleased with both their quality and composition.

8) Hiring and Retention

The biotechnology program has not recruited a new tenure track faculty member in the past five years. However, when recruiting new biotechnology faculty members, the overall philosophy of the department of biological sciences is followed and the recruiting methods used depend on the type of position. Tenure track faculty are recruited through national searches in which the position is advertised in the Chronicle of Higher Education, Higherjobs.com and often a discipline-specific site, such as the Society for Developmental Biology. The search committee evaluates candidates based on credentials and performance during phone and on-campus interviews. Recruitment of adjunct faculty is somewhat similar to a tenure-line search for 1 year positions.

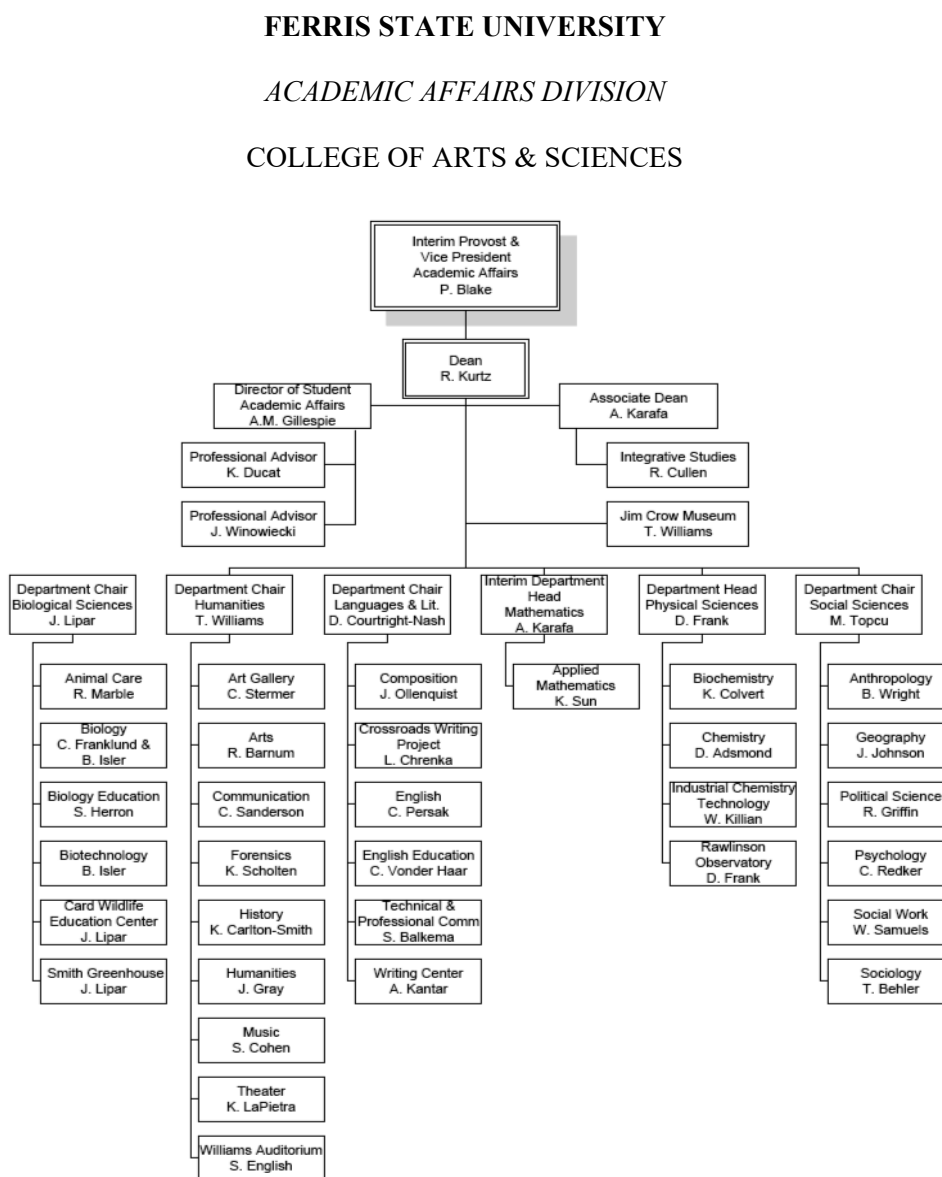
The credentials required for new faculty depend on the type of position. For a tenure line faculty position, candidates must have a Ph.D. in the biological sciences with a degree and/or research background in the discipline we are recruiting for (microbiology, physiology, genetics, ecology, etc). Teaching experience is preferred, but not

always required. A one-year position would have similar credentials of a tenure-track position, but the expectations for teaching are lessened.

Faculty and staff in the department have been very active in the interview-and post-interview period to help assist in the recruitment of new faculty. We do what we can to link first-choice candidates to the information resources they need to evaluate Ferris State and the Big Rapids area.

Program Administration and Support

The organizational chart of the College of Arts and Sciences indicates the position of the biotechnology program in the academic hierarchy of Ferris (note that this chart is several years old):



The College of Arts and Sciences moved from a Department Head to a Department Chair model for the 2014/2015 academic year. At that time Dr. Lipar moved from an Interim Department Head model (3 years) to a position as Department Chair. Because chairs are now required to teach (0.25 FTE), some duties must be delegated to other members of the department, including the Program Coordinators. This process of delegation is ongoing. An evaluation of the effectiveness of a Chair model really cannot occur until more time has passed.

In reality, the Department Chair model is not much different than the previous Department Head Model for our department, except for the delegation of some duties. We have a history in our department of having open communication channels between the department leadership and the faculty/staff. Faculty are often asked for input, and they generally feel free to provide feedback and ask questions about departmental issues.

Dr. Isler serves as the biotechnology program coordinator and receives 0.25 release time for serving in this position.

Administrative Positions with Program Oversight			
Name	Title	Highest Degree Earned	Experience in Position
Dr. Bradley Isler	Program Coordinator	Ph.D.	11 years
Dr. Joseph Lipar	Department Chair	Ph.D.	5 years
Dr. Kristi Haik	Dean	Ph.D.	2 months

In the past, the Dean of the College of Arts and Sciences holds regular meetings with the department leadership in the college both as a group and one-on-one. This allows for the regular exchange of information. In addition, department leadership is always welcome to approach the Dean's office at any time when necessary. No changes to the current structure are required at this time.

Staff Positions within the Department of Biological Sciences	
Name	Title
Patricia Bunce	Department Secretary
Richard Marble	Animal Care Facility Coordinator
Frank Hartley	Laboratory Coordinator
Lisa French	Laboratory Coordinator
Jessica Parker	Assistant Laboratory Coordinator (Part-Time)
Andrea Lodholtz	Greenhouse Manager (Part-Time)

All staff members within the department perform their duties efficiently and effectively. The current structure allows for all work to be completed in a timely fashion.

No changes to the structure are needed at this time.

Support Services

In general, services are well-provided to our program by units from across campus. In general, there have been no major concerns or complaints regarding our interactions with those units. Some units in particular, as listed below, provide particularly important services for us.

Tutoring Center. We work closely with the Tutoring Center every semester to provide specialized tutors for some of our courses and to provide SLA instructors for some of our courses that are more difficult for the students.

Institutional Research and Testing. Our faculty regularly take their multiple-choice exams over to this office to have them graded and evaluated. In addition, this office helps us in the administration of the Biology Field Exams to our graduating seniors.

Educational Counseling and Disabilities. Our department works regularly with this office when we have students with disabilities or who are looking for advice on potential career pathways. Their office is invited to one of our departmental meetings each year so they can provide an overview of the services they provide.

Career Services. Students frequently seek out the advice of career services when preparing resumes for internship applications or job opportunities.

Facilities and Equipment

1) Instructional Environment

The facilities and equipment supporting the program have been sufficient for the needs for the program, but many high use (and high cost) items are reaching the end of their life span. The major concern is the ongoing need for repair and replacement budget for such equipment. This need became especially acute in February 2016, when a frozen water pipe and resulting flood led to the destruction of several large (and expensive) pieces of equipment. We were quite pleased to receive full support from college administration to replace ruined equipment, but we know this is never a guarantee.

Currently, equipment needs are being met as budgets allow. Both the Biology and Physical Sciences departments have improved instrumentation and equipment for courses that support the program by targeting funds specifically for use in the biotechnology labs. Administration has been helpful in one-time funding, including a reconditioned DNA analyzer, a digital gel imager, a Nanodrop spectrophotometer, and a qPCR thermal cycler. However, we will always be in a battle to keep our current equipment working, while still finding funds to purchase new, more modern equipment. The rapid pace of progress in biotechnology leads to the rapid obsolescence of laboratory equipment compared to what is found in external labs. We will never be able to continually purchase the latest, greatest equipment (nor do we expect to), and in fact that is one of the primary reasons for the internship component of the biotechnology program.

The recent opening of the Shimadzu Core Research facility has made a new set of incredibly advanced and versatile instruments available to the program. Biotechnology program faculty are quite excited to integrate these new instruments into the biotechnology program curriculum.

The biotechnology has several areas dedicated specifically to the biotechnology program:

- Core biotechnology laboratories are located in Science 337 (biotechnology lab), Science 338 (instrument room), Science 201A (tissue culture laboratory), and Science 234 (Isler/Mitchell research lab).
- The biotechnology program also has access to a dedicated cold room on the third floor of the Science building.

The biotechnology program also shares several areas with other programs:

- Some teaching laboratory space is shared with both the biology and physical science departments.
- Lecture rooms are shared with other biology programs.
- The Ferris State animal care facility is also utilized for some biotechnology courses and biotechnology research
 - PHR 314F: (rabbit room)
 - PHR314M: (rat room)
 - PHR 314C: (surgery/lab)
 - SCI animal care room
- Several research labs are also used by biotechnology faculty and students for independent study and internship projects
 - SCI 234 (Drs. Mitchell and Isler)
 - SCI 338 (Dr. Colvert)
 - SCI 229 (Drs. Murnik and Zhu)

Laboratory Equipment List	
Item	Quantity
Temperature Control	
Incubator 4 cu. Ft	2
Hybridization incubator	1
Plant tissue incubator	1
Plant cold storage	1
CO2 incubator	1
Large water bath	1
Small water bath	6
Freezer (-20°C)	3
Refrigerator (4°C)	3
Freezer (-70°C)	1
Sample ID and Preparation	
FTIR spectrometer	2
Atomic absorption spectrometer	1

Gas chromatograph	4
Gas chromatograph detector, UV-vis	1
Gas chromatograph detector, UV	2
Gas chromatograph detector, Ion	1
Gas chromatograph detector, refractometer	1
Gas chromatograph detector, fluorescence	1
HPLC w UV fluorescence, detection, photodiode array detection gradient	2
Electrophoresis	
2-D isoelectric focusing system	1
Large horizontal gel apparatus	3
Medium horizontal gel apparatus	3
Small horizontal gel apparatus	15
Sequencing gel apparatus	1
Immuno-electrophoresis apparatus	1
Tube gel electrophoresis apparatus	1
Western blot chambers	4
Large vertical gel electrophoresis apparatus	4
Small vertical gel electrophoresis apparatus	8
High volt power supply	2
Small power supplies	6
Balances	
Large capacity balance	1
Medium capacity balance	1
Analytical balance	1
Centrifuges	
Microcentrifuges	5
Sorvall prep centrifuge	1
Ultracentrifuge	1
Clinical centrifuge	2
Other	
Orbital shaker	2
Transilluminator	1
Inverted scope	2
Biohazard (vertical) laminar flow tissue culture hood	2
Horizontal laminar flow (plant) tissue culture hood	2
Cary Spectrophotometers	4
Ice maker	2

MillQ watermaker	1
Pipette aids	12
Small light box	1
Large light box	1
pH meters	2
Stir/hot plates	6
Vortex mixers	4
Blender	1
Peristaltic pumps	2
Microwave	1
Homogenization motor	1
Gel dryer	1
Fraction collector	4
Autoclave	2
Hybridization bag sealer	2
Evaporating centrifuge	1
ELISA plate reader	1
ELISA plate washer	1
PCR thermal cycler	4
ABI 310 DNA Analyzer	1
UVP Digital Gel Imager	1
ABI StepOne Plus qPCR Thermal Cycler	1
Thermo Nanodrop Spectrophotometer	1

2) Instructional Computer Access and Availability

In addition to the computers that are found in the offices of the program faculty and staff, additional computing resources can be found in the biotechnology laboratory (Sci 337) and instrument room (Sci 338). Computers are also available in most of the faculty research labs for students participating in independent research projects.

Perception of Overall Quality

1) Graduating students

All graduating biotechnology students are administered an exit survey in their final semester in the program (Appendix H). Selected portions of this survey have been discussed in earlier sections of this report, but a full look at the survey data gives us a useful perspective on the opinions of students as they prepare to leave Ferris State.

Graduating Student Survey Data				
	N	Average*	Low*	High*
The biotechnology program provided a solid foundation of knowledge in the following areas such that I am competitive for entry into graduate school, professional school, or the workforce:				
Genetics and molecular genetics	37	4.49	3	5
Biochemistry	37	4.19	2	5
Cell biology	37	3.62	1	5
My coursework has allowed me to develop a proficiency in laboratory techniques.	37	4.54	4	5
My coursework developed my ability to formulate hypotheses, make careful observations, analyze data, and draw conclusions.	37	4.30	3	5
My coursework developed my ability to evaluate, analyze, and synthesize information from scientific literature and exhibit critical thinking skills.	37	4.43	3	5
My coursework was intellectually challenging.	37	4.78	3	5
My advisor was helpful in planning my course selections and completing my degree.	37	4.57	1	5
My advisor was helpful with respect to providing advice about my career.	37	4.41	1	5

* Scoring was performed on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

From the survey data, it appears that graduating students are pleased with the preparation they received from the biotechnology program. The only exception to the exceptionally high scores observed in the survey was for the question “*The biotechnology program provided a solid foundation of knowledge in the following areas such that I am competitive for entry into graduate school, professional school, or the workforce: cell biology*”, where the average score was 3.62. This is an interesting result but not completely unexpected, as the entire biology department has recently recognized a curricular need for more cell biology in all biology programs (including biotechnology). Departmental discussions are underway on ways to incorporate more cell biology into these programs. However, even with this recognition, it is important to note that biotechnology students still score in the 80th or greater percentile in the cell biology subscore area on the Biology Field Exam (see **Assessment of**

Student Learning).

2) Alumni

Previous sections of this report have discussed the portions of the alumni survey (Appendix I) that best illustrate the opinions of biotechnology alumni regarding the quality of the program (see **Employability of Graduates** and **Faculty Composition and Engagement**), so little time will be spent reviewing this data here. However, there is one additional open-response question from the alumni survey that I believe is a good summary of the opinions of the alumni:

Question #17: What do you see as the strengths of the Biotechnology program?

- Advanced techniques in biotechnology as it gave real world applications.
- Bradley Isler is one of the best professors/advisors ever! Experience in both biology and chemistry.
- Course work at higher levels was very challenging and was excellent preparation for graduate coursework and research. Many courses were actually more difficult than those I have taken as part of my graduate coursework.
- Critical thinking skills Hands on lab experience
- Hands on lab work and use of techniques. Exploring non automated and automated techniques in the field. Depth of learning covered in the curriculum of molecular biology.
- How much it encompasses. There are many methods taught and machinery used that is crucial to development and far beyond what some schools can afford.
- I see the main strength of the Biotech program as it's staff. The professors and advisors were extremely knowledgeable in their fields and had the desire and ability to help the students learn and grow.
- In my experiences as a lab technician working with several students and professionals from diverse backgrounds, I can proudly say that the biotech program at Ferris is among the best in preparing students for working hands on in the lab. I have worked with undergrads and grad students from U of M, MSU, Purdue, Oberlin, John's Hopkins, and others. while these are all great programs none of them have the practical, and hands on lab technique training that can even compare to the experience I already had by the time I graduated Ferris.
- Small class size so you get hands on lab experience.
- Small class size, which can translate into more time spent with the instructor, though this is not always the case. Lab courses. There was a lot of at-the-bench training. However, the equipment & resources are dated.
- The amount of hands on lab work. Every student leaving the program should have great experience in buffer preparation, agar plate prep, and basic lab notebook SOP.
- The in-lab experience that students receive in the biotechnology program is unlike any other program. Most graduate programs expect that students 'have hands' and are able to synthesize their scientific knowledge into experiments, but the majority of students are actually lacking in this area. This places students from our program miles ahead of others; they are able to begin meaningful experiments much sooner in their program. In addition, the expertise of the faculty in our program is a huge benefit to the students. Students need to be exposed to scientific literature and current topics as soon as possible, and this has always been a priority to our faculty.

- The student to professor ratio allows for more personalized learning. All of the laboratory experience was helpful as well.

These responses are indicative of the efforts biotechnology faculty take in maintaining quality, hands-on training for our students.

3) Biology department faculty

A survey was administered to all biology faculty (tenured, tenure-track, and adjunct), seeking their opinions of the biotechnology program (Appendix J). Unfortunately, the response rate for this survey was quite low with only 6 of 26 faculty (23%) responding. Data from some of the most relevant questions are reviewed in the following table.

Biology Faculty Survey Data				
	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
The biotechnology program trains students in technical and management skills needed for a successful career in the biomolecular laboratory sciences.	6	0	0	0
The biotechnology program offers sufficient opportunity for students to develop critical thinking and problem solving skills.	5	1	0	0
The biotechnology program offers sufficient opportunity for students to develop good written communication skills.	3	3	0	0
The biotechnology program offers sufficient opportunity for students to develop good oral communication skills.	4	2	0	0
The biotechnology program offers sufficient opportunity for students to master the foundations of biochemistry, molecular biology, cell biology & molecular genetics in the classroom & lab	5	1	0	0
The biotechnology curriculum challenges students academically.	6	0	0	0
The biotechnology curriculum is relevant to the career goals of students.	6	0	0	0
The biotechnology program responds to the needs of the biotechnology and life sciences industries	5	1	0	0

Even with the low response rates of the survey, it is apparent that faculty in the biology department are pleased with the biotechnology program and its ability to prepare graduates for a career in the biomolecular sciences. Note the split responses for the question “*The biotechnology program offers sufficient opportunity for students to develop good written communication skills*”, as written communication skills have been identified by the

department as an area of improvement needed by all students that graduate from biology programs or concentrations.

4) External advisory board

The external advisory board is currently composed of the following members:

- Jeff Ackroyd, MD Anderson Cancer Institute
- Lauren Clements, Neogen
- James Gilles, Zoetis
- Chase Judy, MPI Research
- Abigail Solitro, Van Andel Research Institute

A formal survey was not administered to the external advisory board, but each annual advisory board meeting is recorded for future reference. From multiple years of advisory board meetings here are some recurring items:

- **Excellent technical skills and academic preparation.** All board members stated that our biotechnology students are generally better prepared from a technical and academic standpoint than students from other schools in the state of Michigan, including major universities such as the University of Michigan and Michigan State.
- **Flexibility of curriculum and co-op opportunities.** Several committee members have discussed their negative opinion of standard 12 week summer internship programs. With the advent of more complex molecular techniques, 12 weeks is just not enough time to sufficiently train an intern. An increasing number of companies are moving towards 6 month co-op programs that allow both the student and company to receive maximum benefit from the experience. The committee members stated their preference for these co-op programs and suggested that the biotechnology program investigate ways to make the curriculum more flexible to allow students to more seamlessly integrate a co-op into their course sequence.
- **Previous research experience before internship.** Ideally, internship supervisors would like interns to have as much experience as possible before beginning their internship. In the past, a high GPA and experience from standard laboratory courses were sufficient for a prospective intern to remain competitive for internship selection. However, it is becoming increasingly crucial that students receive not only experience in standard laboratory courses, but also in some sort of independent study/research project prior to applying for internships. Several committee members stated that while biotechnology students are very well prepared from a laboratory course perspective, most do not have the formal research lab experience that is needed for prospective interns. They suggested that the biotechnology faculty and Ferris State investigate ways to increase student research opportunities to give students this added experience.
- **Interviewing skills.** For those committee members that have also served as internship supervisors, an overall theme was that many of our biotechnology students need to work on their interviewing skills. Again, all stated that our students are very well prepared from a technical perspective. However, many do not have the interviewing skills to present this excellent technical knowledge to employers. They suggested that we either add an interviewing course to the biotechnology curriculum or require students to consult with the career services office before interviewing.

5) Department Chair

The department chair's perceptions will be provided in a forthcoming letter.

6) Dean

The Dean's perceptions will be provided in a forthcoming letter.

7) Program Coordinator

I would give the program a score of 89, which equates to a nice solid B+. I feel that the biotechnology program is very strong and continues to train well-prepared junior laboratory scientists. However, I believe that administrators and (especially) biotechnology faculty need to work together to find a way to modernize and streamline the curriculum so that it will best fit the needs of our graduates as they enter a rapidly changing workforce.

Implementation of Findings

The biotechnology program is as strong as it has been in its recent history. Enrollment is consistent and our alumni find jobs or graduate/professional positions soon after graduation. However, the biotechnology program is currently in a transitional period. The retirement of a long-time faculty member has shuffled teaching responsibilities and led to instructional changes that have overall been very positive, but different from what was the standard for many years. The program is also at a point where it needs to reinvigorate the curriculum to fit the changing nature of the biotechnology industry, primarily with the need for more student training on advanced scientific instrumentation. We are fortunate to have new resources available for our use (new ideas from junior faculty, new instrumentation) that can make this reinvigoration possible, but only if we do not limit ourselves via the phrase "But that's the way we have always done it!". Those who fail to recognize history are indeed doomed to repeat it, but this does not mean that progress should stand still while contemplating historical ideals. The data collected for this APR review and its results will serve as more evidence that can be supplied to both internal (faculty and administrators) and external (alumni and employers) stakeholders to wisely help us guide our journey over the next six years.

Appendix A: Biology Department Strategic Plan

Department Planning Alignment Template

Department: Biological Sciences

Date: Feb 3, 2009

Department Statement of Purpose/Mission:

The Department of Biological Sciences provides excellent teaching, quality advising, and exposure to relevant experiences, setting a solid foundation of knowledge and skills that will allow students to become productive citizens and pursue successful careers.

Strategic Planning Goals

#	Goal
1	Centralize and improve advising of Biology majors within the Department
2	Improve BS Biology curriculum
3	Revise procedures for selecting biology award recipients
4	Increase learning opportunities for students outside of class
5	Enhance Department Recruitment Activities
6	Strengthen assessment activities in the Department
7	
8	
9	
10	

Strategic Planning Goal 1:

Department Goal	Desired Outcome	Strategic Plan Alignment	Start Date	End Date	Collaborators
1. Centralize and improve advising of Biology majors within the Department	Advising in the department is restructured to provide proactive, accurate, and consistent advising to students in Biology programs	Goal 5, Init 5	11/07	cont	Department faculty University College Honors Program CAS Dean's office
Action Steps for the Goal	Contributing Steps, Evidence, or Status				
1. Redefine faculty advising roles	1a. Proposal developed and approved by CAS 1b. Feedback gathered and incorporated into proposal		11/07 12/07	1/08 3/08	Depart coords, Dept faculty. Dept. Head CAS Dean, Assoc Dean, counselor, admissions officer, department heads Univ College Dean
2. Enroll new Biology majors into Biology FSUS 100 and HRRS 100 seminar classes	2a. Schedule 5 sections of FSUS 100 for new FTIAC Biology majors that work with block schedules 2b. Reserve 1 section of HNRS 100 for Biology FTIACS 2c. Enroll students in restricted sections		1/08 1/08 6/08	2/08 2/08 8/08	FSUS coordinator and Dept Head HNRS Program director and Dept Head CAS counselor, Summer reg counselors, Dept Head
3. Hire and train Biology advisor	3a. Seek approval for new temporary position 3b. Conduct search for advisor 3c. Train new Biology advisor		2/08 7/08 8/08	7/08 8/08 cont	CAS Dean, VPAA, President Dept faculty Faculty advisors, Department Head, CAS counselor, Registrar,
4. Consolidate and edit advising materials to improve consistency and ease of advising	4a. Revised check sheets that include information from multipage advising handout and function like audit sheet 4b. Edit check sheets based on faculty input		2/08 4/08	3/08 cont	Biology coordinator, Dept Head, CAS counselor Department faculty, Biology advisor, Dept Head
5. Improve consistency in advising across the department	Discuss advising structure/process with Faculty advisors via Dept meetings and email		4/08	cont	Department faculty, Biology advisor, Dept Head, Dept Secretary

Strategic Planning Goal 1:

6. Assess advising in the Department	6a. Survey student perceptions in FSUS 100 Pre/post and Biology/Prepharm	9/08	Cont	Biology advisor
	6b. Survey student perceptions in BIOL 375, 460	10/08	cont	Dept faculty
	6c. Seek input from faculty advisors and Biology advisor			

Strategic Planning Goal 2:

Department Goal	Desired Outcome	Strategic Plan Alignment	Start Date	End Date	Collaborators
2. Improve BS Biology curriculum	Program requirements are more clearly defined, and better reflect the mission of the Department	Goal 1, Init 5	7/06	Fall 2009	Department faculty And curriculum committee
Action Steps for the Goal	Contributing Steps, Evidence, or Status				
1. Evaluation of BS Biology curriculum	Identify problems in present program requirements and advising materials		7/06	8/08	Department faculty advisors, coordinators CAS counselor Students, alumni
2. Meet with faculty to discuss curriculum problems and possible solutions	2a. Curriculum discussed in department meetings 2b. Department comes to consensus as to changes required		4/08	4/08, 8/08 9/08	Department faculty Biology coordinator Biology Advisor Department Head
3. Produce revised check sheets for each program concentration area that incorporate the proposed changes and seek input	Check sheets clearly articulate program requirements to students, even without interpretation by advisor		9/08	11/08	Department Head, Biology Coordinator, lead advisors and Concentration heads
4. Prepare curriculum proposals that clearly articulate changes desired by faculty	4a. Feedback proposals improved based on faculty feedback 4b. Curriculum proposals are approved by Department, CAS, and University Curriculum committees		8/08 11/08	11/08 Cont.	Depart faculty Curriculum committees
5. Educate advisors on revised program requirements	Advisors disseminate information on program requirements to their advisees		8/09	Cont	Department faculty Biology advisor
6. Assess revised BS Biology curriculum	Data gathered from stakeholders on the quality of the program is used to plan future improvements		9/09	Cont	Department faculty advisors, coordinators CAS counselor Students, alumni

Department Goal	Desired Outcome	Strategic Plan Alignment	Start Date	End Date	Collaborators
3. Revise procedures for selecting biology award recipients	Develop process that allows increased student and faculty participation.	1.2 2.6	SP08	Cont.	Department faculty CAS Deans office CAS gift officer
Action Steps for the Goal	Contributing Steps, Evidence, or Status				
1. Form an ad hoc committee of Department faculty	1a. Faculty asked to volunteer, coordinators asked to participate 1b. Committee established : Joe Lipar, Brad Isler, Gary Rodabaugh, Mike Ryan, John Vanderploeg, Dept Head		4/ 08	Aug 08	Department faculty Department Head
2. Establish application procedure for student awards and scholarships	Draft application forms discussed /revised at committee meetings Oct 17 08, Nov 7 08, and Dec 4 08		10/08	12/ 08	Awards committee members
3. Establish a time-line for selection	Set deadlines for application submission, student selection, and dissemination of awards.		10/08	12/ 08	Awards committee members
4. Establish awards ceremony for recipients	4a. Committee discussion of possible methods 4b. Committee selects year-end even with speaker and awards ceremony 4c. Event planned, budget developed		10/08	11/ 08 11/08 Conts	Awards committee members
5. Seek input from Department	5a. Send department update that includes application form, and planned process 5b. Collect and discuss feedback		12/ 08	12/ 08	Department faculty
6. Advertise award process to students	6a. Keep application forms in Department office 6b. Use targeted email message to Biology students 6c. Ask faculty to pass out applications to qualified students 6d. Post application form on University website		1/09	Cont	Department faculty Gayle Driggers (CAS Dean's office)

Funding Request Template

Department:

Date:

Action Steps Prioritized for Funding	4. Establish awards ceremony for recipients			
Alignment	1.2 2.6			
Projected total cost				
Cost covered internal to the unit and means of funding				
Additional funds requested				
Initial date of fund request				
Duration of fund request				
If an established project, College, Divisional, or University funds already spent on project				
Additional funds requested beyond initial request				

A no more than half page rationale for each request for funding.

Department Goal	Desired Outcome	Strategic Plan Alignment	Start Date	End Date	Collaborators
4. Increase learning opportunities for students outside of class	Students become more engaged in the Department and better prepared to pursue successful careers.	1.3 5.5	SP09	Cont	Department Faculty
Action Steps for the Goal	Contributing Steps, Evidence, or Status				
1. Start a Department lecture series	1a. Identify faculty interested in organizing events 1b. Develop budget 1c. Plan events for Fall 09-SP10		SP09	Cont	Department Faculty
2. Encourage student participation in research	2a. Encourage students to attend lectures (speakers) 2b. Advertise research opportunities within the department 2c. Advertise student research grants (CAS Dean's office)		SP09	Cont	Department Faculty
3. Start a competitive student travel award	3a. Identify funds for the award (\$1000??) 3b. Develop selection process (awards committee?) 3c. Advertise availability of award		SP09	Cont	Planning committee Awards Committee Department Faculty
4. Expand Department awards ceremony into a scientific meeting that includes research presentations	4a. Require students that do an independent study to do a presentation (poster or oral) 4b. Require students with internship credit to do a presentation. 4c. Student that conduct research may use BIOL 485 /492/497 in place of 460 if they present at the meeting		Fall 09	Cont	Department Faculty Curriculum committee Awards Committee
5. Develop guidelines for earning credit for internships and independent studies	5a. Develop general guidelines and approval process 5b. Incorporate presentation at year-end meeting		F09	Cont	Curriculum committee Awards committee
6. Increase awareness of student organizations	6a. Compile list student organizations and contact info and make it available in the office and website 6b. Work with Biology advisor to disseminate information of student organizations		Sum 09	Cont	Biology advisor Department faculty Students

Department Goal	Desired Outcome	Strategic Plan Alignment	Start Date	End Date	Collaborators
5. Enhance Department Recruitment Activities	Students interested in Ferris get a more accurate representation of the opportunities available in the Department through a variety of channels.	3.2	Sum08	Cont	Dept. Faculty Marketing? Angie Mishler CAS Dean's office
Action Steps for the Goal	Contributing Steps, Evidence, or Status				
1. Website revision	1a. Develop and approve plan Include access to information on student groups and careers Improved faculty Bios 1b. Get Faculty Bios /Arrange to take Current Faculty Photos 1c. Consider group Faculty photo (perhaps at award ceremony?)		Sum08 SP09 SP09	Sp09 Cont. Cont	Cliff Franklund Depart Planning Committee Dept. Faculty Marketing?
2. Development of Brochures	Department /Program –specific brochures produced that may be mailed to prospective students		SP09	Cont	Department Coordinators Lead advisors Concentration heads Angie Mishler CAS Dean's office
3. Send letter/materials to admitted students	3a. Get names addresses of admitted students interested in Biology 3b. Develop Welcome letter to Department (possibly program specific) 3c. Send letters to students 3d. Consider follow up Contact		SP09 SP09 SP09	Cont	Angie Mishler Vicky Taylor

Department Goal	Desired Outcome	Strategic Plan Alignment	Start Date	End Date	Collaborators
6. Strengthen assessment activities in the Department	Information from assessment of student learning is used to improve and Department courses and programs	1.1	Fall 2007	Cont	Department Faculty Department Assessment Coordinator Department Head CAS assessment Committee Advisory board members
Action Steps for the Goal	Contributing Steps, Evidence, or Status				
1. Develop course outcomes and assessment plans	<p>1.1 Course learning outcomes added to all syllabi started Fall 2007</p> <p>1.2 Workshop for Biology faculty with Todd Stanislov on using exams for assessment of student learning</p> <p>1.3 Faculty participate in CAS assessment initiative. (stipend to develop assessment plan for their courses)</p> <p>1.4 Review of course assessment plans</p> <p>1.5 Enter course outcomes and assessment plans into TracDat</p>		<p>SP07</p> <p>Oct 08</p> <p>Fall 07</p> <p>SP 09</p> <p>SP09?</p>	<p>Cont</p> <p>Oct 08</p> <p>Cont</p> <p>Cont</p>	<p>Department Faculty Assessment coordinator CAS Dean Todd Stanislov</p>
2. Develop/revise program outcomes and assessment plan	<p>2.1 Program outcomes (BA/BS Biology) revised by Department faculty, and accepted</p> <p>2.2 Program outcomes (BA/BS Biology) reviewed by CAS assessment Committee</p> <p>2.3 Program outcomes (BA/BS Biology) reviewed by Faculty Center Director Todd Stanislov</p> <p>2.4 Biotechnology outcomes/ assessment program developed</p> <p>2.5 Enter Program outcomes and assessment plans into TracDat</p>		<p>July 08</p> <p>Sept 08</p> <p>Sept 08</p> <p>Jan 09</p> <p>Dec 08</p>	<p>Sept 08</p> <p>Sept 08</p> <p>Sept 08</p> <p>Cont</p> <p>Feb 09</p>	<p>Department Faculty Assessment coordinator CAS Assessment Committee Todd Stanislov Biotech Advisory Board</p>

3. Map our curriculum against program outcomes	<p>3.1 Attend Curriculum mapping webinar for TracDat</p> <p>3.2. Work with Department Faculty to map curriculum</p> <p>3.3 Attend session with TracDat consultant Paul DeSanto</p> <p>3.4 Enter Curriculum Map into TracDat</p>	<p>Jan 09</p> <p>Jan 09</p> <p>Feb 09</p> <p>Mar 09</p>	<p>Jan 09</p> <p>Mar 09</p> <p>Feb 09</p> <p>Mar 09</p>	<p>Department Faculty Assessment coordinator</p> <p>CAS Assessment Committee Todd Stanislov</p> <p>Biotech Advisory Board</p>
4. Use Assessment data for continuous improvement	<p>4.1. Collect and analyze assessment data</p> <p>4.2 Discuss review assessment with related stakeholders (for programs)</p> <p>4.3 Make warranted changes</p>	<p>SP09</p>	<p>Cont</p>	<p>Department Faculty Assessment coordinator</p> <p>CAS Assessment Committee Advisory board members</p>

Funding Request Template

Department:

Date:

Action Steps Prioritized for Funding				
Alignment				
Projected total cost				
Cost covered internal to the unit and means of funding				
Additional funds requested				
Initial date of fund request				
Duration of fund request				
If an established project, College, Divisional, or University funds already spent on project				
Additional funds requested beyond initial request				

A no more than half page rationale for each request for funding.

Appendix B: Current Biotechnology Checksheets

BACHELOR OF SCIENCE IN BIOTECHNOLOGY

FERRIS STATE UNIVERSITY

Program Coordinator: Dr. Bradley Isler

PHONE: (231) 591-2641 OFFICE: ASC 2113 E-MAIL: BradleyIsler@ferris.edu

Admission requirements: First year student admission is open to high school graduates (or equivalent) who demonstrate appropriate academic preparedness, maturity and seriousness of purpose. High school courses and grade point average, ACT composite score, and ACT Mathematics and Reading sub scores will be considered in the admission and course placement process. Transfer students must have at least 12 credits at the time of application with a minimum 2.0 overall GPA including an English and mathematics course or they will be considered as first year students.

Admission to the Junior Year Professional Sequence is competitive

Graduation Requirements

1. 2.0 Cumulative Grade Average in all courses. No grade lower than a C- in science and math courses allowed for graduation
2. Minimum 121 Credits including general education requirements
3. Residency Requirements: 30 minimum FSU semester credits
4. Minimum 40 credits numbered 300 or higher

Number of 300+ Credits: _____

Program requirements for students entering Biotechnology Fall Semester 2014

REQUIRED	COURSE TITLE – FOR PREREQUISITES NOT INDICATED, SEE FSU CATALOG COURSE DESCRIPTIONS		FSU S.H.	GRADE
Major – 91 credit minimum - No grade lower than a C- allowed for graduation.				
BIOL	121	General Biology 1 (CHEM 121 concurrent)	4	
BIOL	122	General Biology 2 (BIOL 121& CHEM 121)	4	
BIOL OR	205	Human Anatomy/Physiology (CHEM 114 or CHEM 121)	5	
BIOL	321	Human Physiology and Anatomy 1 (BIOL 122 and CHEM 122)	4	
BIOL	322	Human Physiology and Anatomy 2 (BIOL 321)	4	
BIOL	375	Principles of Genetics (F, Sp) (BIOL 122)	3	
BIOL	386	Microbiology and Immunology (Sp, Su) (BIOL 322 & CHEM 214 or 321)	5	
BIOL	470	Molecular Genetics (Sp Even) (BIOL 375 and CHEM 364)	4	
BIOL	471	Recombinant DNA Lab (Sp) (BIOL 375 and CHEM 333)	3	
BIOL	472	Proteins (F Odd) (BIOL 122 and CHEM 322)	3	
BIOL	473	Proteins Laboratory (F) (CHEM 333)	3	
BIOL	474	Advanced Cell & Molecular Biology (Sp Odd) (BIOL 375 and CHEM 364)	3	
BIOL	475	Bioinformatics (Sp) (BIOL 375)	3	
BIOL	476	Advanced Techniques in Biotechnology (F) (BIOL 386 and CHEM 333)	2	
CHEM	121	General Chemistry 1 (MATH 115 and prior CHEM)	5	
CHEM	122	General Chemistry 2 (CHEM 121)	5	
CHEM	231	Quantitative Analysis (F) (CHEM 122)	4	
CHEM	321	Organic Chemistry 1 (CHEM 122)	5	
CHEM	322	Organic Chemistry 2 (CHEM 321)	5	
CHEM	332	Biochemistry Lab 1 (F) (CHEM 322, Corequisite = CHEM 364)	2	
CHEM	333	Biochemistry Lab 2 (Sp) (CHEM 332)	2	
CHEM	364	Biochemistry (CHEM 322)	4	
CHEM	474	Advanced Biochemistry (Sp) (CHEM 364, BIOL 375, and CHEM 231 or 451)	3	
MATH	220	Analytical Geometry – Calculus 1 (MATH 130 or by placement)	4	
MATH	251	Statistics for the Life Sciences (MATH 130)	3	
PHYS	211	Introductory Physics 1 (MATH 120)	4	
CHOOSE ONE:				
BIOL	491	Biotechnology Internship (instructor consent)	3	
BIOL	497	Independent Studies in Biology (instructor consent)	3	
CHEM	497	Independent Studies in Chemistry (instructor consent)	3	

GENERAL EDUCATION REQUIREMENTS

Courses which qualify in the Scientific Understanding (Z), Cultural Enrichment (C) and Social Awareness (S) categories are delineated in the General Education section of the FSU electronic catalog:

<http://www.ferris.edu/htmls/academics/gened/courses.html>

I. GENERAL EDUCATION REQUIREMENTS		
A. COMMUNICATION COMPETENCE		12 Sem Credits
Course	Grade	Credit
ENGL 150		3
ENGL 250		3
ENGL 311, 321, 323, or 325		3
COMM 105 or 121		3
TOTAL		
B. SCIENTIFIC UNDERSTANDING		7 Sem Credits
This requirement is satisfied in the program requirements area.		
C. QUANTITATIVE SKILLS		
This requirement is satisfied in the program requirements area.		
D. CULTURAL ENRICHMENT		9 Sem Credits
Only approved "C" courses may count toward this category. Requirements: 1) one course must be 200+ level, 2) maximum 5 credit hours of music and/or theater activities may apply		
Course	Grade	Credit
200+ level		

TOTAL		
E. SOCIAL AWARENESS		9 Sem Credits
Only approved "S" courses may count toward this category. Requirements: 1) two different subject areas including at least one "foundation" course, 2) one 200+ level course		
Course	Grade	Credit
Foundation		
200+ level		
TOTAL		
F. GLOBAL CONSCIOUSNESS		
Each student must complete one course from the list of qualifying courses presented in the FSU catalog. This course may also count toward fulfilling the Cultural Enrichment or Social Awareness requirement.		
Course:		
G. RACE/ETHNICITY/GENDER		
Each student must complete one course from the list of qualifying courses presented in the FSU catalog. This course may also count toward fulfilling the Cultural Enrichment or Social Awareness requirement.		
Course:		

Sample Course Sequence: The following chart depicts one method to begin the course work requirements. In order to complete this program in a four year plan, students must average 15-16 credit hours per semester. Students MUST consult their faculty advisor to develop a course sequence plan appropriate to their academic development and educational plans.

It is strongly recommended that students take electives during the first and second year summer semesters either at Ferris State University or at a community college, as it will lighten their class load during the fall and spring semesters.

<u>First Year</u>				<u>Second Year</u>			
<u>Fall</u>		<u>Spring</u>		<u>Fall</u>		<u>Spring</u>	
BIOL 121	4	BIOL 122	4	BIOL 321	4	BIOL 322	4
CHEM 121	5	CHEM 122	5	CHEM 231	4	CHEM 322	5
ENGL 150	3	MATH 220	4	CHEM 321	5	PHYS 211	4
COMM 105 or 121	<u>3</u>	Cultural Elective	<u>3</u>	Social Elective	<u>3</u>	ENGL 250	<u>3</u>
		15	16			16	16
1) Admission to the third year level is granted on a competitive basis based on GPA and space available. As a Biotechnology student, you must have completed the course prerequisites and have earned an overall GPA of 2.7 or above to be eligible to apply.							
2) Students must take their remaining general education courses during their third and fourth years.							
<u>Third Year</u>				<u>Fourth Year</u>			
<u>Fall</u>		<u>Spring</u>		<u>Fall</u>		<u>Spring</u>	
BIOL 375	3	BIOL 386	5	BIOL 476	2	CHEM 474	3
CHEM 332	2	CHEM 333	2	BIOL 473	3	BIOL 471	3
CHEM 364	4	BIOL 475 (Odd yr)	3	ENGL 311	3	Cultural Elective	3
Cultural Elective	3	BIOL 470 (Even yr)	4	MATH 251	3	BIOL 475 (Odd yr)	3
BIOL 472 (Odd yr)	3	BIOL 474 (Odd yr)	<u>3</u>	BIOL 472 (Odd yr)	3	BIOL 470 (Even yr)	4
Social Elective (Even yr)	<u>3</u>		13-14	Social Elective (Even yr)	<u>3</u>	BIOL 474 (Odd yr)	<u>3</u>
		15				14	13-15
Summer							
Biotechnology Internship 3							

NOTICE REGARDING WITHDRAWAL, RE-ADMISSION AND INTERRUPTION OF STUDIES

Students who return to the university after an interrupted enrollment (not including summer semester) must normally meet the requirements of the curriculum which are in effect at the time of their return, not the requirements which were in effect when they were originally admitted.

Upper Level Biotechnology Checksheet Supplement

If you will take CHEM 332 (Biochemistry Lab 1) in the fall of an odd year you should take this series of biotech classes:

Third Year

<u>Fall</u>		<u>Spring</u>	
BIOL 375	3	BIOL 386	5
CHEM 332	2	CHEM 333	2
CHEM 364	4	BIOL 470	<u>4</u>
BIOL 472	<u>3</u>		11
	12		

Fourth Year

<u>Fall</u>		<u>Spring</u>	
BIOL 476	2	CHEM 474	3
BIOL 473	<u>3</u>	BIOL 471	3
	5	BIOL 474	3
		BIOL 475	<u>3</u>
			12

If you will take CHEM 332 (Biochemistry Lab 1) in the fall of an even year you should take this series of biotech classes:

Third Year

<u>Fall</u>		<u>Spring</u>	
BIOL 375	3	BIOL 386	5
CHEM 332	2	CHEM 333	2
CHEM 364	<u>4</u>	BIOL 474	3
	9	BIOL 475	<u>3</u>
			13

Fourth Year

<u>Fall</u>		<u>Spring</u>	
BIOL 476	2	CHEM 474	3
BIOL 473	3	BIOL 471	3
BIOL 472	<u>3</u>	BIOL 470	<u>4</u>
	8		10

Several of the upper level biotechnology classes are only offered every other year (BIOL 470, 472, 474, and 475). Failure to take any of these courses when they are offered will result in a wait of **two years** to take the course again. It is **VERY** important that you stay on schedule with these courses. Carefully consult with your advisor when entering your third year of biotech classes. **You are ultimately responsible for graduating on time!**

Appendix C: Syllabi for Core Biotechnology Programs

Biology 375

Principles of Genetics

Spring 2016

3 Credits

Instructor Office

Dr. Bradley Isler

ASC 2113

Phone: 591-2641

E-mail: BradleyIsler@ferris.edu

Class Hours

MWF 11:00-11:50 AM

Science 137

Office Hours

MTWR 12-1 PM

Course Description

A comprehensive course in genetics including molecular aspects of gene structure, function, and control in prokaryotes and eukaryotes, transmission genetics and genes in populations. Designed for students in science baccalaureate programs. Prerequisite: BIOL 122.

Course Outcomes and Assessment

Upon completion of the course, a student will be able to:

- **Demonstrate** understanding of factual knowledge about genetics and, using critical thinking skills, be able to apply this knowledge to the study of inheritance patterns, the molecular mechanisms by which genes control cell metabolism, growth, and differentiation, and the evolutionary implications of genes in populations.
- **Analyze** inheritance patterns, probability, linkage relationships, genetic control mechanisms, quantitative genetics, molecular genetics, and gene frequencies and the impacts of population size, random mating, mutation, migration, and selection on gene frequencies.

These outcomes will be assessed using the following measures:

- Comparison of class performance on specific examinations questions.
- Student performance on quizzes and assignments provides timely assessment of mastery of specific concepts.
- Student responses to regular questioning in class indicates student understanding of current concepts and provides the opportunity to immediately revisit concepts, if necessary.

Required Materials

- Genetics: A Conceptual Approach, Fourth Edition, B. A. Pierce, W.H. Freeman and Company, 2011.

Grading

Your final grade will be determined from the total of all points earned on exams, class participation, pop quizzes, and homework assignments.

	<u>Maximum possible points</u>
Exams	450
Homework	175?
Pop quizzes	?

There will be three **exams** during the semester worth 100 points each and a final exam worth 150 points that will contain a mix of “new” and “old” material. Only standard, non-graphing calculators can be used on exams.

Homework assignments will be assigned after many lecture sessions and will serve to reinforce topics covered during lecture.

Pop quizzes will be administered at the beginning of selected lecture sessions and will cover information covered in previous lecture sessions.

Cheating

Cheating on exams, pop quizzes, or homework assignments will result in a zero on associated assignments and failure of the course. Additional action may be taken by the University.

Attendance Policy

Attendance will not be taken in lectures. However, since BIOL 375 is an upper level course, attendance is expected. Besides covering relevant material, lecture sessions will explore how to analyze and solve genetic problems. It will be very difficult to correctly solve genetic problems on exams, quizzes, and assignments if you are absent from lecture.

If you are absent from lecture, it is your responsibility to obtain information that was presented. It is also your responsibility to contact Dr. Isler to obtain any homework assignments you may have missed.

Late homework assignments that are turned in less than 24 hours late will automatically receive a 75% penalty. Homework assignments that are turned in more than 24 hours late will automatically receive a zero.

Students arriving late for class on the days on which pop quizzes are administered will receive a zero for that quiz. No make-up pop quizzes will be given.

Students who have a legitimate reason for missing an exam may use their score on the “old” portion of the final exam to replace the missed exam. Students who are absent on an exam day and do not have a legitimate excuse will receive a zero for that exam. No exceptions are allowed.

Class Participation

Class participation is not mandatory but will be considered when your final grade is determined. A student that is actively involved in a course will always perform at a higher level than a student that spends lecture periods sleeping, chatting with their friends, playing with their cell phone, or not paying attention.

Reading the Text

You should review the assigned sections of the text following lecture for increased understanding of the lecture material. Your text is an important part of this course and was chosen because it is the best available for explanations, reasoning, illustrations, problem solving, and connecting important topics.

Blackboard

Blackboard will be used throughout the course to post lecture notes, grades, articles, and animations. Lecture notes will be posted by chapter following the completion of an entire chapter.

In some cases, lectures will not be presented in class, but will be recorded using Tegrity and posted online. This will give us more time during class periods to work on problems and review important material. It is your responsibility to watch all Tegrity lectures and come prepared to class.

Class Decorum

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Patterns of behavior which obstruct or disrupt the learning environment in the classroom will be dealt with under the College *Disruptive Behavior Policy*. **Cell phones, iPods, and laptop computers must be turned off, and interpersonal conversations cease during the class period.**

Help!

Dr. Isler will be happy to help you during office hours or during any other available time. Please contact Dr. Isler for help or to arrange an appointment.

Biology 375 tutoring sessions will be held every Tuesday and Thursday at 4 PM in Starr 207. Your tutor is Vida Espinosa.

Tutoring is also available at the tutoring center in ASC 1017. Go to <http://www.ferris.edu/HTMLS/colleges/university/ASC/tutor-trac.htm> to arrange a tutoring session.

Grading Scale

93 – 100%	A
90 – 92.9%	A-
87 – 89.9%	B+
83 – 86.9%	B
80 – 82.9%	B-
77 – 79.9%	C+
73 – 76.9%	C
70 – 72.9%	C-
67 – 69.9%	D+
63 – 66.9%	D
60 – 62.9%	D-
< 60%	F

The grading scale may be adjusted depending upon class performance

Tentative Lecture Schedule

Date	Topic	Chapter
Jan 11	Introduction to genetics Chromosomes	1 2
Jan 13	Mitosis and meiosis	2
Jan 15	Mitosis and meiosis	2
Jan 18	NO CLASS	-
Jan 20	Mitosis and meiosis	2
Jan 22	Principles of segregation and independent assortment	3
Jan 25	Principles of segregation and independent assortment Probability and the chi-squared test	3 3
Jan 27	Probability and chi-squared test <i>Sex determination and the sex chromosomes</i> <i>Sex related traits</i>	3 4 4
Jan 29	Probability and the chi-squared test Extensions and modifications of Mendelian principles	3 5
Feb 1	Extensions and modifications of Mendelian principles	5
Feb 3	Extensions and modifications of Mendelian principles	5
Feb 5	Extensions and modifications of Mendelian principles	5
Feb 8	<i>Quantitative genetics</i> Population genetics	24 25
Feb 10	Population genetics	25
Feb 12	Exam 1	-
Feb 15	Population genetics	25
Feb 17	Population genetics	25
Feb 19	<i>Inheritance patterns</i> Pedigree analysis	6 6
Feb 22	Pedigree analysis	6
Feb 24	Pedigree analysis <i>Chromosome variation</i>	6 9
Feb 26	Chromosome variation	9
Feb 29	Chromosome variation	9
Mar 2	Linkage and recombination	7
Mar 4	Exam 2	-
Mar 7-11	NO CLASS	-
Mar 14	Linkage and recombination	7
Mar 16	Eukaryotic gene mapping	7
Mar 18	DNA	10
Mar 21	DNA	10
Mar 23	Chromosome structure	11
Mar 25	NO CLASS	-
Mar 28	Chromosome structure	11
Mar 30	Chromosome structure	11
Apr 1	DNA replication	12
Apr 4	DNA replication	12
Apr 6	DNA replication	12
Apr 8	Transcription	13
Apr 11	Transcription	13
Apr 13	Exam 3	-

Date	Topic	Chapter
Apr 15	Transcription <i>RNA Processing</i>	13 <i>14</i>
Apr 18	Translation	15
Apr 20	Translation	15
Apr 22	Control of gene expression in prokaryotes	16
Apr 25	Control of gene expression in prokaryotes	16
Apr 27	Control of gene expression in prokaryotes	16
Apr 29	Translation	15
Thursday May 5	Final Exam 10:00-11:40 AM Science 137	-

CHEM 364 - Biochemistry

Spring 2016-MF 10-10:50 – Str 235 TR 10-10:50 – Str 233

Instructor: Dr. Yamuna Kollalpitiya, Assistant Professor of Chemistry

Office: ASC 3088 **Email:** KonaraKollalpitiya@ferris.edu **Telephone:** (231) 591-2597

Office Hours: M 11:00-1:00, T 1:00-2:00, R 2:00-2:50, and other times by appointment.

Course Description (Four Credit Hours):

University Catalog: A rigorous course in the chemistry of such biomolecules as amino acids, polypeptides, proteins and enzymes, carbohydrates, lipids and nucleic acids. The structure/function relationships of these biomolecules will be stressed and the biosynthetic and biodegradative pathways discussed. Credit will not be given for both CHEM 324 and CHEM 364. This course meets General Education requirements: Scientific Understanding.

Pre-Requisites: CHEM 322 with a grade of C- or better.

Student Learning Outcome:

Upon completion of this course, a successful student will be able to:

- apply chemistry concepts and skills acquired in previous courses to living systems to reveal the molecular nature of life.
- master new concepts, facts and skills to support analysis and interpretation of biochemical processes.
- relate chemical structures of biomolecules to biological function.
- develop a sufficient background to study more advanced biochemistry topics.

Required material:

Text book: You can use any biochemistry text book published within last five years including the text book previously used in this class "Principles of Biochemistry," Horton, 5th edition, Prentiss Hall.

Sapling Learning: You will need to purchase access to the homework for this class through Sapling Learning. It is available from bookstore or online. Here is a direct link to course site: [Ferris State University – CHEM 364 – Spring16 – KOLLALPITIYA](http://www.ferris.edu/~chem364)

This link provides Instructions on how to enroll: <http://bit.ly/saplinginstructions>. Sapling Learning offers a grace period on payment; for most courses, this is 14 days from the first day of the term. During registration or throughout the term, if you have any technical problems or grading issues, please email support@saplinglearning.com explaining the issue.

A scientific calculator- You will need a calculator for tests. It cannot be a graphing or programmable calculator.

Blackboard:

I highly recommend you to check the blackboard constantly. I post lecture powerpoint slides, study guides, other assignments, homework due dates, and announcements on blackboard.

Attendance:

Attendance at class and examinations is required. Attendance will be noted daily. There is no penalty for being absence. However, you will lose points for in class assignment or group activity. An absence will only be excused with a written reliable note: Severe illness or hospitalization (note from a doctor), jury duty (copy of your court summons), interview (copy of email or letter you have received). Students are responsible for making up missed class assignments. If you plan to attend athletic contest or school sponsored event, notify me two weeks in advance. The University also has a policy and a form for students' absences due to University-sponsored functions. Students must present a copy of the form to instructor prior to leaving.

Homework:

I will assign homework problems from most of the chapters. Each assignment is worth 10 points.

Exams and Grades:

I will post a study guide on blackboard for each exam. Your grade will be based on your performance in several areas. The relative contributions are:

Exams (3x100)	300
Cumulative final exam	100
Homework	100
Case studies/ worksheets/group work/quizzes	200

Your grade will be based on the following scale:

- A range (A & A-) = 90.0% - 100.0%
- B range (B+, B, B-) = 80.0% - 90.0%
- C range (C+, C C-) = 70.0% - 80.0%
- D range (D-, D, D+) = 60.0% - 70.0%
- F = below 60.0%

Special Needs:

Ferris State University is committed to following requirements of the Americans with Disabilities Act Amendments Act and Section 504 of the Rehabilitation Act. If you are a student with disability or think you may have a disability, please contact the disabilities Services office at 231.591.3057 or send an e-mail message to ecds@ferris.edu to discuss your request further. More information can be found online at:

[Http://www.ferris.edu/htmls/colleges/university/disability](http://www.ferris.edu/htmls/colleges/university/disability).

University and College Standards, Procedures, and Policies:

I will not tolerate any kind of academic misconduct in the classroom, and I will follow university standards and procedures in such situations. These policies are designed to support your success in this course and your career.

Code of Student Community Standards, including Disciplinary Procedures:

[http://www.ferris.edu/htmls/administration/StudentAffairs/Studenthandbook/Academic Misconduct](http://www.ferris.edu/htmls/administration/StudentAffairs/Studenthandbook/AcademicMisconduct), including Cheating, Fabrication, Facilitating Academic Dishonesty, Interference, Plagiarism, Violation of Course Rules, and Violation of Professional Standards and Ethics (from the Code of Student Community Standards (see, specifically, <http://www.ferris.edu/HTMLS/administration/studentaffairs/studenthandbook/general/homepage.htm>)

Student Dignity and Harassment Policy (from the Code of Student Community Standards) see, specifically, <http://www.ferris.edu/HTMLS/administration/studentaffairs/studenthandbook/administrative/homepage.htm>)

Student Support Services:

Here are some of the many services available to you.

Ferris State has Academic Support Center and Tutoring:

<http://www.ferris.edu/HTMLS/colleges/university/ASC/>

The Writing Center: <http://www.ferris.edu/HTMLS/statewide/resources/writing.htm>

Personal Counseling Center:

<http://www.ferris.edu/HTMLS/studentlife/PersonalCounseling/index.htm>

Educational and Career Counseling:

<http://www.ferris.edu/HTMLS/colleges/university/eccc/assessment.htm>

Special Note: The instructor reserves the right to modify this syllabus if necessary during the course of the semester. Any such changes will be announced in class and posted in writing on Blackboard.

Tentative Schedule:

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	1/11 Intro	1/12 Intro	1/13	1/14 Water	1/15 Water
2	1/18 MLK Day	1/19 Water	1/20	1/21 A.A.	1/22 Protein
3	1/25 Protein	1/26 Protein	1/27	1/28 Protein	1/29 Protein
4	2/01 Protein	2/02 Enzyme	2/03	2/04 Enzyme	2/05 Enzyme
5	2/08 Enzyme	2/09 Enzyme	2/10	2/11 Exam I	2/12 Sugar
6	2/15 Sugar	2/16 Sugar	2/17	2/18 Sugar	2/19 Lipid
7	2/22 Lipid	2/23 Membrane	2/24	2/25 Membrane	2/26 Membrane
8	2/29 Energy	3/01 Energy	3/02	3/03 Energy	3/04 Exam II
Spring Break	3/7	3/8	3/9	3/10	3/11
9	3/14 Glycolysis	3/15 Glycolysis	3/16	3/17 Gluconeogen.	3/18 P-P Pathway
10	3/21 Gly. Metab.	3/22 Gly. Metab.	3/23	3/24 No classes	3/25 No classes
11	3/28 TCA cycle	3/29 TCA cycle	3/30	3/31 ETC	4/01 ETC
12	4/04 ETC	4/05 ETC	4/06	4/07 Lipid Met.	4/08 Lipid Met.
13	4/11 Lipid Met.	4/12 Lipid Met.	4/13	4/14 Exam III	4/15 Nitrogen, AA
14	4/18 Nitrogen	4/19 Nu. Acid	4/20	4/21 Nu. Acid	4/22 Nu. Acid
15	4/25 Nu. Acid	4/26 Nu. Acid	4/27	4/28 Nu. Acid	4/29 Review
16	5/02	5/03 Final Exam STR 235 10-11:40			

Biochemistry Laboratory 1 CHEM 332 Fall '14

Laboratory theory and techniques of biochemistry are introduced. Experiments focus on the application of photometry, chromatography, electrophoresis and activity assays to the isolation and analysis of biomolecules such as amino acids, proteins, enzymes and nucleic acids.

Requires: CHEM 322

Instructor: Dr. Kim K. Colvert
colvertk@ferris.edu
Ext. 5851

ASC 3098 Office Hours: MTF 9-9:50 R 1-1:50
(other times by appoint.)

Textbook: No text is required but you will use the internet quite a bit. Supplemental materials will be provided.

Supplies: Gridded notebook with perforated carbon sheets, approved safety goggles, metric straight edge, graph paper (no larger than 10 divisions/in.), calculator (suggest a scientific).

Learning Outcomes: The successful student will

- use basic biochemical techniques and equipment
- work neatly and efficiently in lab with respect for others
- use a lab notebook to keep accurate and useful records of laboratory activities
- prepare clear and concise reports of activities that
 - explain the theories of techniques and concepts encountered
 - describe the experimental process
 - use theories to explain experimental results, account for deviations, summarize and propose alternate or future experimentation

Grading: Grades will be based on as many experiments as we complete, written as described in the following pages. Over the course of the term you must keep a notebook that documents everything you do. The carbon copies will be collected each lab period to ensure real-time documentation and are worth 40 pts each. They will be graded for adherence to the guidelines provided. Remember, keeping the notebook is a real time exercise. No extra time is provided at the end to "catch up". The finished notebook section and the report portion will be due the second lab period after completion of the experiment. If the experiment was completed in one session it will be worth 60 pts. If it covers more than one period it will be worth 70 pts per day. There will be a final exam during the last laboratory period and clean-up will take place during the final exam period.

Cheating : In a word, don't. See <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/academic-dishonesty.htm>. Penalty for a first offense will be a zero for that assignment. A second offense will result in failure of the course. The introduction to your report will be closely scrutinized for plagiarism. Use your own words and organization.

Absences/Make up Labs: There will be no make-up labs. Absence from lecture will not be counted against you but will be to your disadvantage. Absence from a lab which requires more than one lab period will result in a proportionate deduction. For example, if a lab requires 2 lab periods and you miss one you may obtain the data from your partner but 20% will automatically be deducted from the completed report. If you miss a lab that only requires one period an excused absence might be negotiated if the reasons are fully documented

(<http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/absence-policy.htm>).

Missing three labs for any reason will result in failure of the course. **Late assignments WILL NOT BE ACCEPTED!!!!**

Tentative Lab Schedule

Aug. 28/29 Introduction Lecture, Lab Tour, Safety

Sept 4/5 Writing and Research, Library Assignment

11/12 Buffers

18/19 Spectrophotometry

25/26 Centrifugation

Oct. 2/3, 9/10, 16/17 Chromatography

23/24, 30/31 Electrophoresis

Nov. 6/7, 13/14 Enzyme kinetics

20/21 Computer Lab

27/28 Thanksgiving Dec. 5/6 Final Exam

Lab Clean-Up during Finals Week (according to schedule)

The Laboratory Notebook

A nice place to start...

<http://www.ruf.rice.edu/~bioslabs/tools/notebook/notebook.html>

Writing in the laboratory generally takes two forms... the notebook and the report (or a paper for publication). Their purposes are quite different. The laboratory notebook, whether in hardcopy or, as is becoming more common, in electronic format, represents a detailed chronological record of the work done. It must include references for information, the source of materials, the exact procedure and the resulting data for a specific experiment. The notebook content must present a precise, legible record of what was done, why, and by whom. It should also describe the outcome of the experiment and how this is related to the objective and/or hypothesis for the exercise. A laboratory notebook should allow someone who has never performed the experiment to understand and exactly reproduce the experiment. In the "real world" it is also the legal record that can prove primacy in patent applications, provide evidence of regulation adherence and so on, thus must be scrupulously maintained. Formats vary widely and the specifics will depend on the class or company protocols but there are some general rules.

In the Beginning

- Purchase a bound notebook with carbonless copy pages (either white and blue or white and yellow are usual, the pages should be numbered).
- On the outside cover of the notebook write your name and course number (contact info in case of loss can be helpful).
- WRITE IN INK AND ONLY INK!
- There is usually a section in the front for a Table of Contents.
- Never remove pages from the notebook.

To Prepare for Lab

- Read the experiment .
- Start each new experiment on a new page.
- Date the page.
- Give a descriptive title for each experiment.
- Formulate and enter an objective for the day's work that concisely and grammatically summarizes what you expect to accomplish.

- Formulate and enter a hypothesis (if possible...may not be appropriate for all experiments in this class)
- Make a materials list and check for hazards... comment on any special features of the materials to be used - perhaps they require special storage or handling, or there may be several varieties of the compound available (hydrates or anhydrous, maybe). Such factors are very important and must be recorded.
- Write out a summary of the procedure; you will follow this as you do the lab. Your goal is to need only the notebook to perform the experiment. This means that you must include all specifics of concentration, formulas of chemicals to use and so on. If you record your procedure on every other line you can correct or add details that account for actual activities.
- Use simple, direct statements or a bulleted or numbered list of instructions.
- Use preparation tables when appropriate to minimize prose.
- Do calculations for grams and moles of the various reagents, if necessary.
- Prepare data tables, if appropriate, to be filled in as you do the lab. Tables must be written in vertical columns, each column being headed with the quantity and the appropriate units

Tip: Some people use the back of the page for in-lab calculations and for taking notes in pre-lab. **REMEMBER!!:** Put enough information in your lab notebook BEFORE lab so that you can do the entire experiment using your notebook only!

During lab make note of the actual procedure you use. If you had calculated that you needed 5.0 g of a reagent and you actually weighed out 5.1 g, write that down.

- You need not use complete sentences in the notebook. You are creating a record of information that you will use in writing the lab report.
- Record actual weights, volumes, etc.

Data and Observations:

- record as you go along, in the notebook, in ink, immediately.
- do not trust to memory, even for a minute or so - someone talks to you, and that data's forgotten. You need to keep the overall experimental plan in mind.
- do not use odd scraps of paper or the edge of your lab coat to record data
- the data must be recorded as completely as is possible. Don't worry too much about interpreting the data as you go along, and don't worry if some of the observations appear boring.
- use good penmanship. Take care with numbers - **never write-over**, always cross out erroneous material with a single line and re-write the correct data.

- Sketch any important info such as equipment set up or observations easier drawn than described. Drawings need only illustrate novel apparatus and be large enough to label.
- Be sure to record and **properly label** all measurements and observations. If you generate paper from an instrument you must paste that data into your notebook with appropriate identifiers.
- Don't be afraid to use lots of pages.
- Try to write so that someone could repeat your work five years from now using the information in your lab notebook alone.

At the End of Lab

- Before leaving lab each day sign and date your work, turning in the copies.
- This portion of the notebook is worth 40 pts.

After Lab

- Do any follow-up calculations and record those, being sure to label and use units! The calculation section should include any mathematical formulas used to handle the data to obtain results. Define the formula, state the formula then show a set-up using actual experimental data. Repetitive use of the same formula using different data is unnecessary. **One sample will do in this section.** If more than one number is generated by the same calculation usually these numbers are presented in graphical or tabular form in the results section. The proper use of standard mathematical manipulations and symbols is expected.
- Look up any missing information such as literature, etc.
- Analyze the data, creating tables and graphs as needed in the notebook with proper axes and labels.
- Summarize and record your understanding of the results

This portion of the notebook is for completeness. It will form the basis for your Results and Discussion of an abbreviated report. It is worth $\frac{1}{2}$ of the remaining points (for example: one day experiment-in class 40 pts, out of class notebook 30 pts, abbreviated report 30 pts)

Abbreviated Report-Results and Discussion

Normally a report or paper includes a title, abstract, introduction, materials and methods, results and discussion sections. We will concentrate on producing high quality Results and Discussion sections to accompany the lab notebook. This section will be due with copies of the completed notebook two weeks after the completion of the experimental work.

Results: The results of the experiment should be presented in a clear and concise form. Each type of data or manipulated data should be presented, whether in tables, graphs or **smoothly integrated prose**. For instance, suppose that you are asked in the analysis section to plot the

absorbance of a solution as a function of time. You would make the graph, label it appropriately with a figure number and then discuss what the graph shows and to a limited extent; what trend or principle it illustrates. You would use a phrase like

"As can be seen in Figure 6 the rate of the reaction exhibited a maximum at pH 7.2".

Discussion: The discussion should include a comparison of the expected results (from text or literature or lecture) with your experimental results, whether favorable or unfavorable, and an explanation. This is where you prove you understood the principles enumerated in the introduction and relate them to the actual observations you have made. For example, if your results were as above the discussion might include a statement like

"The optimum pH for the activity of the enzyme suggests that at least two amino acids are being titrated as the pH is changed. Protonation of one would be favored coupled with deprotonation of a second."

General statements of conclusions go in this section. It is expected that the last statements of the report are a kind of summary and may include speculations on what might have improved the experiment or what further experiments might be done.

Literature cited: Any references you used for literature values or other information should be listed in any accepted style. I suggest the numbering method. When you cite literature follow it with a sequential number that refers to your list of references.

Example: *The molecular weight of hemoglobin is 64 kD (1).* The (1) indicates the information came from reference numbered 1 in your list.

<http://www.libraries.psu.edu/content/dam/psul/up/pams/documents/QuickGuideACS.pdf>

General directions for writing the report.

- Prepare your reports on a computer. You should have access to a versatile graphing program and a word processing program that can handle chemical symbols and integrate tables. I will often require that a graph be prepared by hand—check before assuming you can use a graphing program.
- the writing should be well constructed, concise and scientific,
- all experimental work is to be reported thoroughly and accurately,
- the report should not have to be reread to 'figure out' what the writer means,
- the report, written in the passive mode, should be free of mechanical errors

- When it is not appropriate to use computer-generated graphs they should be done on standard graph paper with 20 squares to the inch. They must conform to the following format:
 - *margins free of any writing*
 - *a suitable and descriptive title*
 - *x-axis (independent variable) label and units*
 - *y-axis (dependent variable) label and units*
 - *both axes conveniently and correctly scaled*
 - *data points plotted clearly and precisely (consider circles, squares, etc. around point to be sure they are separated from lines and don't forget a legend if necessary)*
 - *smooth curves or straight lines drawn when appropriate.*
 - *one idea per graph (may be more than one line, however)*
 - *neat and pleasing appearance*

Note: Even computer generated graphs must follow the format

Biochemistry Laboratory CHEM 333

Biochemistry laboratory techniques and theory are continued. Experiments will include the isolation of sub-cellular systems such as chloroplasts, mitochondria and microsomes. The metabolic properties of these systems, including chemiosmotic coupling, electron transport and substrate preference will be examined. This course meets General Education requirements: Scientific Understanding, Lab.

Requires: CHEM 332 and CHEM 364

Instructor: Dr. Kim K. Colvert **Office:** ASC 3098

Hours: MWF 11-11:50 T 1-1:50 (or by appt.)

Textbook: Supplemental material will be provided.

Learning Outcomes: The successful student will

- apply basic biochemical techniques and equipment to more complex systems
- work neatly and efficiently in lab with respect for others
- use a lab notebook to keep accurate and useful records of laboratory activities
- use theories to explain experimental observations in appropriate scientific language and format

Supplies: Gridded notebook with perforated carbon sheets, goggles, metric straight edge, graph paper (no larger than 10 divisions/in.), scientific calculator.

Grading: Grades will be based on Notebook work and lab reports as described below.

Absences/Make up Labs: There will be no make-up labs. Absence from lecture will not be counted against you but will be to your disadvantage. If you miss connect up with a classmate! Absence from a lab which requires more than one lab period will result in a proportionate deduction. For example, if a lab requires 2 lab periods and you miss one you may obtain the data from your partner but you will lose any notebook value and 40% of the report. If the absence can be verified as an excused absence (Dean's definition) you are still responsible for the report but will not be held accountable for the notebook work and can receive full value. If you have an excused absence for a lab that only requires one period your final grade will be adjusted for the missing report. Missing three labs for any reason will result in failure of the course.

The Notebook

There must be a Table of Contents at the beginning. Start each lab day with a date and title. List in the table of contents. Begin with a statement of the day's OBJECTIVE (not whole lab if multiple). This is very important and should be based on your understanding of the task for the day (remember the lecture!). It will help you in writing your introduction in the report.

Ex. In order to determine the melting temperature of calf thymus DNA changes in viscosity and absorbance at 260 nm with respect to temperature will be investigated. Results will be interpreted in light of viscosity and hyperchromic effect theories and compared to literature values.

It is also a good idea to identify HAZARDS.

Then proceed to record **all activities**. The PROCEDURE can use well-labeled tables when appropriate, record solution concentrations. Include drawings of specialized equipment. Make sure everything is clear by using titles. Do necessary CALCULATIONS neatly. Record all DATA. If data is instrument-generated label well and make a copy to be pasted into the notebook and one for the report. **Be detailed and thorough**. If a subsequent experiment uses an identical procedure the first may be referenced by notebook page number. If the procedure differs then it must be clearly explained how it differs. Remember, errors must be lined through, not scribbled out. If your handwriting is bad, improve it. At some point in the semester I will ask you to submit some portion of your notebook. Your ENTIRE notebook grade will be based on this “pop” submission.

The Lab Report

Title the report. In the INTRODUCTION start with a context for the total experiment, essentially a re-working of all of the objective statements. This is where you demonstrate your understanding of THE BIG PICTURE. Be sure it is clear in this section what the lab(s) was/were designed to demonstrate. This requires that you identify the theories and concepts. You must choose how detailed this is. Avoid explaining the simplistic but be sure that any theory you intend to use to explain your results in the discussion section is at least generally acknowledged...save exact details for the discussion section. Set the stage for your results.

PROCEDURE: Third person, passive, past tense is required. Tables are encouraged if properly labeled. If your notebook was done well this should be easy to convert to the proper style.

RAW DATA: Within the body of the report identify in a list all the data you will include in an Appendix (properly labeled)

CALCULATIONS: Within the body of the report identify in a list all the calculations you will include in another Appendix (properly labeled and showing formula and one example)

Present and describe the RESULTS. Each result must be reported whether in graph or table or not. Sometimes all you do is report a value as the result of a process and there is nothing else to say. Sometimes you will have to identify a trend in a graph or table. Save the explanation for the

DISCUSSION: here it is all about elaborating on the theory that allows your interpretation. Tables and Figures presented in the RESULTS must be properly identified when explaining what the information means. This is how you prove you understood the experiment so be thorough. Each individual piece of information contributes to a total picture so make the connections clearly.

CONCLUSION: There should be a final paragraph summing up the experiment—focus on the theory and less on how easy or difficult it was to perform.

References **must** be incorporated into the report and tied to the BIBLIOGRAPHY at the end.
APPENDICES: These always include Raw Data and Calculations but there may be others (extensive protocols, images, etc.)

Each report will be worth 100 points for the first day + 30 points for each additional day. (Ex. if a report covers three lab periods it will be worth 160 pts). The random notebook check will be worth 100 pts.

Potential Labs (not necessarily in order)

Sweet Potato Enzymology

Photosynthetic Pigments

Photosynthesis Assays

Mitochondrial Electron Transport

Recombinant protein isolation (?)

GENERAL MICROBIOLOGY AND IMMUNOLOGY

BIOL 386 (5 CR: 4+1)

SPRING 2015

**PREREQUISITES: BIOL 232 AND BIOCHEMISTRY/
CONCURRENT BIOCHEMISTRY
OR INSTRUCTOR PERMISSION**

COURSE SYLLABUS

<u>DATE:</u>	<u>TOPIC:</u>	<u>REFERENCE:</u>
1. TUE 1/13	Introduction and History	Brock ch.: 1,2
2. THU 1/15	Prokaryotic & Eukaryotic Cells	B ch. 3,20
3. TUE 1/20	Bacterial Structure & Function	B. ch: 3
4. THU 1/22	Bacterial Structure & Function	B. ch: 3
5. TUE 1/27	Bacterial Growth/ Sporulation/ Taxonomy	B. ch: 5,
6. THU 1/29	Viral Structure & Replication	B. ch.: 9
7. TUE 2/3	Viral Structure & Replication	B. ch.: 9
8. THU 2/5	Fungal Structure & Taxonomy	B. ch.:20
9. TUE 2/10	EXAM I	
10. THU 2/12	Microbial Metabolism	B. ch. 13, 14
11. TUE 2/17	Microbial Metabolism	B. ch. 13, 14
12. THU 2/19	Microbial Genetics	B. ch.: 10, 11, 12
13. TUE 2/24	Microbial Genetics	B. ch.: 10, 11, 12
14. THU 2/26	Micro Control: Antimicrobial/Disinfectants	B. ch.: 15, 26
15. TUE 3/3	EXAM II	
16. THU 3/5	Mech. of Microbial Pathogenesis	S. ch. 8.9.10,31
TUE 3/10	SPRING BREAK	
THU 3/12	SPRING BREAK	
17. TUE 3/17	Respiratory Tract/ Oral cavity	S. ch. 13,19,21,23,57,58,59
18. THU 3/19	CNS/Skin and Mucosal Membrane Infect.	S..ch.: 36,39,58,48, 61
19. TUE 3/24	GI Tract Infections/ Intoxications	S. ch. 16,17,22,32,37,42,73
20. THU 3/26	Wound Infections	S. ch.: 11,15,20,35
21. TUE 3/31	STD	S. ch.:14,24,27,66
22. THU 4/2	Spring Recess	

22.	TUE 4/7	Immune System Innate Immunity, Phagocytosis	Kuby ch.: 1,2, 3,4,5,6,18,
23.	THU 4/9	EXAM III	
24.	THU 4/14	Humoral Immunity Complement/ Acute Inflammation	K. ch.: 4-6,7,11,13
25.	TUE 4/16	Cellular Immunity	K. ch.: 8,9,10,12,13,14,20,21
27.	TUE 4/21	Chronic Inflammation	K Appendix: A1,A27
28.	THU 4/23	EXAM IV	
29.	TUE 4/28	Hypersensitivity / Autoimmunity	K. ch. :15
30	THU 4/30	Hypersensitivity / Immune Based Disease	K. ch.: 16,17
	TUE 5/5	FINAL EXAM (4 - 5:40 PM)	



SUGGESTED

- TEXTS:** 1) **Brock: Biology of Microorganisms**, 13TH Edition, 2011 or more recent edition by Madigan et al., Benjamin Cummings. (N.B.: Working glossary at the end of each chapter and G1-G17 at the back of the text.)
 2) **Schaechter's Mechanisms of Microbial Disease**, 4th Edition, 2007 or a more recent edition, by Engleberg et.al, Lippincott Williams and Wilkins)
 3) **Kuby Immunology**, 6th EDITION, 2007 or a more recent edition, by Kindt, Goldsby, Osborne (Glossary/Chapter Question & Answers

EXAMS: There will be 4 scheduled exams plus a comprehensive final. Each of these exams are worth 100 points and **will be individually curved**, if necessary, to 75%. **In addition laboratory will be worth 100 points for a total of 600 points** for the course. Exam format may include multiple choice, matching, essay, and problem solving case studies. **Make up exams**, for valid and documented absences, are essay in format and are graded without a curve.

SCALE: 100-93 = A, 92-90 = A-, 89-87 = B+, 86-83 = B, 82-80 = B-, 79-77= C+, 76-73 = C, 72-70 = C-, 69-67 = D+, 66-63 = D, 62-60 = D, 59- = F

ATTENDANCE: You are **EXPECTED** to attend every lecture and to explain any absence.

INSTRUCTOR: M. Ryan, Ph.D., ASC2115, Voice mail: 231-591-5892. FAX: 231-591-2540, Email: ryanm@ferris.edu
 Office hours: MTWR 3-4 PM and by appointment. If I am not available, please leave a message via voice mail or e-mail.

LEARNING OBJECTIVES:

- To learn how professionals in microbiology use the scientific method to gain new knowledge and to modify/eliminate existing paradigms.
- 2) To learn collaborative skills by working in groups for some assignments.
 - 3) To learn how to apply certain course material to develop problem solving and critical thinking skills in microbiology.
 - 4) To learn the language/terminology of microbiology.
 - 5) To learn the fundamental principles of microbial structure and function, microbial metabolism, microbial growth and reproduction, microbial genetics, and the use of antimicrobial drugs.
 - 6) To learn the principles, mechanisms, and theories of microbial pathogenicity in humans.
 - 7) To learn the structure, function, and control of the immune system and the mechanisms of hypersensitivity.

1)

LECTURE LEARNING OUTCOMES :

<u>GOAL</u>	<u>CLASSROOM ACTIVITY</u>	<u>MEASUREABLE OUTCOME/ASSESSMENT</u>
1. The student will learn the scientific method as it applies to medical microbiology – BIOL 386	Instruction in the Koch's Postulates which have been used historically and contemporarily to establish the microbial etiology of diseases	Student will demonstrate knowledge of the Koch's Postulates. Assessed by examination questions.
2. The student will learn problem solving/critical thinking skills as they apply to medical microbiology – BIOL 386	Instruction in both lecture and laboratory in the analysis of clinical case studies, bacterial generation time problems, and dilution problems	Student will demonstrate knowledge solving case studies, generation time and dilution problems. Assessed by lecture and laboratory examination questions.
3. The student will learn the structures and functions of bacteria, viruses and fungi studied in BIOL 386	Instruction from lectures, study guide and textbook assignments on microbial structure and function	Student will demonstrate knowledge of microbial structure and function. Assessed by lecture and laboratory examination questions.
4. The student will learn how to analyze scientific data generated during BIOL 386 laboratories	Instruction in the graphing and charting of scientific data generated in laboratory sessions	Student will demonstrate knowledge constructing graphs and/or charts. Assessed by completion of lab assignments requiring graphs/charts and examination questions.
5. The student will learn how to use scientific instruments such as the compound light microscope	Instruction in the preparing and visualization of stained microorganisms using all levels of magnification of the compound light microscope, including oil immersion,	.Student will demonstrate knowledge of microscopy. Assessed by laboratory examinations.

GENERAL EDUCATION OUTCOMES: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science .

Biology 470

Molecular Genetics

Spring 2016

4 Credits

Instructor Office

Dr. Bradley Isler

ASC 2113

Phone: 591-2641

E-mail: bradleyisler@ferris.edu

Class Hours

TR 9:00-10:50 AM

Starr 136

Office Hours

MTWR 12-1 PM

Course Description

An analysis of genetic phenomena at the molecular level. Topics include: structures of DNA, replication, recombination, mutation, repair, genomic sequences, chromatin structure, transcription, processing, translation, and the theory of selected techniques. Emphasis is on regulatory mechanisms. This course meets General Education requirements: Scientific Understanding. Pre-Requisites: BIOL 375 and CHEM 364 with a grade of C- or better. Typically Offered Spring Only Even Years

Course Outcomes and Assessment

Upon completion of the course, a student will be able to:

- **Demonstrate** an upper-level understanding of genetic phenomena at the molecular level, including: replication, recombination, mutation, repair mechanisms, DNA structure, chromatin, and the control of gene expression via transcription and RNA processing.
- **Interpret** scientific articles related to molecular genetics and apply this interpretation to the understanding of the experimental basis of scientific discovery.

Materials

- Lewin's Genes XI, J.E. Krebs, E.S. Goldstein, and S.T. Kilpatrick, Jones and Bartlett Learning, 2014.

Grading

Your final grade will be determined from the total of all points earned on exams and quizzes:

	<u>Maximum possible points</u>
Exams	450
Quizzes	100?
Homework	?

There will be three **exams** during the semester worth 100 points each and a final exam worth 150 points.

Quizzes will be either announced or unannounced. Quizzes will be administered during selected lecture sessions and will cover information discussed in previous lecture sessions and assigned scientific articles.

Cheating

Cheating on exams, quizzes, or assignments will result in a zero on associated assignments and failure of the course. Additional action may be taken by the University.

Attendance Policy

Attendance will not be taken in lecture. However, since BIOL 470 is an upper level course, attendance is expected. If you are absent from class, it is your responsibility to obtain information that was presented.

Students arriving late for class on the days on which unannounced quizzes are administered will receive a zero for that quiz. No make-up quizzes will be given.

Students who are absent on the day of an announced quiz or exam and do not have a legitimate excuse will receive a zero for that quiz or exam. No exceptions are allowed.

Class Participation

Class participation is not mandatory but will be considered when your final grade is determined. A student that is actively involved in a course will always perform at a higher level than a student that spends lecture periods sleeping, chatting with their friends, playing with their cell phone or computer, or not paying attention.

Reading the Text

You should review the textbook following lecture. Your text is an important part of this course and was chosen because it is the best available for explanations, reasoning, illustrations, and connecting important topics.

Blackboard

Blackboard will be used throughout the course to post lecture notes, grades, articles, and animations. Lecture notes will be posted by chapter following the completion of an entire chapter.

Class Decorum

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Patterns of behavior which obstruct or disrupt the learning environment in the classroom will be dealt with under the College *Disruptive Behavior Policy*. Cell phones must be turned off and interpersonal conversations cease during the class period.

Help!

Dr. Isler will be happy to help you during office hours or during any other available time. Please contact Dr. Isler for help or to arrange an appointment.

Grading Scale

93 – 100%	A
90 – 92.9%	A-
87 – 89.9%	B+
83 – 86.9%	B
80 – 82.9%	B-
77 – 79.9%	C+
73 – 76.9%	C
70 – 72.9%	C-
67 – 69.9%	D+
62 – 67.9%	D
60 – 61.9%	D-
< 60%	F

The grading scale may be adjusted depending upon class performance

Tentative Lecture Schedule

Date	Topic	Chapter
Jan 12	Genes are DNA	1
	Genes encode RNAs and polypeptides	2
Jan 14	The interrupted gene	4
Jan 19	The content of the gene	5
Jan 21	Genome sequences and gene numbers	6
Jan 26	Clusters and repeats	7
Jan 28	Clusters and repeats	7
	Genome evolution	8
Feb 2	Genome evolution	8
	Chromosomes	9
Feb 4	Chromatin	10
Feb 9	Exam 1	-
Feb 11	Chromatin	10
Feb 16	Replication and the cell cycle	11
Feb 18	The replicon: initiation of replication	12
Feb 23	The replicon: initiation of replication	12
	DNA replication	13
Feb 25	DNA replication	13
	Homologous and site-specific recombination	15
Mar 1	Homologous and site-specific recombination	15
	Repair systems	16
Mar 3	Exam 2	-
Mar 7-11	NO CLASS	-
Mar 15	Repair systems	16
Mar 17	Repair systems	16
	Prokaryotic transcription	19
Mar 22	Prokaryotic transcription	19
Mar 24	NO CLASS	-
Mar 29	Prokaryotic transcription	19
	Eukaryotic transcription	20
Mar 31	Eukaryotic transcription	20
Apr 5	RNA splicing and processing	21
Apr 7	mRNA stability and localization	22
Apr 12	Translation	24
Apr 14	Exam 3	-
Apr 19	Using the genetic code	25
Apr 21	The operon	26
Apr 26	Eukaryotic transcription regulation	28
May 28	Epigenetic effects are inherited	29
Tuesday May 3	Final Exam 8:00-9:40 AM Starr 136	-

BIOLOGY 471: BIOTECH 2: RECOMBINANT DNA LAB, SPRING 2016

Credits: 3, prerequisites: BIOL 375, CHEM 333.

Section: 211, Lecture: W 12:00 – 12:50 PM in Sci. 235, lab: M and T 12:00 – 3:50 PM in Sci. 337.

Instructor: Dr. Roger Mitchell. **Office hours:** ASC (Commons) 2007: Wednesday 11:00 AM – 11:50 AM and 1:00 - 3:00 PM, and Friday 10:00 - 10:50 AM. Make an appointment, or drop by to see if I am available at some other time. Knock if the door is closed! You may call my office: 591-5879, but email is preferred. email: mitchelr@ferris.edu

Materials you are required to have:

lab manual: “Laboratory DNA Science” by Bloom, Freyer, and Micklos.

additional materials: purchase a lab notebook, a three-ring binder, lab coat, eye protection, and other materials as necessary.

students should have a means of saving files from Dr. Mitchell’s laptop computer. Possibilities include USB memory devices and recordable CD and DVD. You may also email yourself the files.

Course outcomes: A student succeeding in this course should be able to:

- 1) perform professional-quality, hands-on lab techniques in molecular genetics. These include the following:
 - Bacterial transformation.
 - DNA extraction.
 - Gel electrophoresis.
 - Restriction enzyme digests
 - Use of plasmids.
 - Southern blots and colony lifts.
 - Membrane hybridization and probe preparation.
 - PCR.
 - DNA sequencing.
 - Basic DNA bioinformatics.
- 2) demonstrate by examination, report preparation, and other methods, an understanding of the principals behind the techniques listed above.
- 3) prepare and organize lab documentation.
- 4) carry out lab work while maintaining a professional environment.
- 5) maintain proper lab safety procedures.

Course Description: Practical training in recombinant DNA techniques is provided to students. These include DNA isolation, restriction enzymes, production of recombinant DNA plasmids, bacterial transformation, polymerase chain reaction (PCR), Southern transfer, non-radioactive probe labeling, hybridization, and DNA sequencing. DNA sequence data from internet databases and the use of graphics files to record results are also introduced.

Policies and Course Requirements:

Final exam time and place will be announced

Lab reports will be assigned that will be prepared by computer.

Dropping with the “W” grade must be done on or before **March 23**.

Incompletes will be given only at my discretion and will require proof of exceptional need. Consistent with university policy, the student must have passed 75% of the class prior to being forced to stop attending due to circumstances beyond their control. The “I” grade must be cleared or it will become an “F.”

Attendance policy. Attendance is mandatory. Missing more than 2 labs may result in course failure. I reserve the right to treat tardiness as an absence, or require additional work from tardy, disruptive, or absent students.

Due to the nature of these labs you will occasionally need to come in at additional times for brief periods.

Grades will be 25% from your lab notebooks, which may be checked at any time, 25% subjective (including following directions, time management, preparation, effort, lab safety, professional attitude, punctuality, etc.), and approximately 25% for reports and related assignments, and 25% on tests, quizzes, and worksheets. The test/quiz/worksheet category will include points for performance on the ETS Field exam in Biology. Poor lab safety will lead to lower grades.

THE FOLLOWING SCHEDULE IS HIGHLY TENTATIVE:

WEEK	DATE	TOPIC
1	Jan. 11	transformation 1, lecture: safety, overview
	12	transformation 2
	13	transformation 3, DNA purification lecture 1
2	18	NO CLASS: MLK day
	19	plant DNA 1
	20	plant DNA 2
3	25	plant DNA 2, plasmid prep 1
	26	plasmid prep 2
	27	DNA purification lecture 2
4	Feb. 1	plasmid prep 3, restriction enzymes 1
	2	restriction enzymes 2
	3	restriction enzymes lecture
5	8	restriction enzymes 3
	9	pKA recombination 1
	10	PhotoShop lecture
6	15	pKA recombination 2
	16	pKA recombination 3, RAPD 1
	17	PCR lecture
7	22	λ -library 1, RAPD 2
	23	λ -library 2
	24	Lecture: hybridization
8	29	λ -library 3
	March 1	λ -library 4
	2	Lecture: hybridization
9	7-9	NO CLASS: Spring break
10	14	λ -library 5
	15	λ -library 6, Southern 1
	16	Lecture: hybridization
11	22	Southern 2
	23	Southern 3
	24	Lecture: taxonomy methods
12	28	Southern 4
	29	Southern 5
	30	sequencing lecture 1
13	April 4	electrophoresis, other follow-up
	5	electrophoresis, other follow-up
	6	sequencing lecture 2
14	11	sequencing 1
	12	sequencing 2
	13	sequencing demo
15	19	sequencing 3
	20	sequencing 4
	21	Lecture: new technologies
16	26	RAPD 3
	27	complete labs, cleanup
	28	Review

BIOL 472: Proteins

Course Syllabus, Fall 2013



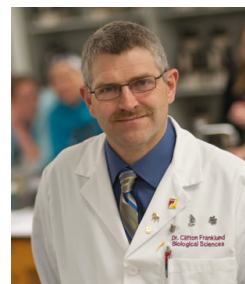
In order to optimize student learning, the standards and requirements set forth in this syllabus may be modified during the semester. Notice of any such changes will be announced in class and posted on our FerrisConnect course homepage.

Class location and meeting time

Lectures will be held on Mondays and Wednesdays from **6:00 to 7:15 pm** in **SCI-135**. You are responsible for all announcements, assignments, handouts, etc., even if you are late or absent (see the attendance policy for more details).

Contact information

Instructor name: Dr. Clifton Franklund
Office: ASC 2011
Telephone: (231) 591-2552
Email: franklc@ferris.edu
Twitter: [@Dr_Franklund](https://twitter.com/Dr_Franklund)
Web site: <http://myhomepage.ferris.edu/~franklc>



Office hours

Posted hours: [M | W | F] from 1:00 to 3:00 pm

I maintain official office hours as indicated above. These are first come, first served – you are encouraged to make appointments but walk-ins are welcome and will be accommodated whenever possible. You can sign up times online at <http://cliftonfranklund.youcanbook.me>. In addition, I have posted my schedule outside of my office door. All of my free time is available to you as office hours. Simply find the day that works for you and sign up for a meeting (in 15-minute increments).

If you score below 60% on any lecture exam, I **require** you to schedule attend at least one office hours session to go over your results. You will need to bring your copy of the exam, your lecture notes, and the feedback that you receive from me by email to this session. I would like to help you do well in this course. That may involve trying some new learning strategies.

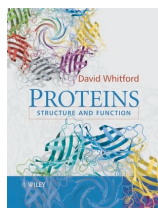
Prerequisites

BIOL 122: General Biology 2 and **CHEM 364:** Biochemistry

Course description

The theory, molecular mechanisms, and practical aspects of the major techniques used in protein purification. Emphasis is placed on data interpretation and manipulation, troubleshooting, and prediction of the impact of various errors on the data, for each technique. Included are: enzyme kinetics; buffer design; cell disruption; differential solubility; ion exchange, gel permeation, and affinity chromatography; ultracentrifugation; chromatofocusing; radioisotope use; PAGE; and IEF.

Required text and additional resources



Proteins: Structure and Function by David Whitford, Wiley, ISBN: 0471498947.

We will be using Turning Technologies ResponseCard NXT clickers in class this semester. These will be used for in-class review questions and for taking lecture exams.



Learning outcomes

My goal is for you to understand and apply the basic concepts and procedures pertaining to the structure, function, purification, and characterization of proteins. I have several specific learning outcomes for students in this course and they are listed below. By the conclusion of this course you will:

- A) **Scientific knowledge:** Demonstrate an understanding of the theoretical basis of various techniques used in protein purification, and the practical aspects of carrying out those techniques.
- B) **Critical Thinking:** Interpret graphical representations of data, to manipulate data for maximum clarity of presentation, and to identify technical errors by examination of data.
- C) **Calculations:** Understand and use equations describing experimental phenomena and carry out basic calculations required for technical success.

Modified Bloom's taxonomy

Each of the graded course activities will correspond to one or more of the three course outcomes listed above. In addition, these activities can be involved different levels of cognitive skill or ability. One way to classify these levels is the modified Bloom's taxonomy of Anderson and Krathwohl.

Anderson, L W, & Krathwohl D R (eds.) (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.

Our class assignments will require you to use these six cognitive levels. Each requires more complex and abstract thought than those preceding it. The basic aspects of these levels (and the relative importance of each) are described below. Examples of questions pertaining each level will be provided to you throughout the semester.

- 1) Identify and correctly use appropriate terms and concepts related to proteins. This constitutes “**Remembering**” – the lowest level of the modified Blooms’ cognitive outcomes. You should expect about **10%** of all course points to correspond to this outcome.
- 2) Classify or provide examples of concepts related to proteins and be able to make simple conclusions based upon those principles. This constitutes “**Understanding**” – also a low-level of the modified Blooms’ cognitive outcomes. You should expect about **20%** of all course points to correspond to this outcome.
- 3) Carry out correct calculations on proteins problems and apply appropriate formulae to novel problems. This constitutes “**Applying**” – a mid-level of the modified Blooms’ cognitive outcomes. You should expect about **20%** of all course points to correspond to this outcome.
- 4) Organize available data, find and select relevant facts and interpret them to address specific proteins problems or cases. This constitutes “**Analyzing**” – a high-level of the modified Blooms’ cognitive outcomes. You should expect about **20%** of all course points to correspond to this outcome.
- 5) Judge the validity of scientific statements or potential courses of action and detect errors or inconsistencies in such statements. This constitutes “**Evaluating**” – also a high-level of the modified Blooms’ cognitive outcomes. You should expect about **20%** of all course points to correspond to this outcome.
- 6) Construct tables or figures to illustrate data or concepts and compose reports regarding abstract concepts. This constitutes “**Creating**” – the highest level of the modified Blooms’ cognitive outcomes. You should expect about **10%** of all course points to correspond to this outcome.

Instructional methods

BIOL 472: Proteins will be taught as a blended delivery class. The primary form of instruction for this course will be most likely be lecture. However, since this is a small upper-division course, we will also spend a lot of time analyzing data sets in groups during our “lecture” time as well. You will be expected to bring your clicker to every class session and participate in group discussions (both in class and online). We will regularly use the clickers to gather feedback, take concept check quizzes, and work collaboratively on case studies or problems. Your clicker responses will be included as part of your course participation score. I hope to post a series of

on-line tutorials during the semester as well. Since this is my first time teaching this course, the online components will probably be a work in progress (and thus will not directly affect your course grade).

Grading policies

I use an objective point-based system to grade all assigned work. The nature and relative point values of all assignments are explained in the following section. I have designed this course to be worth a total of **1,000 points**. Mid-term grades will be posted by **October 21, 2013** so that you may assess your class standing. Final grades for the course will be assigned based upon your total earned score as indicated in this table. ***These breakpoints are not negotiable.*** The bonus points should give you more than adequate buffer against any poor assignment performances.

Point Range	Grade	Percent
930 to 1,000 points	A	93-100%
900 to 929 points	A-	90-92.9%
870 to 899 points	B+	87-89.9%
830 to 869 points	B	83-86.9%
800 to 829 points	B-	80-82.9%
770 to 799 points	C+	77-79.9%
730 to 769 points	C	73-76.9%
700 to 729 points	C-	70-72.9%
670 to 699 points	D+	67-69.9%
630 to 669 points	D	63-66.9%
600 to 629 points	D-	60-62.9%
0 to 599 points	F	0-59.9%

Graded assignments

Lecture exams – There will be two 150-point lecture exams (see the lecture schedule for dates). They will consist of multiple true-false (MTF) and short answer essay (SAE) questions. The exam items will assess your comprehension of course materials at several different cognitive levels. They may be based upon diagrams, problems, data sets, or material drawn from the textbook or assigned readings. You will submit your MTF responses using the Turning Technologies clicker system. You will write your essays on the exam itself.

- 300 points (30.0% of your final grade)

Homework worksheets – You will be required to complete eight take-home worksheets during the semester (see lecture schedule for dates). These assignments generally involve the analysis and/or interpretation of a data set. Each worksheet is worth a total of 25 points.

- 200 points (20.0% of your final grade)

Project – You will be working in small groups to create a report on an assigned protein during the semester. You will be evaluated individually based upon your contributions to your group’s protein wiki. At the end of the semester you will also be evaluated as a group based upon an in-

class presentation. Each of these (individual and group evaluations) are worth 100 points.

- 200 points (20.0% of your final grade)

Participation – Surveys and class participation (using the clickers) will also count toward your grade. You must be present to win and you must have a functional clicker to be counted as participating. There are no make-ups for missed sessions.

- 150 points (15.0% of your final grade)

Final Exam – There will be a comprehensive lecture exam. Its content will be evenly divided between the material on the two lecture exams. Like the lecture exams, it will consist of multiple true-false (MTF) and short answer essay (SAE) questions.

- 150 points (15.0% of your final grade)

Bonus – There will be two online bonus quizzes this semester – one follow each of the two lecture exams. These will be based upon the material on the exams that the class had the most difficulty with. ***There will be no other bonus points in this course.***

- 20 points (an additional 2.0% restored to your final grade – you could earn 102%!)

Due dates for graded work

Your grade will be based upon many different assignments this semester. The following is a chronological compilation of the due dates (last acceptable date) for each assessment.

Assignment	Due Date	Points	Percent
Worksheet 1	9/11/13	25	2.5%
Worksheet 2	9/23/13	25	2.5%
Worksheet 3	9/30/13	25	2.5%
Worksheet 4	10/7/13	25	2.5%
Exam 1	10/9/13	150	15.0%
Worksheet 5	10/21/13	25	2.5%
Worksheet 6	10/28/13	25	2.5%
Worksheet 7	11/6/13	25	2.5%
Worksheet 8	11/13/13	25	2.5%
Exam 2	11/25/13	150	15.0%
Project - individual	11/25/13	100	10.0%
Project - group	12/4/13	100	10.0%
Surveys	Various	50	5.0%
Class participation	Various	100	10.0%
Final Exam	12/9/13	150	15.0%
Total		1000	100.0%

Class attendance, late assignments, and make-up policies

You are expected to attend class regularly. I have noted a direct correlation in my prior classes between student attendance and class performance. However, it is ultimately up to you to show up for class. You will be responsible for all reading, discussions, and lecture materials.

All graded materials must be completed on time. Make up exams will be provided only in the case of an excused absence. You must contact me within one week of the missed exam and provide written evidence to explain your absence. If you know in advance that you will be absent for an exam, please contact me immediately. I will attempt to arrange to accommodate you (within reason) with no penalty. You may always turn in assignments before their due dates. If you miss a lab, you may attend a different section in order to participate in graded work.

The following are instances of excused absences:

1. Hospitalization, with documentation from your physician
2. Severe illness, with documentation from your physician
3. Jury duty, with a copy of your court summons
4. Bereavement, with a letter from a family member
5. Ferris-sponsored sporting event, with a letter from your coach

The following are NOT instances of excused absences:

1. Oversleeping – get a better alarm clock
2. Work – You agreed to the class schedule when you signed up for the course
3. Appointments – see number two
4. Traveling – see number two
5. Other classes conflict – see number two
6. Jail or prison time – you have bigger problems than a missed deadline
7. Illness without documentation – you must have a physician's note
8. Forgot deadlines – they are your responsibility
9. Bad weather – if Ferris is open, our classes will meet as scheduled
10. Confusion – ask questions earlier rather than later!
11. Computer problems – there are over 100 computers available in the library alone

FerrisConnect

This semester, we will be extensively using Blackboard Learn 9.1 (branded FerrisConnect at FSU). This site will contain a variety of materials to supplement, but not replace, class attendance and reading. I am always interested in comments, corrections, or suggestions with regard to the electronically delivered course content! This semester, the site will contain the following:

1. A PDF copy of this syllabus.
2. Course announcements
3. Additional course materials such as a) PDF copies of the lecture slides for your note-taking convenience, b) interactive copies of the slides, c) practice materials in a variety of formats, and d) links to additional information on the internet.
4. A calendar of all course assignments and deadlines.
5. Assignment descriptions for all graded work.
6. Online communication tools for you to contact me or your classmates
7. On-line access to your course grades.

I hope that you find this material to be helpful in preparing for exams and pursuing your interests. Please feel free to offer constructive criticism.

Registering your Turning Technologies clicker

To complete this process, you will need the following: a Turning Technologies clicker (NXT) and a computer with Internet access.

1. Turn on your computer.
2. Connect to the Internet using your favorite browser.
3. Go to the MyFSU website and log in. (<http://myfsu.ferris.edu/>)
4. Click on "FerrisConnect" icon at the top of the screen.
5. Click on the "Courses" icon at the top of the page.
6. Select "BIOL472: Proteins, Fall 2013" from the list of online courses.
7. Click on "Start Here (please)" in the left navigation menu
8. Click on the link called "Register Clicker"
9. Enter your clicker's serial number.

If you are experiencing difficulty registering your clicker, please come to my office hours.

Statement of disability services at FSU

Ferris State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act and Section 504 of the Rehabilitation Act. If you are a student with a disability or think you may have a disability, contact the Disabilities Services office at 231.591.3057 (voice), or email <mailto:ecds@ferris.edu> to discuss your request further. More information can be found on the web at <http://www.ferris.edu/htmls/colleges/university/disability/>.

Any student registered with Disabilities Services should contact the instructor as soon as possible for assistance with classroom accommodations.

Academic misconduct policies at FSU

The university may discipline a student for academic misconduct, which is defined as any activity that tends to undermine the academic integrity of the institution. Academic misconduct includes, but is not limited to, the following:

Cheating - A student may not use unauthorized assistance, materials, information, or study aids in any academic exercise, nor should a student give assistance, materials, information, or study aids to another student in any academic exercise.

Fabrication - A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citations of the sources of information.

Facilitating Academic Dishonesty - A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct. A student is responsible for taking reasonable precautions to ensure his or her work is not accessed by or transferred to another individual wherein it may then be used to commit an act of academic misconduct.

Interference - A student must not steal, change, destroy, or impede another student's work. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain. A student must not give or offer a bribe, promise favors, or make threats with the intention of affecting a grade or the evaluation of academic performance.

Plagiarism - A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge indebtedness whenever he or she quotes or paraphrases another person's words, either oral or written and whenever he or she borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

Violation of Course Rules - A student must not violate course rules as contained in a course syllabus which are rationally related to the content of the course or to the enhancement of the learning process in the course.

Violation of Professional Standards and Ethics - A student must not violate the professional standards or ethical code related to one's intended profession as defined by the academic program or department.

Communication courtesy policy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and online wiki projects. If I deem any of them to be inappropriate or offensive, I will first contact the persons involved. For chronic problems, I will forward the messages to the head of the department and the online administrators and appropriate action will be taken, not excluding expulsion from the course. The same rules apply online as they do in person. Be respectful of other students. Foul discourse will not be tolerated. Please take a moment and read the following link concerning "netiquette".

<http://www.albion.com/netiquette/>

Class Schedule

	Day	Date	Topic	Reading	Assignment
Protein Structure and Function	Mon.	Aug 26	Course policies and introduction	Syllabus	
	Wed.	Aug 28	Proteins - an overview	pp 1-11	
	Mon.	Sep 02	Labor Day – No Class		
	Wed.	Sep 04	Amino acids	pp 13-38	
	Mon.	Sep 09	Primary and secondary structure	pp 39-50	Worksheet 1
	Wed.	Sep 11	Tertiary and quaternary structure	pp 50-84	
	Mon.	Sep 16	Fibrous proteins	pp 85-103	
	Wed.	Sep 18	Membrane proteins	pp 104-159	Worksheet 2
	Mon.	Sep 23	Enzyme kinetics	pp 189-209	
	Wed.	Sep 25	Globular proteins and enzymes	pp 209-227	Worksheet 3
	Mon.	Sep 30	Enzyme regulation	pp 227-245	
	Wed.	Oct 02	Ligand binding	Handout	Worksheet 4
	Mon.	Oct 07	Review session		Review sheet
	Wed.	Oct 09	Lecture Exam One		
Protein Purification and Characterization	Mon.	Oct 14	Protein synthesis and regulation	pp 247-312	
	Wed.	Oct 16	Protein detection and quantitation	pp 32-34	Worksheet 5
	Mon.	Oct 21	Cell disruption and differential solubility	pp 319-326	
	Wed.	Oct 23	Gel filtration chromatography	pp 330-331	Worksheet 6
	Mon.	Oct 28	Ion exchange chromatography	pp 326-329	
	Wed.	Oct 30	Hydrophobicity and affinity chromatography	pp 331-333	
	Mon.	Nov 04	Gel electrophoresis	pp 333-346	Worksheet 7
	Wed.	Nov 06	Protein over-expression	pp 313-319	
	Mon.	Nov 11	Protein-protein interactions	Handout	Worksheet 8
	Wed.	Nov 13	Protein structure analysis	pp 347-394	
	Mon.	Nov 18	Proteomics	pp 161-188	
	Wed.	Nov 20	Review session		Review sheet
	Mon.	Nov 25	Lecture Exam Two		
Integration	Wed.	Nov 27	Thanksgiving - No Class		
	Mon.	Dec 02	Group project reports		
	Wed.	Dec 04	Group project reports		
	Mon.	Dec 09	Comprehensive Final Exam		

SYLLABUS ATTACHMENT
COLLEGE OF ARTS AND SCIENCES – FERRIS STATE UNIVERSITY
FALL 2013

ARE YOU CONSIDERING ADDING A MINOR OR MAJOR TO YOUR CURRENT PROGRAM?

Use **My Degree** to see what classes may already apply.
For more information, stop by the Arts and Sciences Dean's Office!

IMPORTANT DATES		
Late registration	Wed. – Fri.	Aug. 21 – 23
First day of classes	Monday	Aug. 26
Last day for Drop/Add	Thursday	Aug. 29
Labor Day (no classes)	Monday	Sept. 2
Mid-term grades due	Monday	Oct. 21
Last day for "W" grades	Thursday	Oct. 31
Thanksgiving recess begins (no classes)	Wed (noon)	Nov. 27
Thanksgiving recess ends (classes resume)	Monday	Dec. 2
Last day of classes	Friday	Dec. 6
Examination Week	Mon – Fri	Dec. 9 - 13
Commencement	Saturday	Dec. 14
Final grades due by 1:00 pm	Monday	Dec. 16
Grades available to students on MyFSU	Tuesday (after 8AM)	Dec. 17

Sessions	Dates	Last Day to Withdraw
Full Session	Aug. 26 – Dec. 6	Oct. 31
Session A	Aug. 26 – Oct. 15	Sept. 26
Session B	Oct. 16 – Dec. 6	Nov. 15
Session D	Aug. 26 – Sept. 27	Sept. 16
Session E	Sept. 30 – Oct. 31	Oct. 18
Session F	Nov. 1 – Dec. 6	Nov. 21

DEPARTMENT OFFICES		
Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Languages & Literature	ASC 3080	591-3988
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Dean's Office	ASC 3052	591-3660

WHAT YOU NEED TO KNOW

E-MAIL

All registered FSU students have a Ferris Gmail account. This is the only e-mail to which all official University information about registration, financial aid, student activities, and class cancellations will be sent. Please check your account at least once a week. E-mail is our primary communication resource for students.

CLASS ATTENDANCE IS IMPORTANT!

Attendance usually has a high correlation with how well you do in a course. Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness to encourage students to be present for the full class period. Check your course syllabus or talk to your instructor about his/her policies.

HOW TO CONTACT A FACULTY MEMBER OR ADVISOR

If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, through the College of Arts and Sciences web page at <http://www.ferris.edu/htmls/colleges/artsands/>, or through the Directories & Maps link on the FSU home page.

DROPPING CLASSES OR WITHDRAWING */**

Dropping and adding only occurs during the first four days of the term. You can adjust your schedule **online during the first four days** or in person at the Timme Center (from 8-5 except for the last day when it is 12-5). *If you add a class you must pay for your additional charges by the fourth day or your schedule will be dropped.*

If you need to withdraw from a class after the official drop/add period, you must do so **OFFICIALLY**, through your dean's office, in order to avoid

receiving an "F" grade in the course. **You may not withdraw online after the first four days of the term.** You will receive a "W" for the course. *You will not receive a refund.* If you need to totally withdraw from the University, you must do so **officially** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. **CHECK THE SESSIONS DATES SECTION ABOVE OR THE REGISTRATION AND ACADEMIC GUIDE FOR THE WITHDRAWAL DEADLINES FOR THE SEMESTER.**

In cases of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES

The "I" is only considered for extenuating circumstances that have led to a student missing a portion of the course. The intent and appropriate use of the "I" grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended alternative to withdraw from a class (W). Extenuating circumstances are generally defined as those situations over which a student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an "I" will be considered, and they may be required to sign an agreement regarding course completion. An "I" grade automatically changes to an "F" after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

GRADUATION

Students should apply for graduation the semester prior to their last semester of completion. For associates in arts or associates in science degrees, this needs to be completed at the Dean's Office. For bachelor degrees, this needs to be completed with your program coordinator. Be aware of deadlines for participation in commencement.

INCLEMENT WEATHER CONDITIONS

Only during the most severe weather conditions – which could potentially endanger the safety of students or staff – will the Big Rapids campus consider cancelling classes. The decision to cancel classes due to weather conditions at the Big Rapids site will be made as early as possible. In the event it is necessary to cancel classes, periodic announcements will be made on area radio and television stations. It is the student's responsibility to listen for these announcements. A student may also call the Ferris Information Line at 231-591-5602 to obtain information or check the Ferris website.

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person's ideas or work as your own, taking someone else's exam for them, violating computer software licenses or program/data ownership, etc. It is the expectation of the College of Arts and Sciences that all work you turn in is your own and is original for the course in which it is being submitted. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification.

Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated.

Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University. The full Disruptive Behavior Policy is available on the College of Arts and Sciences website at <http://www.ferris.edu/htmls/colleges/artsands/student-resources/disruptive-behavior.htm>

For additional policies and helpful information, check out the College of Arts & Sciences Student Resources page at <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/>

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of university life. Don't hesitate to explore and use these services at Ferris.

ACADEMIC ADVISING

All students have an assigned advisor and should confer with that advisor regularly. Students who have declared a major should see an advisor in that major. To find out who your advisor is, login to MyFSU and click on the Academics and Services tab, then Registration Status / Advisor Information link.

ACADEMIC SUPPORT CENTER.....ASC 1017 – 591-3543

THE WRITING CENTER.....ASC 1017 – 591-2534

The Academic Support Center, Tutoring Services, and Writing Center join together to offer FSU students an array of academic support services. Tutors are available to answer questions for many courses. The Writing Center helps writers individually and in workshops with skills and assignments. There is also study skills assistance to help with note-taking, test-taking, memory and reading strategies, and time management.

DISABILITIES SERVICES.....STR 313 – 591-3057

According to the Americans with Disabilities Act, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. Students requiring a classroom accommodation due to a physical, learning, mental or emotional disability should contact the Disabilities Services Office.

SCHOLAR PROGRAM.....ASC 1021 – 591-5976

SCHOLAR is an academic support program that aids in the student's successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

PERSONAL COUNSELING, SEXUAL ASSAULT, SUBSTANCE ABUSE BIRKAM

HEALTH CENTER 2nd Floor - 591-5968 Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment.

If you or a friend is in immediate crisis, call 911.

EDUCATIONAL & CAREER COUNSELINGSTR 313 – 591-3057

Students wanting to examine their choice of major or career choice, learning styles or strategies can make one-on-one appointments with licensed counselors.

SAFETY

Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

OTHER RESOURCES

BIRKAM HEALTH CENTER.....1st Floor - 591-2614

The Birkam Health Center provides fee-for-service medical care including evaluation and treatment for illness and injury anytime during the year. Patients are seen on a walk-in and by appointment basis.

FLITE LIBRARY.....591-2669

Regular hours for FLITE:

Monday – Thursday 7:30 a.m. – MIDNIGHT

Friday 7:30 a.m. – 6:00 p.m.

Saturday NOON – 4:00 p.m.

Sunday 1:00 p.m. – MIDNIGHT

(Extended Studies Court will begin late night hours September 17, 2013

*Sunday-Thursday/MIDNIGHT to 7:30 a.m. *Friday/6 p.m. to MIDNIGHT

*Saturday/5 p.m. to MIDNIGHT)

FSU BOOKSTORE.....14265 NORTHLAND DR. 231 591-2607

Regular on-campus hours for the Bookstore **:

Monday – Thursday 9:00 a.m. – 6:00 p.m.

Friday 9:00 a.m. – 5:00 p.m.

Saturday 12:00 p.m. – 4:00 p.m.

Sunday CLOSED

New location is at the Save-A-Lot Shopping Center Plaza.

HELPFUL NUMBERS

Admissions	2100	Inst. Testing	3628
Business Office	2125	Public Safety	5000
Financial Aid	2110	Records	2792
Housing	3745	TAC	4822

9 When calling from off campus, extensions can be called by using the prefix 231-591-_____.

BIOL 473 Proteins Laboratory Fall '08 Wed 9:00-6:00 SCI 337

Dr. Kim Colvert

Office: ASC 3098 MTF 9:00-9:50 F 10-10:50 Other hours by appt.

Ext 5851

Home Phone 796-2058

colvertk@ferris.edu

Text: *Protein Methods*, Bollag and Edelstein, Wiley-Liss (most recent edition)

Supplies: Approved eye protection, notebook with carbon copies.

Learning Outcomes:

Successful students in this course will

- 1) *research methods in the biochemical literature*
- 2) *design and adapt purification and analysis protocols from the literature*
- 3) *perform methods of protein analysis and purification*
- 4) *maintain accurate and complete records of work*
- 5) *present the results of the isolation and analysis in a professional format*

Your task this semester is to isolate and purify a protein. You must go to the literature to find a method to purify a protein (enzymes are usually the best bet). You might start with commercial sources of enzymes—you know someone has isolated those! I will also provide direction. The process must be 'feasible' given the resources of the lab, the availability of source material and, unfortunately, the cost of isolation. The method should include a variety of techniques with useful stopping and starting points. Once a method has been **approved** you must develop a list of materials needed, check supplies and submit a list of materials to be purchased. The research portion of your work should take two to three weeks. Start immediately. We do not start with live animals but can obtain a variety of animal materials from abattoirs. Plants, bacteria and yeast are also options for sources. You will then develop a procedure and carry out the isolation. You will also wish to assay the protein and determine as much information about its physical properties as possible. You may need to go to several literature sources to complete your project. All facets of your work must be documented in an orderly and legible fashion in your notebook, including your sources, your exact actions, where you deviated from published methodology and why, etc. 70% of your grade will be based on this notebook. I will periodically check your notebook (**without warning**).

The other 30% of your grade will be based on the 'final'. The final will be a semi-formal presentation of your work to the class that will be jointly presented by you and your partner. Your presentation will be by PowerPoint and is expected to include a flow chart, data and results tables where appropriate. You should also include a bibliography. A copy of your work must be submitted with your notebook. The 'semi-formal' part refers to the fact that it will be a discussion and you will be asked questions and encouraged to explain in detail or ask questions of your own. Your organization and ability to respond to questions about your work will be evaluated. This will take place during the last lab period of the semester and constitutes the "final". You may invite guests. The final exam period will be devoted to lab clean-up.

Biol 474: Advanced Cell and Molecular Biology
Spring 2015

Instructor: Dr. Changqi C. Zhu
Class room: STAR 136
Lecture time: Tuesday and Thursday 9:30 am – 10:45 am

Office: ASC 2015
Office hours: Monday and Friday 8 am – 10 am or by appointment
Tel: 231-591-3196
E-mail: Zhuc@ferris.edu

Course Objectives: Students will learn the major molecular mechanisms underlying the genome organization, maintenance, and evolution; the use of genetic information by prokaryotic and eukaryotic cells; the important structures and functions of some major macromolecules. Through the study of this course, students will also gain significant insight into the main structures and functions of the major structural components of eukaryotic cells. In addition, the major molecular and cellular mechanisms underlying cell division, differentiation, and apoptosis will be introduced as well.

Prerequisite: A minimum grade of C- in PHCH 320 or CHEM 364, and BIOL 375, or consent of instructor.

Textbook: *Molecular Biology of the Cell*, fifth edition, by Alberts *et al.*, Garland, 2008

Examination and grading:

1. There will be three exams, 50 points each, each covering one third of the total lecture materials. The exam format will be a combination of multiple choice questions, filling-in blanks, and short-answer essays.
2. There will be some homework assignments. The entire homework assignments can be about 50 points in total.
3. Good, regular class attendance is expected for each student. Class attendance will have 50 points.

Grading Scale:

A ($\geq 93\%$)	C- (73 – 76.9%)
A- (90 – 93.9%)	D+ (67 – 69.9%)
B+ (87 – 89.9%)	D (63 – 66.9%)
B (83 – 86.9%)	D- (60 – 62.9%)
B- (80 – 82.9%)	F ($\leq 59.9\%$)
C+ (77 – 79.9%)	

How to succeed:

Reading the textbook and attending the class well is essential for your success in this course. Looking up additional information through reading review articles and/or primary scientific research papers can help good understanding of the molecular and cellular mechanisms of many cellular processes of both prokaryotic and eukaryotic cells.

Lecture and Exam Schedule (Subject to change):

Weeks	Dates	Topics	Chapters
Basic Genetic Mechanisms			
Week 1	Jan 13 (T)	Amino acids and Proteins	Chapter 3
	Jan 15 (R)	Chromosomes and Chromosomal modifications	Chapter 4
Week 2	Jan 20(T)	From DNA to Protein	Chapter 6
	Jan 22 (R)	Control of Gene Expression	Chapter 7
Week 3	Jan 27 (T)	Control of Gene Expression	Chapter 7
Methodology			
	Jan 29 (R)	Manipulating Proteins, DNA, and RNA	Chapter 8
Week 4	Feb 3 (T)	Manipulating Proteins, DNA, and RNA	Chapter 8
	Feb 5 (R)	Visualizing Cells	Chapter 9
Membranes			
Week 5	Feb 10 (T)	Exam I (Chapters 3, 4, 6, 7, 8, and 9)	
	Feb 12 (R)	Membrane Structure	Chapter 10
Week 6	Feb 17 (T)	Mechanisms of Membrane Transport	Chapter 11
	Feb 19 (R)	Mechanisms of Membrane Transport	Chapter 11
Intracellular Compartments and Vesicular Traffic			
Week 7	Feb 24 (T)	Intracellular Compartments and Protein Sorting	Chapter 12
	Feb 26 (R)	Intracellular Compartments and Protein Sorting	Chapter 12
Week 8	Mar 3 (T)	Intracellular Vesicular Traffic	Chapter 13
	Mar 5 (R)	Intracellular Vesicular Traffic	Chapter 13
Week 9	Mar 10 (T)	Spring recess (no class)	
	Mar 14 (R)	Spring recess (no class)	
Cell Signaling and Signal Transduction			
Week 10	Mar 17 (T)	Mechanisms of Cell Communication	Chapter 15
	Mar 19 (R)	Mechanisms of Cell Communication	Chapter 15
Week 11	Mar 24 (T)	Exam II (Chapters 10, 11, 12, 13, and 15)	
The Cytoskeleton and Cell Adhesion			
	Mar 26 (R)	The Cytoskeleton	Chapter 16
Week 12	Mar 31 (T)	The Cytoskeleton	Chapter 16

	Apr 2 (R)	Mid-term recess (no class)	
Week 13	Apr 7 (T)	Cell junctions, adhesion, and the extracellular matrix	Chapter 19
	Apr 9 (R)	Cell junctions, adhesion, and the extracellular matrix	Chapter 19

The Cell Cycle and Apoptosis

Week 14	Apr 14 (T)	The Cell Cycle	Chapter 17
	Apr 16 (R)	The Cell Cycle	Chapter 17
Week 15	Apr 21 (T)	Apoptosis	Chapter 18
	Apr 23 (R)	Apoptosis	Chapter 18
Week 16	Apr 28 (T)	Cancer	Chapter 20
	Apr 30 (R)	Cancer	Chapter 20
Week 17	May 4 (M)	Final Exam (Chapters 16, 17, 18, 19, and 20) 10 am – 11:40 am in STAR 136	

Biology 475

Bioinformatics

Spring 2015

3 Credits

Instructor Office

Dr. Bradley Isler

ASC 2113

Phone: 591-2641

E-mail: islerb@ferris.edu

Class Hours

MWF 9:00-9:50 AM

Science 235

Office Hours

MWF 10-11 AM

T 12-1 PM

Course Description

A study of the interface between biotechnology and information technology. Primary focus will be placed on the use of nucleic acid and protein databases in the modern molecular sciences. Prerequisite: BIOL 375.

Course Outcomes and Assessment

Upon completion of the course, a student will be able to:

- **Understand** the fundamentals of molecular genetics as they relate to modern tools of genomics and proteomics.
- **Demonstrate** using assignments, examinations, and discussions, an understanding of the fundamentals of bioinformatics and modern tools of molecular biology, including: sequence alignment, analysis of genetic variation, gene annotation, and gene expression analysis.
- **Analyze** molecular data using both manual bioinformatics methods and electronic tools.
- **Apply** results of bioinformatics analyses to the solution of relevant questions of molecular biology.
- **Interpret** bioinformatics data and communicate interpretation to others in a verbal and written fashion.

Materials

- Human Molecular Genetics, Fourth Edition. T. Strachan and A. Read, Garland Science, 2011.

Grading

Your final grade will be determined from the total of all points earned on exams and assignments:

	<u>Maximum possible points</u>
Midterm Exam	200
Final Exam	300
Projects	200
Quizzes	50?
Homework	100?

The **midterm exam** will consist of both in-class and take-home portions, worth 100 points each.

The **final exam** will consist of both in-class and take-home portions, worth 150 points each.

There will be two large **projects** worth 100 points each. The first large project will consist of a written report summarizing a modern technique of molecular biology/genomics and its relationship to bioinformatics and bioinformatics tools. The second large project will be a written review of a peer-reviewed bioinformatics article.

Quizzes will be either announced or unannounced. Quizzes will be administered during selected lecture sessions and will cover information discussed in previous lecture sessions.

Homework will be assigned after some lecture sections and will serve to reinforce topics covered during lecture. Late assignments that are turned in less than 24 hours late will automatically receive a 50% penalty. Assignments that are turned in more than 24 hours late will automatically receive a zero.

Cheating

Cheating on exams, quizzes, or assignments will result in a zero on associated assignments and failure of the course. Additional action may be taken by the University.

Attendance Policy

Attendance will not be taken in lecture. However, since BIOL 475 is an upper level course, attendance is expected. Besides covering relevant material, we will use the time spent in the computer lab to learn how to use bioinformatics tools. It will be nearly impossible to learn how to use these tools if you are absent from lecture.

If you are absent from class, it is your responsibility to obtain information that was presented. It is also your responsibility to contact Dr. Isler to obtain any assignments you may have missed.

Students arriving late for class on the days on which unannounced quizzes are administered will receive a zero for that quiz. No make-up quizzes will be given.

Students who are absent on the day of an announced quiz or exam and do not have a legitimate excuse will receive a zero for that quiz or exam. No exceptions are allowed.

Class Participation

Class participation is not mandatory but will be considered when your final grade is determined. A student that is actively involved in a course will always perform at a higher level than a student that spends lecture periods sleeping, chatting with their friends, playing with their cell phone or computer, or not paying attention.

Reading the Text

You should review the textbook following lecture. Your text is an important part of this course and was chosen because it is the best available for explanations, reasoning, illustrations, and connecting important topics.

Class Decorum

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Patterns of behavior which obstruct or disrupt the learning environment in the classroom will be dealt with under the College of Arts and Sciences *Disruptive Behavior Policy*. Cell phones must be turned off and interpersonal conversations cease during the class period.

Use of personal and laboratory computers is prohibited unless the class is actively involved in a computer exercise. Checking of e-mail, Facebook, Google+, ESPN, Twitter, playing games, etc. is not permitted!

Help!

Dr. Isler will be happy to help you during office hours or during any other available time. Please contact Dr. Isler for help or to arrange an appointment.

Grading Scale

93 – 100%	A
90 – 92.9%	A-
87 – 89.9%	B+
83 – 86.9%	B
80 – 82.9%	B-
77 – 79.9%	C+
73 – 76.9%	C
70 – 72.9%	C-
67 – 69.9%	D+
63 – 66.9%	D
60 – 62.9%	D-
< 60%	F

The grading scale may be adjusted depending upon class performance

Tentative Lecture Schedule

	Topic	Reading
Jan 12	The basics of the NCBI and UCSC bioinformatics portals	-
Jan 14	Chromosome structure and function	<i>Chapter 2</i>
Jan 16	Using OMIM and MapViewer	-
Jan 19	NO CLASS	-
Jan 21	Using OMIM and MapViewer	-
Jan 23	Using OMIM and MapViewer	-
Jan 26	Databases	-
Jan 28	Databases	-
Jan 30	Databases	-
Feb 2	Amplifying DNA: Cell based cloning and PCR	<i>Chapter 6</i>
Feb 4	Amplifying DNA: Cell based cloning and PCR	<i>Chapter 6</i>
Feb 6	Amplifying DNA: Cell based cloning and PCR	<i>Chapter 6</i>
Feb 9	Amplifying DNA: Cell based cloning and PCR	<i>Chapter 6</i>
Feb 11	Amplifying DNA: Cell based cloning and PCR	<i>Chapter 6</i>
Feb 13	Analyzing genes and genomes	<i>Chapter 8</i>
Feb 16	Analyzing genes and genomes	<i>Chapter 8</i>
Feb 18	Analyzing genes and genomes	<i>Chapter 8</i>
Feb 20	Visualizing and investigating genomes using bioinformatics tools	-
Feb 23	Visualizing and investigating genomes using bioinformatics tools	-
Feb 25	Visualizing and investigating genomes using bioinformatics tools	-
Feb 27	Visualizing and investigating genomes using bioinformatics tools	-
Mar 2	Visualizing and investigating genomes using bioinformatics tools	-
Mar 4	Visualizing and investigating genomes using bioinformatics tools	-
Mar 6	Midterm Exam	-
Mar 9-13	NO CLASS	-
Mar 16	Alignment and comparative genomics	<i>Chapter 10</i>
Mar 18	Alignment and comparative genomics	<i>Chapter 10</i>
Mar 20	Alignment and comparative genomics	<i>Chapter 10</i>
Mar 23	Working with online alignment tools	-
Mar 25	Working with online alignment tools	-
Mar 27	Working with online alignment tools	-
Mar 30	Working with online alignment tools	-
Apr 1	Working with online alignment tools	-
Apr 3	NO CLASS	-
Apr 6	Working with online alignment tools	-
Apr 8	Gene expression and functional genomics	<i>Chapters 11 and 12</i>
Apr 10	Gene expression and functional genomics	<i>Chapters 11 and 12</i>
Apr 13	Investigating gene expression using bioinformatics tools	-
Apr 15	Investigating gene expression using bioinformatics tools	-
Apr 17	Investigating gene expression using bioinformatics tools	-
Apr 20	Human genetic variation	<i>Chapters 13 and 14</i>
Apr 22	Human genetic variation	<i>Chapters 13 and 14</i>
Apr 24	Using dbSNP to investigate human genetic variation	-
Apr 27	Using dbSNP to investigate human genetic variation	-
Apr 29	Cancer genetics and bioinformatics	<i>Chapter 17</i>
May 1	Cancer genetics and bioinformatics	<i>Chapter 17</i>
Monday May 4	Final Exam 8:00-9:40 AM Prakken 117	-

SYLLABUS ATTACHMENT
FERRIS STATE UNIVERSITY – COLLEGE OF ARTS AND SCIENCES
Spring 2015

ARE YOU CONSIDERING ADDING A MINOR OR MAJOR TO YOUR CURRENT PROGRAM?

Use **My Degree** to see what classes may already apply.
For more information, stop by the Arts and Sciences Dean's Office!

IMPORTANT DATES		
Late registration	Wed. – Fri	Jan 7 – 9
First day of classes	Monday	Jan 12
Last day for Drop/Add	Thursday	Jan 15
Martin Luther King Day (no classes)	Monday	Jan 19
Last Day for Online Grad Application	Friday	Mar 6
Mid-term grades due	Monday	Mar 9
Spring recess (no classes)	Sat, Mar 7 – Sun, Mar 15	Mar 7 – Mar 15
Last day for "W" grades (full semester)	Friday	Mar 26
Mid-term recess (no classes)	Thurs - Sun	April 2 - 5
Last day of classes	Friday	May 1
Examination Week	Mon – Fri	May 4 – May 8
Commencement	Friday, Saturday	May 8, 9
Final grades due by 1:00 pm	Monday	May 11

DEPARTMENT OFFICES

Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Lang/Lit	ASC 3080	591-3988
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Dean's Office	ASC 3052	591-3660

Sessions	Dates	Last Day to Withdraw
Full Session	Jan 12 – May 1	Mar 26
Session A	Jan 12 – Mar 3	Feb 12
Session B	Mar 4 – May 1	Apr 14
Session D	Jan 12 – Feb 13	Feb 2
Session E	Feb 16 – Mar 26	Mar 6
Session F	Mar 27 – May 1	Apr 20

WHAT YOU NEED TO KNOW

E-MAIL

All registered FSU students have a Ferris Gmail account. This is the only email to which all official University information about registration, financial aid, student activities, and class cancellations will be sent. Please check your account at least once a week. E-mail is our primary communication resource for students.

CLASS ATTENDANCE IS IMPORTANT!

Attendance usually has a high correlation with how well you do in a course. Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness to encourage students to be present for the full class period. Check your course syllabus or talk to your instructor about his/her policies.

HOW TO CONTACT A FACULTY MEMBER OR ADVISOR

If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, through the College of Arts and Sciences web page at <http://www.ferris.edu/htmls/colleges/artsands/>, or through the Directories & Maps link on the FSU home page.

DROPPING CLASSES OR WITHDRAWING

Dropping and adding only occurs during the first four days of the term. You can adjust your schedule **online during the first four days** or in person at the Timme Center (from 8-5 except for the last day when it is 12-5). *If you add a class you must pay for your additional charges by the fourth day or your schedule will be dropped.*

If you need to withdraw from a class after the official drop/add period, you must do so **OFFICIALLY**, through your dean's office, in order to avoid receiving an "F" grade in the course. **You may not withdraw online after the first four days of the term.** You will receive a "W" for the course. *You will not receive a refund.* If you need to totally withdraw from the University, you must do so **officially** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. **CHECK THE SESSIONS DATES SECTION ABOVE OR THE REGISTRATION AND ACADEMIC GUIDE FOR THE WITHDRAWAL DEADLINES FOR THE SEMESTER.** In cases of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES

The "I" is only considered for extenuating circumstances that have led to a student missing a portion of the course. The intent and appropriate use of the "I" grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended

alternative to withdraw from a class (W). Exenuating circumstances are generally defined as those situations over which a student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an “I” will be considered, and they may be required to sign an agreement regarding course completion. An “I” grade automatically changes to an “F” after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

GRADUATION – ONLINE APPLICATION DEADLINE for participation in Spring Commencement Ceremony: MARCH 6, 2015 Students should apply for their degree the semester prior to the degree completion term. To obtain a degree audit for either associate in arts degree, contact Dr. Roxanne Cullen (cullenr@ferris.edu), or associate in science degree, contact Jenice Winowiecki (wino2@ferris.edu). For a degree audit and clearance for bachelor degrees, contact your program coordinator. Online graduation application is REQUIRED and deadlines will be ENFORCED per the Provost’s Office and Records Office. Apply for your degree by logging into your MyFSU (Academics & Services Tab, Student Records channel, Apply to Graduate link). For more information, contact the Dean’s Office.

INCLEMENT WEATHER CONDITIONS

Only during the most severe weather conditions – which could potentially endanger the safety of students or staff – will the Big Rapids campus consider cancelling classes. The decision to cancel classes due to weather conditions at the Big Rapids site will be made as early as possible. In the event it is necessary to cancel classes, periodic announcements will be made on area radio and television stations. It is the student’s responsibility to listen for these announcements. A student may also call the Ferris Information Line at 231-591-5602 to obtain information or check the Ferris website.

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person’s ideas or work as your own, taking someone else’s exam for them, violating computer software licenses or program/data ownership, etc. It is the expectation of the College of Arts and Sciences that all work you turn in is your own and is original for the course in which it is being submitted. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification.

Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated.

Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University. The full Disruptive Behavior Policy is available on the College of Arts and Sciences website at <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/CAS-disruptive-behavior-policy-final.pdf>

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of university life. Don’t hesitate to explore and use these services at Ferris

ACADEMIC ADVISING

All students have an assigned advisor and should confer with that advisor regularly. Students who have declared a major should see an advisor in that major. To find out who your advisor is, login to MyFSU and click on the Academics and Services tab, then Registration Status/Advisor Information link.

ACADEMIC SUPPORT CENTER.....ASC 1017 – 591-3543
THE WRITING CENTER.....ASC 1017 – 591-2534

The Academic Support Center, Tutoring Services, and Writing Center join together to offer FSU students an array of academic support services. Tutors are available to answer questions for many courses. The Writing Center helps writers individually and in workshops with skills and assignments. There is also study skills assistance to help with note-taking, test-taking, memory and reading strategies, and time management.

DISABILITIES SERVICES.....STR 313 591-3057

According to the Americans with Disabilities Act, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. Students requiring a classroom accommodation due to a physical, learning, mental or emotional disability should contact the Disabilities Services Office.

SCHOLAR PROGRAM.....ASC 1021 591-5976

SCHOLAR is an academic support program that aids in the student's successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

PERSONAL COUNSELING, SEXUAL ASSAULT, SUBSTANCE ABUSE BIRKAM HEALTH CENTER 2nd Floor - 591-5968

Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment. *If you or a friend is in immediate crisis, call 911.*

EDUCATIONAL & CAREER COUNSELING.....STR 313 591-3057

Students wanting to examine their choice of major or career choice, learning styles or strategies can make one-on-one appointments with licensed counselors.

SAFETY

Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

OTHER RESOURCES

BIRKAM HEALTH CENTER.....1st Floor 231-591-2614

The Birkam Health Center provides fee-for-service medical care including evaluation and treatment for illness and injury anytime during the year. Patients are seen on a walk-in and by appointment basis.

FLITE LIBRARY.....231-591-2669

Regular hours for FLITE:

Monday – Thursday 7:30 am – Midnight
Friday 7:30 am – 6:00 pm
Saturday NOON – 5:00 pm
Sunday 1:00 pm – Midnight

Extended Studies Court will begin late night hours January 20, 2015

*Sunday-Thursday/MIDNIGHT to 7:30 a.m.

*Friday/6 p.m. to MIDNIGHT *Saturday/5 p.m. to MIDNIGHT

FSU BOOKSTORE.....UNIVERSITY CENTER 231 - 591-2607

Regular hours for Bookstore (*subject to change*):

Monday – Thursday 9:00 am – 6:00 pm
Friday 9:00 am – 5:00 pm
Saturday NOON – 4:00 pm
Sunday CLOSED

Now located at the University Center

HELPFUL NUMBERS

Admissions	2100	Inst. Testing	3628
Business Office	2125	Public Safety	5000
Financial Aid	2110	Records	2792
Housing	3745	TAC	4822

When calling from off campus, extensions can be called by using the prefix 231-591-_____.

BIOL 476 is a 2 credit course. In this course you will: 1) practice safe, appropriate, and humane handling of laboratory animals 2) gain practical experience in conducting animal-based research 3) collect blood from and immunize rabbits 4) immunize mice and subsequently perform splenectomies to harvest murine lymphocytes 5) develop a research protocol that involves the use of animals 6) use immunological and other laboratory techniques to test hypotheses 7) assess proper laboratory design and safety 8) maintain a laboratory notebook in which procedures are recorded and data is collected and analyzed

Attendance:

1. The class is scheduled to meet from 2 pm to 4:50 pm each Thursday of the term, except November 26 which is Thanksgiving Day.
2. Attendance is mandatory; for one unexcused absence 25 points will be deducted from your final point total. An additional unexcused absence may result in your receiving an F for the course.
3. Excused absences include those due to documented University-sponsored events (approval forms must be completed prior to the absence), jury duty, serious illness or death of an immediate family member, and personal illness.

Class will begin on time:

1. Due to the nature of the laboratory exercises, there will be no make-up labs.
2. *The laboratory experience is an essential part of the learning process and may occasionally require you to stay over the allotted time or require you to come in at times other than the scheduled lab period.*

Make-up quizzes:

1. Make-up quizzes will be available for excused absences only; they will be in the form of short essay questions.

Texts/Lab Materials:

1. The text required for this class is *“Guide for the Care and Use of Laboratory Animals”, eighth ed., National Research Council, National Academy Press, Washington, D.C., 2011.*
2. A laboratory notebook will be provided for you – it will be the property of the FSU Biology Department.
3. Lab exercise handouts and other information will be provided for you as paper copies and will also be posted to the course on FerrisConnect.
4. You must obtain a three-ring loose-leaf binder, a cloth laboratory coat, a pair of safety goggles, and a permanent marker (such as a Sharpie®).

FerrisConnect:

1. BIOL476 is a *web-enhanced* course. Most of the handouts, assignment rubrics, power point presentations, and internet links for this course will be posted on FerrisConnect *BIOL 476 Content*. Your scores for each graded item will appear on FerrisConnect *BIOL 476 Gradebook*. Course announcements made via email will also be posted to FerrisConnect *BIOL 476 Announcements*.

Grading:

1. There are **1000 points** possible in this course: a) Assessment Quiz = **50pts** b) FSU Institutional Animal Care and Use Committee (IACUC) Collaborative Institutional Training Initiative (CITI) modules = **140pts** c) evaluation of your animal care & handling performance = **50pts** d) animal care & handling exam = **100pts** e) eight quizzes at **20pts each = 160pts** f) eight notebook evaluations @ **25pts each = 200pts** g) evaluation of your biotechnology lab performance = **50pts** h) completion of Cell Culture Lab Redesign = **25pts** i) completion of IACUC animal use protocol application = **75pts** j) a comprehensive final exam = **150pts**
2. Although not required for this course, your Mid-term grade will be available Monday, 19OCT. It will be based on your percentage of the total points possible prior to the class meeting on 22OCT. Barring any changes in the class schedule that total possible will be **385pts**.
3. Your percentage of the point total will be converted to a letter grade for both the Mid-term and the Final Grade as per the Ferris State University 12-point grading scale. These letter grades will be posted to your MyFSU page and FerrisConnect for this course.

Course Outcomes:

Upon completion of this course you will have:

1. Learned and engaged in safe laboratory practices and procedures.
2. Gained an appreciation of the importance of appropriate animal care in research, and demonstrated understanding of the role of an institutional animal care and use committee (IACUC).
3. Completed the assigned FSU IACUC CITI modules.
4. Collected blood from and immunized rabbits.
5. Redesigned a laboratory space to make it suitable for cell and tissue culture.
6. Immunized mice and harvested spleen cells from the immunized mice.
7. Performed a variety of laboratory procedures including: immunodiffusion, immunoelectrophoresis, enzyme-linked immunosorbant assay, Western blot, hemmagglutination, bacteriophage neutralization, and blood typing.
8. In a properly maintained laboratory notebook, collected, analyzed, and interpreted data.
9. Demonstrated acquisition and retention of factual information pertinent to the course content.
10. Developed a research protocol that meets FSU IACUC animal care guidelines.

Assessment of Course Outcomes:

Assessment will be based upon the following:

1. Observation and evaluation of your performance in the laboratory and in the animal care facilities – these evaluations will be in accordance with clearly stated performance criteria (rubrics).
2. The extent to which your research protocol satisfies the associated rubrics.
3. The extent to which your laboratory notebook satisfies the associated rubrics.
4. The extent to which your redesign of the cell culture laboratory satisfies the associated rubrics.
5. Your performance on quizzes and exams – any of which may be entirely, or include combinations of, multiple choice (including True/False), matching, fill-in-the blank, diagrams and graphs, interpretation of data, short answer, and essay.

Class Schedule

Thursdays

Follow-ups may be scheduled for additional days/times.

Lecture 2 pm-2:50 pm in Science (SCI) 207 OR Pharmacy (PHR) 314

Laboratory 3 pm-4:50 pm in SCI 153, SCI 207 OR PHR 314

<i>Date</i>	<i>Description (Content is subject to change at the instructors' discretions)</i>
9/3	SCI 207 (Marble/Hartley) – Introduction to the Course, Lab Notebook Rubric, Health Risk Assessment Form, History and Origins of Laboratory Animal Care and Research, Terminology, Lab Safety, and Zoonosis.
9/10	SCI 207 (Marble) – Drug Dosage Calculations, Animal Rights Activism vs. Animal Welfare, Common Laboratory Species Husbandry Information, IACUC CERTIFICATION QUIZZES
9/17	PHR 314 (Marble) – Handling Animals housed in Pharmacy Building, Pre-immunization Blood Collection from Rabbits Notebook #1 due in Biology Office-ASC 2004 <u>by 12pm Friday, 9/18</u>
9/24	SCI 207/153 (Marble/Hartley) – Careers in Laboratory Animal Research, Assessment Quiz – recall information presented during prerequisite courses BIOL 386 & CHEM 333, Vocabulary List, Animal Use Protocol Application Rubrics, Handling Animals housed in the Science Building Notebook #2 due in Biology Office-ASC 2004 <u>by 12pm Friday, 9/25</u>
10/1	SCI 207 (Hartley/Marble) – Biotechnology/Immunology Review, Cell Culture Lab Redesign Rubric, Review Session for Animal Care & Handling Exam
10/8	PHR 314 (Marble/Hartley) – Animal Care & Handling Exam (100pts) , Immunizations of Rabbits Notebook #3 due in Biology Office-ASC 2004 <u>by 12pm Friday, 10/9</u>
10/15	SCI 207 (Hartley) – Quiz #1 , Bacterial Transformation; Cell Culture Lab Redesign
10/22	SCI 207 (Hartley) – Quiz #2 , Cell Culture Lab Redesign Due, Bacterial Transformation Follow-up PHR 314 (Marble) – Post-immunization Blood Collection from Rabbits Notebook #4 due in Biology Office-ASC 2004 <u>by 12pm Friday, 10/23</u>
10/29	SCI 207 (Hartley) – Quiz #3 , Draft of Animal Use Protocol Application Due, Bacteriophage Neutralization
11/5	SCI 207 (Hartley) – Quiz #4 , Blood Typing, Immunoelectrophoresis Notebook #5 due in Biology Office-ASC 2004 <u>by 12pm Friday, 11/6</u>
11/12	SCI 207 (Hartley) – Quiz #5 , Bacteriophage Neutralization and Immunoelectrophoresis Follow-ups, Introduction to Proteomics & Western Blot Notebook #6 due in Biology Office-ASC 2004 <u>by 12pm Friday, 11/13</u>
11/19	SCI 207 (Hartley) – Quiz #6 , Proteomics (SDS-PAGE), Western Blot Notebook #7 due in Biology Office-ASC 2004 <u>by 12pm (Noon) Friday, 11/20</u>
11/26	NO CLASS – THANKSGIVING BREAK

<i>Date</i>	<i>Description (Content is subject to change at the instructors' discretions)</i>
12/3	SCI 207 (Hartley) – Quiz #7, Completed Animal Use Protocol Application Due; Enzyme-linked Immunosorbant Assay (ELISA) <i>Notebook #8 due in Biology Office-ASC 2004 <u>by 12pm (Noon) Friday, 12/4</u></i>
12/10	SCI 207 (Hartley) – Quiz #8, Complete any incomplete exercises, Final Exam Review
Week of 12/14	TBA – Comprehensive Final Exam

CHEM 474 Advanced Biochemistry

10:00 am - 10:50 am MWF Science Building 111

Builds on the introduction to biochemistry presented in CHEM 364. Metabolism will be examined in greater detail, stressing mechanisms, regulation, and research implications. A significant component of the course is literature driven, requiring research, analysis, and discussion of current topics in biochemistry. This course meets General Education requirements: Scientific Understanding.

Requires:

CHEM 231 or CHEM 451; & CHEM 364 & BIOL 375

Dr. Kim K. Colvert
ASC 3098 ex. 5851

Office Hours : MWF ^{11:15-11:50} 9-9:50 T 1- 1:50
or by appointment

Text: "Biochemistry", Voet and Voet, 4th edition, Wiley

Learning Outcomes:

Survey courses in biochemistry lay a general framework of information and analytical skills. By building on this foundation this course will help students pursuing careers relating to biochemistry become more sophisticated in the evaluation and analysis of biochemical relationships. To this end the course will focus on advanced concepts in metabolism and will contain a significant literature review component. Students will:

- 1) Deepen specific understanding of anabolism and catabolism stressing regulation and interdependency of pathways.
- 2) Develop the ability to analyze and predict metabolic effects.
- 3) Increase awareness of biochemical literature.
- 4) Develop skills in the evaluation of published research.
- 5) Enhance skills in oral and written communication of scientific information.

Grading:

Grades in this course will be based on three exams, two literature presentations, participation in discussion and a research paper. The exams will be take home exams. Each exam is worth 100 pts. There will also be presentations of literature required from each student. A paper must be selected for presentation. The paper should be a single-topic, peer reviewed article (not a review paper) must be provided to the class and a copy provided to the instructor no later than the Monday before presentation. The presentation will consist of a brief explanation of the point of the research, the techniques and the results. Critical evaluation is expected, discussion will take place. The whole class must participate. There will be two of these per student in this semester. Each presentation is worth 50 pts and your participation over the course of the semester is worth 100 pts. The research paper must be at least ten single-spaced, Times-New Roman-12, equivalent pages long, and reference at least ten sources. No more than two of these sources may be internet sources. Topics must be submitted and approved by February 1. An outline of the paper is due by March 18. Papers are due April 26. Electronic submission requested. The paper is worth 150 pts. There will be a compulsory final.

Cheating and Plagiarism

Don't. You are **absolutely** on the honor system. First offense, zero for that assignment. Second offense, failure of the course. If I suspect your work is not your own, especially on the exams I will not hesitate to implement the penalties. **Don't make it necessary.**

Probable Lecture/Discussion Topics

Review of Metabolism

Biosynthesis of amino acids

The five families and histidine

Amino acid analogs

Metabolic fate of amino acids

Review of catabolism and links to catabolic paths

Synthesis of porphyrin, glutathione

Neurotransmitters

Nucleotide metabolism

Anabolism, catabolism, regulation

Biosynthesis of nucleotide coenzymes

Photosynthesis

Light reactions--photosystems and chlorophyll

Dark reactions--CO₂ to sugars

Lipid Metabolism

Fatty acid and phospholipid synthesis

Cholesterol metabolism

Cholesterol, lipoproteins, bile acids

steroid hormones, vitamin D

Special Techniques

Exams (Tentative)

1--Post amino acids

2--Post complex carbohydrates

3--Post Techniques

Compulsory Final May 3, 10:00

Appendix D: Syllabi for Pre-Professional Courses

Instructor: Mary Murnik, Ph.D.

Office: ASC 2117

Phone: 591-2546

e-mail: murnikm@ferris.edu

Office Hours: TR 8:20-9:10 am; 3:00-3:50 pm

*I am usually in my office when I am not in class and would be happy to see you.
Appointments can also be made for different times.*

BIOL 101 Genetics - Human Aspects presents fundamental genetic principles and concepts and how these apply to individuals within our culture and society as a whole. Topics include transmission of inherited traits, chromosomal abnormalities, gene structure and function, genes in populations and genetic implications of cancer, genetic engineering, evolution, eugenics and bioethics. The course is designed for non-science majors and is not applicable to the applied biology major. This course meets General Education requirements: Scientific Understanding, Lab

Course Objectives

BIOL 101 is intended as an introduction to the science of genetics for non-science majors with little or no background in science. You will gain factual knowledge about genetics and learn fundamental principles and concepts. BIOL 101 should help you to understand how genes affect human appearance, health, development and evolution. You will learn about the role of the environment and random events on genetic expression. You will consider current controversies about genetic engineering, genetic screening, cloning, stem cells, genes, environmental mutagens and cancer, genetic testing and discrimination, genetic counseling and bioethics.

This course satisfies general education objectives in the natural science area:

1. To increase students' understanding of scientific concepts, scientific methods, the relationship between science and technology, and the role of science in modern society.
2. To increase students' abilities to read critically and to write position papers about contemporary issues in genetics.
3. To increase students' critical thinking and valuing abilities with respect to public debates over contemporary issues, such as genetic screening, genetic testing and discrimination, genetic engineering, cloning, experimental therapeutic use of embryonic stem cells, environmental mutagens, and bioethics.

Course Outcomes

1. General Education

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- Have a working knowledge of the fundamental principles of a natural science discipline.
- Be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences.
- Have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas.
- Have a more positive attitude toward science and an increased confidence in their ability to understand science.

2. Course Specific Outcomes

This course is intended as an introduction to the science of genetics for non-science majors with little or no background in science. Upon completion of the course, a student will be able to:

- Demonstrate, using lecture examinations and discussions, an understanding of the fundamentals of Mendelian, molecular, and population genetics.
- Solve basic mathematical problems of Mendelian and population genetics.
- Analyze pedigrees, determine modes of inheritance for genetic diseases, and use this information to calculate phenotypic and genotypic probabilities.
- Operate a microscope and other basic laboratory tools and relate their uses to fundamentals of genetics.
- Interpret scientific articles of a popular nature, formulate an informed opinion, and communicate this opinion to others in a verbal or written fashion.

Texts

1. Human Heredity, Michael Cummings, Brooks/Cole, 11th ed., (9th or 10th ok)
2. Genetics: Human Aspects: Lecture Guide, M. R. Murnik, FSU, 2015*
3. BIOL 101 Laboratory Manual, M. R. Murnik & B. Isler, 2014*

*Only available at Great Lakes Books & Supply, 840 Clark St. (Corner at Perry)

You will need 5 Scantrons, Form 882-E. Bring one to each exam.

Attendance Policy

I want you to succeed in this class. Attendance is important to your success. You need to be in class in order to consider the concepts that are presented, understand them, and participate with other students in class.

Attendance at all lectures and laboratory sessions is required. Attendance will be taken in lecture on most days, and each unexcused lecture absence ***will subtract three points from your grade on the next lecture test. Missing 3 or more labs will result in automatic failure in the course.*** Promptly contact the instructor and provide documentation if you have a valid reason to be absent. (See *Make-ups* below about the possibility of making up tests or laboratory work.)

“In the Ferris Institute, tardiness is an insult.” Woodbridge Ferris Please make every effort to arrive in class before 9:30 am. Tardy arrivals disturb other students, and miss any announcements at the beginning of class. If you are late, please enter as quietly as possible. Students who are more than 5 minutes late will be penalized 1 pt.

Bonus quizzes

There may be random bonus quizzes which will be given *only* at the beginning of the lecture period. (Tardy students will not be given bonus quizzes.) The short quizzes will be on material which was presented during recent lectures.

Class Decorum

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Patterns of behavior which obstruct or disrupt the learning environment in the classroom will be dealt with under the College *Disruptive Behavior Policy*. **Cell phones, iPads and laptop computers, etc., must be turned off, and interpersonal conversations cease, during the class period. If you want to read your emails or texts during class, go out in the hall. You may be asked to leave the classroom if you use an electronic device during class time.**

Help!

Dr. Murnik will be happy to help you during office hours or during any other available time. Please stop by the office for help or to arrange an appointment.

A tutor is also available to help you with this course. The tutor, **Nicole Christy**, will hold BIOL 101 workshops in **SCI 207** (our lab room) on **Mondays and Wednesdays from 6-7:30pm**. Students who attend tutoring sessions will receive a bonus point for each session attended.

Tests

Students may not use calculators, iPods, blackberries, cell phones, etc., while taking tests. You may not leave the lecture room during an exam. Prepare ahead.

You will need 5 **Scantron** form number **882-E** for the 4 objective tests and final exam. Bring a Scantron to each exam.

Cheating on exams or quizzes will result in failure in the course. Additional action may be taken by the university.

Make ups

Make-up tests will only be offered to students who have written documentation (such as a suitable statement from a physician, a bail bond ticket, evidence of a funeral, etc.) for serious circumstances which made it impossible to take the examination at the scheduled time.

Students with a valid reason for missing a laboratory session should attempt to attend another session later that day, if possible. Otherwise, if you have a valid reason for missing the lab, promptly contact your instructor and arrange to make up the lab within two weeks. Lab exercises will not be available to make up after that time. Some laboratory exercises involve live materials, chemicals, enzymes or DNA; parts of these exercises may not be repeatable. A comprehensive laboratory final exam will be offered to make up for one missed lab exercise.

Grades

Your final grade will be determined from the total of all points earned on lecture tests, lab quizzes, lab work and assignments. Quizzes will include short essay answers, problems to solve and objective questions. Lecture tests are objective: multiple choice and true and false. Tutor bonus points will be added to your overall grade; absence penalties are subtracted from your lecture test score.

Maximum possible points

Lecture tests	400
Writing assignments	60
Laboratory	140

The final exam (which is **required** if you have any lecture test with a grade below 70%) will replace your lowest lecture test grade (if the final exam grade is higher.) If you do not take the final exam when it was required, your overall percentage grade will be lowered by 10%.

Grading Scale

A 93-100% A- 90-92% B+ 87-89% B 83-86% C+ 77-79% C 73-76%
 C- 73-76% D+ 67-69% D 63-66% D- 60-62% F below 60%

Learning Outcomes A student succeeding in this course should be able to...	Measurable Outcome Assessment (items pertain to all outcomes, not just to that in the same row)
demonstrate understanding of fundamental principles of genetics, including those of Mendelian inheritance, molecular and population genetics	Comparison of class responses to specific questions on course examinations
analyze inheritance patterns, determine modes of inheritance and be able to use this information to calculate phenotypic and genotypic probabilities. Solve basic mathematical problems of Mendelian and population genetics	Student discussions and analyses during regular class sessions and laboratories, will indicate whether students understand the concepts being considered at that time, and provide the opportunity to re-visit the concepts right then if they are not. Comparison of class responses to specific questions on course examinations and quizzes
interpret scientific articles of a popular nature, formulate an informed opinion, and communicate this opinion to others in a verbal or written fashion.	Writing assignments , both papers and daily assignments, and class discussions , allow assessment of students' reasoning through biological concepts
demonstrate basic laboratory skills, such as the proper operation of a microscope, loading and running gels, and relate their uses to fundamental concepts of genetics.	Performance in laboratory, where each completed step is assessed, and on specific responses on weekly lab quizzes

**BIOL 101 Lecture Schedule
Spring 2015**

Date:	Topics	Assigned pages in text
Jan 13	Genetics as a Human Endeavor	Ch. 1
Jan. 15	Cells and Chromosomes; Mitosis	20-33
Jan. 20	Meiosis and Patterns of Inheritance	33-40,44-55
Jan. 22	Inherited traits in humans	58-63; 70-85
Jan. 27	Multiple alleles, linkage and variations in gene expression	63-64,70-78
Jan. 29	Review; Introduction to Development	
Feb. 3	Test 1	
Feb. 5	Sex linkage; Development	78-85
Feb. 10	Development and Sex Determination	Ch. 7
Feb. 12	Polyploidy and Aneuploidy	Ch. 6
Feb. 17	Variations in Chromosome Structure	103-143
Feb. 19,14	DNA, Chromosomes and DNA replication	Ch. 8
Feb. 26	Test 2	
Mar. 3	RNA, transcription, the Genetic Code and translation	Ch. 9
Mar. 5, 17	Metabolic Pathways and Disease, Recombinant DNA	Ch. 10
Mar. 19	DNA fingerprinting, RFLP analysis	Ch.13
Mar. 24	Mutation, Genomic imprinting	Ch. 14
Mar. 26	Mutation, mutagens, and DNA repair	Ch 11
3/.31, Apr 2	Genes and Cancer	Ch. 12
Apr. 7	Test 3	

April 9	Immunogenetics	Ch. 17
Apr. 14	Polygenes	Ch. 5
Apr.16	Twin Studies and Behavior	Ch. 18
Apr. 21	Genes in Populations	Ch. 19
Apr. 23	Human Diversity and Evolution	Ch. 19
Apr. 28	Test 4	
Apr. 30	Review Session for Final Exam	

May 4, Monday, Final examination 10-11:40 am SCI 120

Note: The lecture schedule will be modified as needed according to student progress.

BIOL 101 Laboratory Schedule Spring 2014

Date	Topic and Exercise in Laboratory Manual
Jan. 15	Exercise 1: The Use of the Microscope and Examination of Cells
Jan.22	Exercise 2: Mitosis
Jan. 29	Exercise 3: Meiosis
Feb.5	Exercise 4: Genetics I: Monohybrid Crosses
Feb. 12	Exercise 5: Genetics II: Dihybrid Crosses
Feb. 19	Exercise 6: Sex Chromatin, Barr Bodies, and the Human Karyotype
Feb. 27	Exercise 7: DNA Structure and Replication
Mar. 5	Exercise 8: DNA, RNA and Protein Synthesis
Mar. 19	Exercise 9: Reproduction and Development, Genetics and Ethics
Mar. 26	DNA fingerprinting; Exercise 11: Visualization of Normal and Transformed Cells
April 2	Paternity Testing; examination of DNA gels
Apr.9	Exercise 12: Immunogenetics
Apr. 16	Exercise 13: Polygenes
Apr. 23	Exercise 14: Genes in Populations; Evolution
Apr. 29	Optional Lab Final Examination (replaces lowest lab grade)

Laboratory participation is an important part of this course. You will receive points for each lab attended and completed. Laboratory quizzes will be given to assess your understanding of the previous lab exercise and of the introductory material presented for the current lab exercise. The laboratory portion contributes 140 points toward your total score. Lecture examinations may also include pertinent questions based on laboratory experiences.

University safety policy prohibits children in laboratories at any time.

BIOL 103 Biological Concepts

Fall 2014

Lecture: SCI 120 MWF 11-11:50AM

Lab: SCI 208 211: W 8→10:50, 212 W 12:00 → 2:50 pm, 213 W 3:00 → 5:50 pm

Instructor: Dr. Karen Barkel

Office hours: MW 9-11am or by appointment

Office: 2116 ASC Phone: 591-2544 **email: karenbarkel@ferris.edu**

The goal of this class is give you a foundation in the basic concepts of Biology (please see lecture schedule for list of topics) and show you how these concepts are connected to your every day lives.

Required Materials:

Lecture Text: Biology, A guide to the natural world, 5th edition by Krogh

Laboratory Materials: BIOL 103 Lab Manual (from Great Lakes bookstore only) /calculator

Packet of SCANTRON cards (form 882-E), 2 #2 pencils, student ID (or driver's license)

Notes and Recording: Class material will be presented during the lectures. It is your responsibility to attend class, take notes, and become informed of any announcements made during your absence. GET TO KNOW OTHER STUDENTS IN THE CLASS! The questions for the exams will be taken from the material presented in class and the chapters assigned in the textbook. You may use a tape recorder for the lectures.

Attendance: Attendance in lecture is expected. Please BE ON TIME!!!! Random bonus quizzes may be given during the semester, you must be present to get these points!

Attendance in lab is MANDATORY. Labs cannot be made up.

More than 2 missed laboratories (for any reason) will result in a failing grade in the class (Departmental Policy).

General Education Course Outcomes for Scientific Understanding (lab):

Students who have successfully completed their coursework in scientific understanding should:

1. Have a working knowledge of the fundamental principles of a natural science discipline (biology).
2. Be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences
3. Have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas
4. Have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course outcomes:

This course is a broad overview of the field of Biology, for non-biology majors. A student succeeding in this course should be able to:

1. Demonstrate by examination a general understanding of the major unifying themes of biology information and evolution, development and homeostasis, energy and resources.
2. Demonstrate their understanding that the scientific method is a way of discovering how life works.
3. Recognize and appreciate how knowledge of biological principles can help one make more informed political and consumer decisions, and make intelligent decisions regarding personal health and environmental issues.
4. Learn basic laboratory skills to explore the world of biology at the molecular, cellular, and organismal levels.

Exams: Examinations will be given during the normal lecture period on the dates are listed on the class schedule. Exams will include material covered in lecture, lab, and from assigned readings in the textbook. Failure to take an exam at the scheduled time (see class schedule) will result in a grade of 0 for the exam. If you have a valid excuse, inform me ahead of time (except for hospitalization etc.), and provide documentation within 2 weeks of the missed exam (proof of funeral, hospitalization, etc), you may replace your grade of zero with the final exam. Students who take all exams will automatically be allowed to replace their lowest exam score with the comprehensive final.

***Bring a scantron sheet (Form 882-E), 2 #2 pencils, and your student ID (or drivers license) to EVERY EXAM.

Grading: Final grades will be based on points earned in lecture (75%) and laboratory (25%).

Lecture grade (400 points) will be based on the average of 4 exams (100 points each) and an optional CUMULATIVE final (May replace one exam score, 100 points) as well as any bonus quiz points earned during the semester.

Lab grades will be based on the score earned on lab quizzes (10 points each) and lab participation (5 points each lab period). See lab section for more detail. Grade in class = (0.75 x lecture avg.) + (0.25 x lab average)

Grading Scale:

A (≥94%)	C (73 - 76.9%)
A- (90 - 93.9%)	C- (70 - 72.9%)
B+ (87 - 89.9%)	D+ (67 - 69.9%)
B (83-86.9%)	D (63 - 66.9%)
B- (80-82.9%)	D- (60 - 62.9%)
C+ (77 - 79.9%)	F (≤ 59.9%)

Academic Integrity: Any form of cheating will not be tolerated, and will result in a 0 for the assignment or exam in question. Additional action may be taken by the University.

To do well in this course: Due to the broad spectrum of material that must be covered, this is a fast pace course that will require regular attendance and studying to keep up. I suggest the following:

- Attend all lectures and labs, and BE ON TIME
- Exhibit professional behavior during class
- Ask questions in class when you don't understand something
- Take good notes, and organize them after class
- Read the assigned sections of the text book both before and after class
- Study your notes EVERY WEEK, not just before the exam
- Do the weekly study questions posted on Ferris Connect
- Seek help if you need it!!

Lecture Schedule: (subject to change)

Week	Dates	New Topic	Chapter reading
1	Aug 25 Aug 27 Aug 29	Introduction Intro Chemistry Biological molecules	1/2 2,3 3
2	Sept 1 Sept 3 Sept 5	Labor Day- No class Cell structure Membranes	4 4/5
3	Sept 8 Sept 10 Sept 12	Membranes /Energy Energy and Enzymes Continued	5 6
4	Sept 15 Sept 17 Sept 19	Exam 1 Monday Sept 15 Cellular Respiration Respiration cont.	— 7 8
5	Sept 22 Sept 24 Sept 26	Photosynthesis Cont. Mitosis	9 9
6	Sept 29 Oct 1 Oct 3	Meiosis (Start Mendel) Exam 2 Friday Oct 3	10 —
7	Oct 6 Oct 8 Oct 10	Mendel Inheritance Continued	11 12
8	Oct 13 Oct 15 Oct 17	DNA Structure and Replication Making Proteins Continued	13 14 15 (part)
9	Oct 20 Oct 22 Oct 24	Evolution cont Exam 3 Friday Oct 24	16 —
10	Oct 27 Oct 29 Oct 31	Microevolution- mechanisms Speciation and Classification Continued	17 18
11	Nov 3 Nov 5 Nov 7	Diversity -Bacteria Protists Fungi	21 22
12	Nov 10 Nov 12 Nov 14	Plants Animal diversity Continued	24 23
13	Nov 17 Nov 19 Nov 21	Exam 4 Monday Nov 17 Animals: Structure and Function Systems 1	— 30
14	Nov 24 Nov 26 Nov 28	Systems 2 Reproduction No Class: Thanksgiving	31 33
15	Dec 1 Dec 3 Dec 5	Population Ecology Community Ecology Continued	34 35
16	Dec 11 Thursday	10 -11:40am Exam 5 and optional Final Exam	

Lab information

Lab Grades:

The points earned in lab will count for about 25% of your final course grade.

Labs cannot be made up for any reason. ***Missing more than 2 labs will result in a failing grade in the course. There are no makeup labs, however if you have a valid (and documented) excuse- you may be able to attend another lab section during the week. Make sure to contact your instructor well in advance (not after you have missed the lab).

Lab Quizzes:

Quizzes are worth 10 points and may be given at the beginning or end of the lab period, depending on the exercise covered (ask your lab instructor). Dates of each quiz are listed on the Lab schedule. Your lowest lab quiz will be dropped. There are no make-ups for lab quizzes.

Lab Schedule: (subject to change)

Week	Dates	Topic	Quiz
1	Aug 27	Measurement	
2	Sept 3	Biological molecules	Quiz 1 (Measurement / Metric)
3	Sept 10	Microscope	Quiz 2 (Biological Molecules)
4	Sept 17	Diffusion	Quiz 3 (Microscope)
5	Sept 24	Respiration / Photosynthesis Lab	Quiz 4 (Diffusion)
6	Oct 1	Cell Division: Mitosis Lab	Quiz 5 (Respiration /Photosynthesis)
7	Oct 8	Heredity Lab	Quiz 6 (Cell Division)
8	Oct 15	DNA Replication, transcription and Translation	Quiz 7. (Heredity)
9	Oct 22	Evolution exercise	Quiz 8 (DNA)
10	Oct 29	Bacteria and Protists (including algae)	Quiz 9 (Evolution)
11	Nov 5	Fungi / Plants	Quiz 10 (Bacteria and Protists)
12	Nov 12	Animal Lab I: Invertebrates	Quiz 11 (Fungi / Plants)
13	Nov 19	Animal Lab II: Chordates	Quiz 12 (Invertebrates)
14	Nov 26	Thanksgiving: No Lab this week	
15	Dec 3	Card Wildlife Center	Quiz 13 (Chordates)

BIOLOGY 109
HUMAN ANATOMY & PHYSIOLOGY
4 Credit Hours
Spring Semester 2015

Instructor: John Johnson; Anna Rizzo (rizzo@ferris.edu)

Office: SCI 141, cubicle F

Phone: 591-5849

Office Hours: M & F 11am-1pm

E-mail: johnsj23@ferris.edu; best to send messages through Ferris Connect

Course Description

An introductory course designed to provide students with a basic understanding of the structural organization and functions of the major systems of the human body. laboratories provide opportunities to observe various anatomical parts and investigate physiological phenomena. For non-science students and is not applicable toward the applied biology major. This course meets General Education requirements: Scientific Understanding, Lab.

Course Materials

1. *Essentials of Anatomy & Physiology*, 6th Ed. Seeley, Stephens, and Tate
READ YOUR TEXT DAILY.
2. *Basic Human Anatomy & Physiology, Laboratory Exercises for BIOL 109*, Luane Gogolin and Robert Friar.
3. Turning Technologies Response Card NXT Clicker
4. This course is web enhanced with Ferris Connect, it will be necessary for you to access Ferris Connect to receive announcements as well as to take advantage of all the learning materials provided.

Class Schedule

Lecture (IRC 120):	MWF	10 – 10:50am		
Lab (SCI 232) :	Sec. 211 – R	9 - 10 :50am	Sec. 221 - R	12 – 1 :50pm
	Sec. 212 – T	9 - 10:50am	Sec. 222 - M	12 – 1 :50pm
	Sec. 213 – T	12 - 1:50pm	Sec. 223 - M	2 – 3:50pm
	Sec. 214 – W	12 - 1:50pm	Sec. 224 – W	2- 3:50pm
	Sec .215 – TBA		Sec. 225 -	TBA

Sections 212- 215; 222- 225 are taught by Anna Rizzo

General Education Outcomes:

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Course Specific Outcomes: by the end of the semester, you will be able to demonstrate on lecture exams and quizzes, and laboratory quizzes:

1. knowledge of definitions of basic anatomical terminology.
2. an understanding of the relationship between structure (anatomy) and function (physiology)

3. an understanding of the concept of homeostasis, and how it applies to physiology.
4. the ability to describe the major anatomical features and functions of the 11 organ systems.
5. the ability to identify the major parts of the organ systems in the laboratory.
6. the ability to describe and understand case examples of systems pathology.
7. the ability to explain, using specific examples, of how homeostatic mechanisms apply to your daily activities, including diet and exercise.
8. the ability to critically analyze reports in the news media about new developments in health and medicine.

Grading

Lecture Exam 1: 100 points

Lecture Exam 2 : 100 points

Lecture Exam 3 : 100 points

Lecture Exam 4 : 100 points

Optional Final Exam : 100 points (it will replace the lowest grade earned on Exams 1-4)

Lecture Quizzes : to be determined

Lab Quizzes: to be determined

Lab assignments: there may be additional reports that may be turned in for credit. These will be added to the total lab grade.

Extra-credit lecture quizzes (these may be unannounced)

Your grade will be based on: (lecture exams + quizzes) x 75% + (lab scores x 25%)

Source of lecture exam questions: Questions will be taken primarily from lecture and the text. Occasionally, articles may be assigned that may be used for questions as well. I reserve the right to ask questions from the assigned reading on every exam, even if the material **was not covered in class!** You are responsible for reading the text book. Each lecture exam will consist of approximately 50-75 multiple choice or matching questions. The final exam will be comprehensive, which means it will contain material from the first four exams.

Note: There will be no opportunities for extra credit, with the exception of extra-credit quizzes. The final exam will only replace the lowest earned grade, this means that you must have taken all of the first four exams in order for the final to replace the lowest.

Any students who have missed a lecture exam *MUST* notify me the day of the exam (via Ferris Connect is best). See ‘_CAS EXCUSED ABSENSE POLICY’ further down to see if you can be excused from missing a lecture exam and qualify for no deductions on make-up exam. If sick, a medical note is required in order to do make-up exam without penalty. All others; since persons who take exams late have additional time to prepare for the exam, to be fair to the rest of the class, I will deduct 5points from the score for each day the exam is delayed.

There are no make-ups for missed quizzes. ***The make-up exam may be more difficult and must be completed within 4 school days.*** The comprehensive final exam will be 100 points; it will not replace an exam that you failed to take. The time to worry about your grade is right from the start, not at the end of the semester.

Grading Scale

A	93-100%	B-	80-82.9%	D+	67-69.5%
A-	90-92.9%	C+	77-79.9%	D	63-66.9%
B+	87-89.9%	C	73-76.9%	D-	60-62.9%
B	83-86.9%	C-	70-72.9%	F	Below 60%

Lecture Attendance Policy: PLEASE READ THE NO FAULT POLICY CAREFULLY!

It is the instructor's firm belief that attendance is crucial to success in this class, however, as you are adults it is up to you how you chose to use your time. **Lab attendance, however, is mandatory!** You must attend class on exam days (please make note of the exam dates). **Attendance will be taken every day.** You must let me know immediately if you are unable to attend class. The best way to notify me is through Ferris Connect e-mail. If you miss a lecture exam, you **must** contact me the day of the exam and you will have 4 school days in which to make up the exam (see further make-up exam rules in "Grading" section above). If you miss a lecture, you are responsible for the lecture contents and any assignments given during the lecture.

Modification of above policy: according the CAS EXCUSED ABSENCE POLICY

"All student requests to be excused from classes are the responsibility of the faculty member teaching the course. The only excused absence that is a part of University policy involves institutional travel which must be approved by the Vice President for Academic Affairs. Students participating in approved University-related travel are to be excused from classes but are still responsible for making up any missed assignments and/or tests. It is up to the discretion of individual faculty members whether other extenuating circumstances should be considered for an excused absence. The Dean's office does not make these judgments for faculty."

c. Tardiness. Do **not** be late. "[At Ferris], tardiness is an insult." (W.N Ferris, founder). All students who show up late (any time after class begins) will lose 1 point from their grade. You are expected to be in your seat at least 30 seconds **BEFORE** class begins. If you have a special situation which will cause you to be tardy, discuss the situation with me during the first week of class. If you are unable to make it on time, please sneak in as quietly as possible (like a ninja).

d. Seat Assignment: There are no assigned seats. If you have trouble seeing or hearing, sit in the front of the class.

Electronic Devices

Electronic devices (cellular phones, walkmans, etc.) **must** be turned off in the lecture hall. **If your cell phone rings in class, you will be marked absent and asked to leave.** You can handle 50 minutes of not seeing your friend's latest Facebook status.

Lab Assignments

If you miss a lab, you must make it up during the same week by arranging to attend another lab. There are ten lab codes and all are full. Strive to avoid changing a lab. (The labs are listed above along with the day and time that each lab meets.) If you have a special event, e.g. a field trip in another course, **PLAN AHEAD** to attend another lab. Don't get caught short. (CONTACT me IMMEDIATELY if you miss a lab.) **Attendance to Lab is MANDATORY: Biology department dictates that more than 2 lab absences will result in FAILURE of the course!**

a. You **MUST GET PERMISSION** from me to attend another lab.

b. A lab that is missed and not made up by attending another lab will result in a "zero" grade for that lab.

Lab attendance is mandatory. A quiz will be given each lab session. This quiz must be taken during your lab period. Missing your scheduled lab time and attending a different lab time will result in 2 points deducted for your lab quiz.

If you show up late to lab (anytime after lab is scheduled to begin) you will have 2 points deducted from your lab quiz for that day!

Academic Misconduct

"When any society loses faith in honesty, its disintegration is a certainty." W.N. Ferris, founder. Cheating will not be tolerated.

Students are referred to the section on **ACADEMIC MISCONDUCT** that is found on the final sheet attached to this syllabus.

Disruptive Behaviors

Behaviors that are disruptive to learning will not be tolerated. Talking in class will **NOT** be tolerated. ANY STUDENT WHO HABITUALLY PERSISTS IN TALKING DURING LECTURE WILL BE ASKED TO LEAVE. This applies to lab as well.

Children in the classroom

Students are strongly discouraged from bringing children to the lecture hall. Because of safety and liability reasons, under no circumstances will children be allowed in the laboratory.

Food and Beverages in the classroom

Water is acceptable, but food and beverages (e.g. pop) should not be consumed in class. Because of safety and liability reasons, no food or beverages are allowed in the laboratory.

Final Exam

Your final exam is scheduled for Tuesday, May 5, at 10-11:40 AM in IRC 120

Note: You **cannot** take the final exam at a different time from your scheduled time

without prior approval from the instructor. The optional final replaces the lowest EARNED grade from the first 4 exams. You must take the first 4 exams.

*NOTE: Instructor reserves the right to make needed and appropriate adjustments to the syllabus. Any changes will show up on Ferris Connect, but will not be passed out in hardcopy form.

The best time to be concerned with your grade is right from the start. If you are struggling, please come see me as soon as possible. There is also tutoring available at the tutoring center (ASC 1017; (231) 591-3543)

TENTATIVE LECTURE SCHEDULE*

<u>DATE</u>	<u>TOPIC</u>	<u>Reading Assignment</u>
1-12	Introduction to the Human body	Ch 1
1-14	The Chemistry of Life	Ch 2
1-16	The Chemistry of Life	Ch 2

1-19	Martin Luther King Day: No Class	
1-21	The Chemistry of Life	Ch 2
1-23	Cell Structures and Their Functions	Ch 3

1-26	Cells, Tissues	Ch 3,4
1-28	Tissues, Glands, and Membranes	Ch 4
1-30	Tissues, Glands, and Membranes	Ch 4

2-2	Integumentary System	Ch 5
2-4	Integumentary System	Ch 5
2-6	EXAM 1 (Ch.1-5)	

2-9	Skeletal System	Ch 6
2-11	Skeletal System	Ch 6
2-13	Muscular System	Ch 7

2-16	Muscular System	Ch 7
2-18	Nervous Tissue, Action Potentials	Ch 8
2-20	Nervous Tissue, Action Potentials	Ch 8

2-23	Central Nervous System	Ch 8
2-25	Central Nervous System	Ch 8
2-27	Peripheral Nervous System	Ch 8

3-2	Peripheral Nervous System	Ch 8
3-4	The Senses	Ch 9
3-6	EXAM 2 (Ch.6-9)	

3-7→15	SPRING BREAK →	

3-16	Endocrine System	Ch 10
3-18	Endocrine System	Ch 10
3-20	Cardiovascular System: Blood	Ch 11

3-23	Cardiovascular System: The Heart	Ch 12
3-25	Cardiovascular System: Blood Vessels & Circulation	Ch 13
3-27	Cardiovascular System: Blood Vessels & Circulation	Ch 13

3-30	Lymphatic System	Ch 14
4-1	Lymphatic System	Ch 14
4-3	Mid-Semster Recess (starting 4-2): NO CLASS	

4-6	Respiratory System	Ch. 15
4-8	Respiratory System/Review	Ch 15
4-10	EXAM 3 (Ch.10-15)	

4-13	Digestive System	Ch 16
4-15	Digestive System	Ch 16
4-17	Metabolism	Ch 17

4-20	Urinary System	Ch 18
4-22	Urinary System	Ch 18
4-24	Reproductive System	Ch 19

4-25	Reproductive System	Ch 19
4-27	Review	
4-29	EXAM 4 (Ch.16-19)	

FINAL EXAM : Tuesday, May 5, at 10-11:40am in IRC 120

*NOTE: Instructor reserves the right to make needed and appropriate adjustments to the schedule. Check Ferris Connect.

Tentative Laboratory Schedule*

Week of:

1/12: Lab Exercises 1 & 2: Body Organization; Microscopy

1/19: No Lab; Martin Luther King Day

1/26: Lab Exercise 3: Epithelial and Muscle Tissues

2/2: Lab Exercise 4: Osmosis, Connective and Nervous Tissues

2/9: Lab Exercise 5: Skeletal System

2/16: Lab Exercise 6: Skeletal Muscles

2/23: Lab Exercise 7: Brain, Spinal Cord, Reflexes

3/2: Lab Exercise 8: Sensations

3/9: No Lab; Spring Break

3/16: Lab Exercise 9: The Heart

3/23: Lab Exercise 10: Blood and Blood Vessels

3/30: No Lab; Mid-Semester Break

4/6: Lab Exercise 11: Respiratory & Digestive Systems

4/13: Lab Exercise 12: Urinary & Reproductive System

4/20: Lab Exercise 13: Urinary/Reproductive System Quiz/Review

4/27: Lab Practical

*Note: There will be a quiz given at the beginning of every lab with the possibility of a quiz at the end of lab. Anything in the lab manual is fair game for quiz material. Therefore, you should read the manual and study all diagrams before you come to lab.

*NOTE: Instructor reserves the right to make needed and appropriate adjustments to the lab schedule.

FOR YOUR SAFETY, PLEASE DO NOT BRING FOOD or BEVERAGES into LAB.

FOR THE SAFETY OF SMALL CHILDREN, THEY ARE NOT PERMITTED IN LAB.

2014 Fall Semester - Lab Schedule

Lab Instructor: Arlene Westhoven

Office: ASC 2004 Phone: 591-5842 E-mail: westhova@ferris.edu

Office Hours – Wednesday 11-noon
Thursday 10:00 - noon

Section

- 211 Lab: 9-10:50 T SCI 227 - Workman
- 212 Lab: 12-1:50 T SCI 227 - Workman
- 213 Lab: 9-10:50 W SCI 227 - Westhoven**
- 214 Lab: 12-1:50 Th SCI 227 - Westhoven**

Required Lab Text: *Biol 111 Environmental Biology*: Rodabaugh 2013 – Available ONLY at Great Lakes Bookstore

Course Description: You have selected BIOL111, Environmental Biology, to fulfill the requirement for a lab science. Laboratory exercises allow you “hands on” experience using the steps of the scientific method to investigate the concepts presented in lecture. You will learn to use tools, techniques, and calculations that will help you draw conclusions from your observations. I hope you find the lab setting to be a rewarding and enjoyable learning experience.

Attendance: You must attend lab at your scheduled time. If you have an OCCASIONAL conflict, you may attend another lab, ONLY with permission from lab instructor. Labs must be made up during the scheduled week.

Hand in the assigned pages at the end of each lab. At the beginning of lab, there will be a 10-point quiz on the previous week’s work. At the end of each lab, I will hand out a work sheet to do for the next week’s lab.

HAVE YOUR LAB BOOK, A CALCULATOR, AND A PENCIL WHEN YOU COME TO LAB

Lab Schedule

Week	Lab	Lab for the Week
Aug 25		NO LABS First Week
Sept 2	1	Metrics
Sept 8	2	Population dynamics
Sept 15	3	Biological organization/microscope
Sept 22	5	Individual and population genetics
Sept 29	4	Soils and particle distribution
Oct 6	-	Global Warming
Oct 13	-	Field Trip to Big Rapids Wastewater Treatment Fac.
Oct 20	6	Dissolved oxygen (DO)
Oct 27	8	Acid rain
Nov 3	10	Solid waste
Nov 10	2	Population experiment/essay
Nov 17	12	Biodiversity/population essay due
Nov 24		Thanksgiving – NO LABS THIS WEEK
Dec 1	14	Card Wildlife Center

ENVIRONMENTAL BIOLOGY

BIOL 111 – FALL 2014

Instructor: Doug Workman, Ph.D.
Office: ASC 1013
Phone: O: 591-2558 C:(231) 912-0506
E-mail: DougWorkman@ferris.edu

Office Hours: T 3 PM-4PM
W 11AM-12PM
TH 3 PM-4PM
OR BY APPT.

Welcome to Environmental Biology! This is an introductory course for non-majors and is intended to provide fundamental principles of biology as they apply to people, their health, as individual organisms, as species, and as a part of a functioning ecosystem. It is my intent to relate biological concepts to relevant topics. Student participation is strongly encouraged during class and lab. Any time you have a concern about the course material or your grade, DON'T WAIT. Come see me promptly as we cover a lot of material in a short period of time.

General Education Outcomes:

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

1. Have a working knowledge of the fundamental principles of a natural science discipline;
2. Be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
3. Have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
4. Have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course outcomes:

This course is a broad overview of the field of biology, for non-biology majors. A student succeeding in this course should be able to:

1. Have a working knowledge of the fundamental principles of a natural science discipline.
2. Demonstrate understanding that the scientific method is a way of discovering how life works.
3. Recognize and appreciate how knowledge of biological principles can help one make more informed political and consumer decisions, and make intelligent decisions regarding personal health and environmental issues.
4. Learn basic laboratory skills to explore the world of biology at the molecular, cellular and organismal levels.

Lecture: Tuesday and Thursday 4:00PM – 5:15 PM in SCI 126

Required Materials:

1. Lecture Text: Norm Myers and Scott Spoolman. 2014. Environmental Issues and Solutions
2. Turning Technologies Response Card (Digital Clicker for answering questions in class) – available with course text as a package or may be purchased individually.

FSU sells text and clicker, **or you may find text and clicker cheaper on the internet.**

3. Lab Book: BIOL 111 Lab Manual (Available only at Great Lakes Bookstore)

***Please be sure to bring a **calculator** to lab with you as well. ***

Attendance Policy: Prompt attendance to all lectures is required and expected. If you miss lecture, you are responsible for the lecture contents and any assignments given out during the lecture. **Attendance in all lab sessions is required as there will be no make up lab period.**

Excused absences (Serious illness, family emergency and very limited circumstances): They only excuses that will be accepted for missing a scheduled lecture exam or laboratory is a signed document from your physician indicating that due to your medical condition you were unable to attend class that day, or a signed statement from a funeral director that you attended a funeral of an immediate family member. All other excuses will not be accepted. You must see me before your next scheduled lab to make up the missed lab. *Any lab that is not made up will result in 0 points recorded for that lab. The reality: You actually wind up missing two weeks worth of points (last week's lab participation and quiz and missing critical information for next week's quiz).* Please schedule your travel and personal commitments accordingly.

Unexcused absences: There will be no makeup for unexcused absences.

Your Grade: Your grade for this course will be based your performance in Four Exams, Weekly Laboratory Quizzes, Lecture quizzes (approximately one each week) and participation in daily class clicker questions.

Examinations and Point Distribution: Your scores will be weighted according to the following: **70%** of your grade will be determined by the results of your lecture quizzes, 3 lecture exams and final exam; **20%** of your grade will be determined by the results of your lab quizzes and lab notebook; **10%** of your grade will be determined by your lecture attendance as determined by participation in daily clicker questions. Failure to take an exam at the scheduled time (see class schedule) will result in the loss of all points for that exam. Please schedule your travel and personal commitments accordingly.

Lecture Quizzes

Lecture quizzes are typically unannounced and are offered as a means to measure your comprehension of class material. Quiz material may show up on lecture and final exams. Participation in lecture quizzes is mandatory and failure to do so will affect your final grade. Your performance on quiz scores is factored into 70% of your class grade as previously described.

Grading Scale

Grading will be done on a straight scale as follows:

A = 93-100%	B = 83-86.9%	C = 73-76.9%	D = 63-66.9%
A- = 90-92.9%	B- = 80-82.9%	C- = 70-72.9%	D- = 60-62.9%
B+ = 87-89.9%	C+ = 77-79.9%	D+ = 67-69.9%	F = Below 60%

Grade Disputes

If you believe there is an error in the calculation of any of your graded assignments, you need to come and see me during office hours (or make an appointment) to discuss your assignment.

Important considerations

TURN OFF YOUR CELL PHONES – be respectful to everyone in the class!

The lectures do not necessarily follow the textbook and Powerpoints closely. Be sure to attend each lecture and take good notes.

Lab sections **will not meet** during the first week of class.

Be aware there is discussion during my class and exams may contain discussion material will not be on PowerPoints. Failure to attend class on a regular basis will certainly affect your ability to answer exam questions.

Although we have a defined course outline, the material may change. The instructors reserve the right to alter schedules, topics, exams and any other material needed to manage the course effectively.

Fall 2014 LECTURE SCHEDULE

Date	Chapter	Topic
8/26	1	Syllabus, Text, and Introduction
8/28	1	Sustainability, Scientific Method, Environmental Ethics
Course clickers are mandatory by second week of semester!		
9/2	2	Population Dynamics and Humans
9/4	2	Population Dynamics and Humans
9/9	1	Chemistry and molecules
9/11	1	Molecules, energy, respiration and photosynthesis
9/16	1	Molecules, energy, respiration and photosynthesis
9/18	-	Exam 1
9/23	8	Population genetics and natural selection
9/25	13	Ecosystem cycles and Climate Change
9/30	13, 4	Climate change and soil
10/2	4	Soil processes and farming
10/7	10	Water and water cycles
10/9	11	Streams and water pollution
10/14	11	Wastewater Management
10/16	-	Exam 2
10/21	5	Energy production
10/23	12	Acid rain and air quality
10/28	14	Solid waste management
10/30	5	Renewable energy – wind and hydroelectric
11/4	6	Non-renewable resources – mining and fracking
11/6	-	Exam 3
11/11	10	Groundwater and water rights
11/13	10	Groundwater and water rights
11/18	15	Environment and human health
11/20	9	Stream Habitat Restoration
11/25	15	Environment and human health
11/27		NO CLASS - THANKSGIVING
12/2	-	Invasive species
12/4	-	Exam 4
12/9 (Tuesday)		Optional Cumulative Final Exam (4PM-5:40PM)...Must sign in whether taking exam or not!!!

2014 Fall Semester Lab Schedule

Lab Instructor: Doug Workman or Arlene Westhoven
Westhoven's Phone: 591-5842
E-mail: westhova@ferris.edu

Section

211 Lab: 9-10:50 T SCI 227 - Workman
212 Lab: 12-1:50 T SCI 227 - Workman
213 Lab: 9-10:50 W SCI 227 - Westhoven
214 Lab: 12-1:50 Th SCI 227 - Westhoven

Required Lab Text: *Biol 111 Environmental Biology*: Rodabaugh 2013 – Available at Great Lakes Bookstore

Course Description: You have selected BIOL111, Environmental Biology, to fulfill the requirement for a lab science. Laboratory exercises allow you “hands on” experience using the steps of the scientific method to investigate the concepts presented in lecture. You will learn to use tools, techniques, and calculations that will help you draw conclusions from your observations. I hope you find the lab setting to be a rewarding and enjoyable learning experience.

Attendance: You must attend lab at your scheduled time. If you have an OCCASIONAL conflict, you may attend another lab, ONLY with permission from lab instructor. Labs must be made up during the scheduled week.

Lab Schedule

Week	Lab	Lab for the Week
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Sept 8	2	Population dynamics
Sept 15	3	Biological organization/microscope
Sept 22	5	Individual and population genetics
Sept 29	4	Soils and particle distribution
Oct 6	-	Global Warming
Oct 13	-	Field Trip to Big Rapids Wastewater Treatment Fac.
Oct 20	6	Dissolved oxygen (DO)
Oct 27	8	Acid rain
Nov 3	10	Solid waste
Nov 10	2	Population experiment/essay
Nov 17	12	Biodiversity/population essay due
Nov 24		Thanksgiving – NO LABS THIS WEEK
Dec 1	14	Card Wildlife Center

SYLLABUS ATTACHMENT
COLLEGE OF ARTS AND SCIENCES – FERRIS STATE UNIVERSITY
FALL 2014

ARE YOU CONSIDERING ADDING A MINOR OR MAJOR TO YOUR CURRENT PROGRAM?

Use **My Degree** to see what classes may already apply.

For more information, stop by the Arts and Sciences Dean's Office!

IMPORTANT DATES		
Late registration	Wed. – Fri.	Aug. 20 – 22
First day of classes	Monday	Aug. 25
Last day for Drop/Add	Thursday	Aug. 28
Labor Day (no classes)	Monday	Sept. 1
Mid-term grades due	Monday	Oct. 20
Last day for "W" grades	Thursday	Oct. 30
Thanksgiving recess begins (no classes)	Wed (noon)	Nov. 26
Thanksgiving recess ends (classes resume)	Monday	Dec. 1
Last day of classes	Friday	Dec. 5
Examination Week	Mon – Fri	Dec. 8 - 12
Commencement	Saturday	Dec. 13
Final grades due by 1:00 pm	Monday	Dec. 15
Grades available to students on MyFSU	Tuesday (after 8AM)	Dec. 16

Sessions	Dates	Last Day to Withdraw
Full Session	Aug. 25 – Dec. 5	Oct. 30
Session A	Aug. 25 – Oct. 14	Sept. 25
Session B	Oct. 15 – Dec. 5	Nov. 14
Session D	Aug. 25 – Sept. 26	Sept. 15
Session E	Sept. 29 – Oct. 30	Oct. 17
Session F	Oct. 31 – Dec. 5	Nov. 20

DEPARTMENT OFFICES

Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Languages & Literature	ASC 3080	591-3988
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Dean's Office	ASC 3052	591-3660

WHAT YOU NEED TO KNOW

E-MAIL

All registered FSU students have a Ferris Gmail account. This is the only e-mail to which all official University information about registration, financial aid, student activities, and class cancellations will be sent. Please check your account at least once a week. E-mail is our primary communication resource for students.

CLASS ATTENDANCE IS IMPORTANT!

Attendance usually has a high correlation with how well you do in a course. Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness to encourage students to be present for the full class period. Check your course syllabus or talk to your instructor about his/her policies.

HOW TO CONTACT A FACULTY MEMBER OR ADVISOR

If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, through the College of Arts and Sciences web page at <http://www.ferris.edu/htmls/colleges/artsands/>, or through the Directories & Maps link on the FSU home page.

DROPPING CLASSES OR WITHDRAWING */**

Dropping and adding only occurs during the first four days of the term. You can adjust your schedule **online during the first four days** or in person at the Timme Center (from 8-5 except for the last day when it is 12-5). *If you add a class you must pay for your additional charges by the fourth day or your schedule will be dropped.*

If you need to withdraw from a class after the official drop/add period, you must do so **OFFICIALLY**, through your dean's office, in order to avoid receiving an "F" grade in the course. **You may not withdraw online after the first four days of the term.** You will receive a "W" for the course. *You will not receive a refund.* If you need to totally withdraw from the University, you must do so **officially** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. **CHECK THE SESSIONS DATES SECTION ABOVE OR THE REGISTRATION AND ACADEMIC GUIDE FOR THE WITHDRAWAL DEADLINES FOR THE SEMESTER.**

In cases of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES

The "I" is only considered for extenuating circumstances that have led to a student missing a portion of the course. The intent and appropriate use of the "I" grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended alternative to withdraw from a

class (W). Extenuating circumstances are generally defined as those situations over which a student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an “I” will be considered, and they may be required to sign an agreement regarding course completion. An “I” grade automatically changes to an “F” after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

GRADUATION

Students should apply for graduation the semester prior to their last semester of completion. For associates in arts or associates in science degrees, this needs to be completed at the Dean’s Office. For bachelor degrees, this needs to be completed with your program coordinator. Be aware of deadlines for participation in commencement.

INCLEMENT WEATHER CONDITIONS

Only during the most severe weather conditions – which could potentially endanger the safety of students or staff – will the Big Rapids campus consider cancelling classes. The decision to cancel classes due to weather conditions at the Big Rapids site will be made as early as possible. In the event it is necessary to cancel classes, periodic announcements will be made on area radio and television stations. It is the student’s responsibility to listen for these announcements. A student may also call the Ferris Information Line at 231-591-5602 to obtain information or check the Ferris website.

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person’s ideas or work as your own, taking someone else’s exam for them, violating computer software licenses or program/data ownership, etc. It is the expectation of the College of Arts and Sciences that all work you turn in is your own and is original for the course in which it is being submitted. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification.

Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated.

Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University. The full Disruptive Behavior Policy is available on the College of Arts and Sciences website at <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/CAS-disruptive-behavior-policy-final.pdf>

For additional policies and helpful information, check out the College of Arts & Sciences Student Resources page at <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/>

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of university life. Don’t hesitate to explore and use these services at Ferris.

ACADEMIC ADVISING

All students have an assigned advisor and should confer with that advisor regularly. Students who have declared a major should see an advisor in that major. To find out who your advisor is, login to MyFSU and click on the Academics and Services tab, then Registration Status / Advisor Information link.

ACADEMIC SUPPORT CENTER.....ASC 1017 – 591-3543

THE WRITING CENTER.....ASC 1017 – 591-2534

The Academic Support Center, Tutoring Services, and Writing Center join together to offer FSU students an array of academic support services. Tutors are available to answer questions for many courses. The Writing Center helps writers individually and in workshops with skills and assignments. There is also study skills assistance to help with note-taking, test-taking, memory and reading strategies, and time management.

DISABILITIES SERVICES.....STR 313 – 591-3057

According to the Americans with Disabilities Act, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. Students requiring a classroom accommodation due to a physical, learning, mental or emotional disability should contact the Disabilities Services Office.

SCHOLAR PROGRAM.....ASC 1021 – 591-5976

SCHOLAR is an academic support program that aids in the student’s successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

PERSONAL COUNSELING, SEXUAL ASSAULT, SUBSTANCE ABUSE BIRKAM HEALTH CENTER 2nd Floor - 591-5968 Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment.

If you or a friend is in immediate crisis, call 911.

EDUCATIONAL & CAREER COUNSELINGSTR 313 – 591-3057

Students wanting to examine their choice of major or career choice, learning styles or strategies can make one-on-one appointments with licensed counselors.

SAFETY

Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

OTHER RESOURCES

BIRKAM HEALTH CENTER.....1st Floor - 591-2614

The Birkam Health Center provides fee-for-service medical care including evaluation and treatment for illness and injury anytime during the year. Patients are seen on a walk-in and by appointment basis.

FLITE LIBRARY.....591-2669 Regular hours for FLITE:

Monday – Thursday 7:30 a.m. – MIDNIGHT

Friday 7:30 a.m. – 6:00 p.m.

Saturday NOON – 5:00 p.m.

Sunday 1:00 p.m. – MIDNIGHT

Extended Studies Court will begin late night hours September 16, 2014

*Sunday-Thursday/MIDNIGHT to 7:30 a.m. *Friday/6 p.m. to MIDNIGHT

*Saturday/5 p.m. to MIDNIGHT)

FSU BOOKSTORE.....14265 NORTHLAND DR. 231 591-2607

Regular on-campus hours for the Bookstore **:

Monday – Thursday 9:00 a.m. – 6:00 p.m.

Friday 9:00 a.m. – 5:00 p.m.

Saturday 12:00 p.m. – 4:00 p.m.

Sunday CLOSED

Located at the Save-A-Lot Shopping Center Plaza.

HELPFUL NUMBERS

Admissions	2100	Inst. Testing	3628
Business Office	2125	Public Safety	5000
Financial Aid	2110	Records	2792
Housing	3745	TAC	4822

When calling from off campus, extensions can be called by using the prefix 231-591-_____.

Biology and Turf grass Maintenance

Summer 2015

Instructor: Anna Rizzo

Office: Science 141a

Office Hours: Monday & Wednesday 11:00am – 12:00pm.

Phone: 231 591 – 5841

Email: rizzo@ferris.edu

- Course requirement lecture 3 hours per week.

Monday & Wednesday 9:00am – 10:35am in Science 126

- Lab requirement 2 hours per week.

Tuesday (section 211), Thursday (section 212) 8:00am – 9:55am Sci 232

Textbook (available at the University Center Bookstore)

Turf grass Management, ninth edition by A.J. Turgeon

Additional course Materials: three ring binder for semester turf analysis project and turf disease journal.

Course Description

The study of the biology of plants and soils as they relate to the turf grass environment. Includes the growth, care, and management of turf and turf grass, used on golf courses. Intended for professional golf management majors. Laboratory exercise is designed to reinforce the lecture material with hands-on experiences.

Course Objectives

This course is designed to prepare the Professional Golf Student for the PGA Professional Golf Management certification test.

At the completion of this course, the student will:

- Demonstrate by examination the plant anatomy and physiology, knowledge of cellular organelles, function of organelles, tissues, and internal and external structures of grasses.
- Demonstrate the ability to analyze soil composition, obtain soil samples, determine soil content of sand, clay, topsoil, and loam, test soil pH, and how to improve soil composition.

- Demonstrate the ability to determine different turf grass by examining external turf anatomy.
- Demonstrate the knowledge of climate and turf grass grown in different climates (warm vs. cool)
- Recognize turf grass abnormalities and causes lack of nutrients, acid or basic pH, salinity. And pathogens.
- Show an ability to utilize equipment (such as a microscope, pH meter) safely and effectively to complete lab assignments.
- Understand golf course construction, maintenance, mowing, seeding, fertilization, herbicide and pesticide administration
- Use the scientific method to formulate hypotheses, design an experiment, collect samples, analyze/test samples and make conclusions.

BLACKBOARD: Lecture outlines, announcement, supplemental resources and grades will be available.

Tests and Quizzes:

No makeup: lecture quizzes, exams and classroom work. Without a valid documented excuse.

- 4 lecture Exams 100 pts. Each
- Weekly lecture quizzes 10 pts. Each
- Lecture activities 5 to 10pt.
- Lecture Portions 70% of total grade
- Final exam Optional TBD
- Lab Weekly Quizzes and Assignments: 30% of total grade

100 pt. Turf grass analysis report 100pts. Turf grass disease Journal 50 pts.

Grading Scale:

A = 93 – 100%	A- = 90 -92%	B+ = 87- 89	B = 83 -86%	B- = 80 – 82%
C+ = 77 – 79%	C = 73 – 76%	C- = 70 – 72%		
D+ 65 – 69%	D = 60 – 64%	D- = 57-59%	F= Below 57%	

EXAM FORMAT

- Exam questions will be true/false, multiple choices and will come from lecture notes, handouts, and lecture quizzes. STUDENTS ARE REQUIRED AND EXPECTED TO TAKE EXAMS AT THE

SCHEDULED TIME. Failure to take exams at the scheduled time will result in a grade of zero on that exam.

- In the case of documented illness or extenuating circumstances, a make-up exam will be given, after a written explanation or valid documentation (such as a letter from a physician, evidence of funeral, etc.) has been submitted to the instructor. The documentation or explanation must be submitted within 2 weeks of the missed exam. An explanation submitted after the two week period is considered late, and unacceptable, resulting in a grade of zero for that exam.

Attendance:

Attendance to all lectures is required and expected. Come to class on time and prepared. If you miss a lecture, you are responsible for the lecture contents and any assignments given during the lecture. **YOU CANNOT MAKEUP A LECTURE QUIZ**

Disruptive Behavior:

End conversations once instructor starts class. Please **turn off your cell phone** and put it in your backpack. If I see you texting during lecture or lab the phone is mine for the duration of class.

Biology 114 Turf grass

Lecture Schedule

Summer 2014

Unit	Date	Topic/chapter
Turf grass Intro	May 20	Chapter 1
Grass Anatomy	May 25	Chapter 2 and 3
Plant cells	May 27	Chapter 2 pg. 38 - 48
Plant physiology	June 1	Chapter 2 pgs. 49 - 46
Plant Nutrition	June 3	Chapter 5 pgs. 169 - 185
Soil Chemical Properties	June 8 and 10	Chapter 4
EXAM 1	Monday June 15, 2015	
Turf grass Diseases	June 17 Assignment	
Turf grass Insects/nematodes	June 22	
Turf grass Weeds	June 24	
EXAM 2	Monday June 29, 2015	
Irrigation	July 1	Chapter 5 pgs. 189 - 207
IPM	July 6	Chapter 7 pgs. 231 -304
Cultural systems	July 8	
Golf Course Construction	July 13	Chapter 8 pg. 332 - 340
<i>Field trip</i>	<i>TBA</i>	
EXAM 3	Wednesday July 15	
Use of Pesticides	July 20	
Fertilizers	July 22 and July 27	
Sprayers and Spreader	July 29 and August 3	
Budgets	August 5	
Exam 4	Wednesday ,August 12	

Turf Grass Lab Schedule

DATE(wk. of)	LAB
Week 1 May 18 (Rizzo)	Soil composition and Grass Characteristics
Week 2 May 25 (Rizzo)	The Microscope and Cell structure
Week 3 June 1 (Rizzo)	Monocot Anatomy and Transpiration
Week 4 June 8 (Rizzo)	Membrane Permeability, Photosynthesis, cellular respiration
Week 5 June 15 (Rizzo)	Turf Soils
Week 6 June 22 (Rizzo)	Turf Grass

Week of June 29 to the end of the Semester lab will be at Katke golf course

Instructor: Tony Geib

Lab Schedule is Tentative and subject to change.

Attendance: Attendance to all lab classes is mandatory. If you miss your assigned lab session for a valid reason, you may arrange with the lab instructor to attend another lab session the same week or a zero grade is given for a missed quiz. The Biology Department's policy states that more than two unexcused lab absences are grounds for failing grade in the course.

Lab quizzes occur each week covering the previous week's material. Make-up quizzes are not given without a legitimate excuse.



Course Description: Great Lakes flora and fauna are studied, with emphasis on ecological relationships and environmental impacts. Fisheries and wildlife management principles are also discussed. Open to recreation and outdoor activities directors, teachers needing updating in natural science, lifelong learning adults and others interested in the out-of-doors. Not applicable to the applied biology major. Some hiking required. This course meets General Education requirements: Scientific Understanding, Lab.

Course Outcomes:

(1) *General Education.* This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- Have a working knowledge of the fundamental principles of a natural science discipline.
- Be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences.
- Have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas.
- Have a more positive attitude toward science and an increased confidence in their ability to understand science.

(2) *Specific Course Outcomes.* Through the **knowledge acquired in lecture, daily material assessments, performing laboratory activities, application of journaling exercises, and a community service project**, students will be able to:

- Explain the interconnectedness among living and non-living things within a habitat.
- Identify basic flora, fauna, and habitats of Michigan by using field guides effectively.
- Predict the potential consequences of a habitat being altered in terms of species populations and interactions.
- Discuss many of the positive and negative impacts humans have on Michigan habitats.
- Develop an appreciation of the natural world through direct experience with local habitats.

Instructor: *Cindy Fitzwilliams-Heck*

<p><u>Office</u></p> <p>Science Building (SCI) 141-E</p> <p><u>Phone:</u> Office: (231) 591-5843</p> <p>Cell : (231) 349-7495 (texts okay)</p> <p>Home: (231) 592-4067 No calls 9pm - 6am</p> <p><u>E-mail:</u> fitzwilc@ferris.edu</p>	<p><u>Office Hours</u></p> <p>Tue - Wed 8 – 9:00 a.m. Wed & Fri 1 – 2:00 p.m.</p> <p>Or call/email for an appointment.</p> <p><u>Lecture</u></p> <p><u>M W F</u> at 2 – 2:50 p.m.</p> <p>All lectures meet in SCI 126.</p>	<p><u>Laboratory</u></p> <p>Mon 9 – 10:50 a.m. (211) 11 – 12:50 p.m. (212)</p> <p>Tue 9 – 10:50 a.m. (213) 12 - 1:50 p.m. (214)</p> <p>All labs meet in SCI 208 unless otherwise stated on our lab schedule, in class, or on Ferris Connect.</p>
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Grading Scale:

A = 100-94%	B = 86.9-83%	C = 76.9-73%	D = 66.9-63%
A- = 93.9-90%	B- = 82.9-80%	C- = 72.9-70%	D- = 62.9-60%
B+ = 89.9-87%	C+ = 79.9-77%	D+ = 69.9-67%	F = below 60%

REQUIRED Materials for the Course:

(1) **Reference books (7):**

- Trees of Michigan (Kershaw)
- Golden Guide: Pond Life (Reid)
- Insects of the Northwoods (Hahn)
- Fish of Michigan Field Guide (Bosanko)
- Amphibians & Reptiles of the North Woods (Sheldon)
- Birds of Michigan (Black & Kennedy)
- Mammals of Michigan Field Guide (Tekiela)

(2) **FerrisCONNECT (FC) access** (for printing notes/assignments, reading emails, turning in papers, and taking quizzes)

(3) **Nature Journal folder with tab dividers** (ACCEPTABLE OPTIONS: folder with fasteners or ½" binder)

(4) **Three-ring binder (1") for lecture notes** (with pockets)

(5) **MISCELLANEOUS:** camera, line paper, #2 pencil, eraser, basic calculator, hole punch, stapler

(6) **COMFORTABLE WALKING SHOES (do not wear flip-flops or open-toed sandals to outside labs!)**

★ **ATTENDANCE POLICY:**

(a) **Prompt attendance to all lectures and labs is expected & critical to your grade.**

(b) If you miss lecture, you are responsible for its content & any assignments given during class. Notes & assignments will be available on FerrisCONNECT.

(c) You will sit in the same seat every lecture, but I won't take actual roll (**seating chart** will be passed around the second lecture so I can learn names ... remember, I have the right to change your seat).

(d) **Attendance in all lab sessions is required (note: LAB QUIZ most days)** ... there will be no make-up labs (see 'Grading Policy: Labs' section for more information). According to the FSU Biology Department's policy, **missing more than two lab periods may result in failure of the class.**

★ **GRADING: (Cheating will result in a zero & other disruptive behavior like using electronic devices or excessive talking may result in a grade reduction and will be reported to the Dean).**

(a) To figure out grades, **compare your total number of points to the number of points possible** in the course. Keep all your papers & start your own grade sheet. **Current grades will be updated regularly on FerrisCONNECT.**

(b) **Labs** **10-50 points each**

Laboratory attendance is mandatory! More than two unexcused absences will result in failure of the course. **Labs cannot be made up.** You must notify me prior to missing lab in order for me to determine which of the other lab times you can attend *that* week. The lab quiz points may vary each week depending on the material. Arriving late, leaving early, not doing your own work, not fully participating, or not being prepared for class (i.e. no field guide, no pencil, etc.) will result in a deduction of your lab points.

(c) **Nature Journal (NJ)**..... **+/-= 300 points**

You will select an outside location of your choice (some place convenient - near where you *currently* live) to complete your requirements for this project. To help earn a good grade: pay close attention to assignment details, grading criteria, and due dates. The assignment sheets will be available throughout the semester on FerrisCONNECT for you to print, or may also be distributed in class. The final due date of the project is: **WEDNESDAY, NOVEMBER 27, 2013 @ 2:00 p.m.**

(d) **Community Service Project** **TBA**

The academic service-learning project is yet to be determined. You will take an active role in our community doing things to improve the environment. Stay tuned for more details!

(e) **Daily Assessments** **<,>= 12 points**

We will have an assessment (quiz) everyday in **lecture and/ online**. Questions will come from lecture material, homework assignments, and lab. The number and type of questions will vary depending on the material.

(f) **In-Class Assignments** **up to 10 points**

There may be unannounced/announced activities given during class.

(g) **Homework** **10 - ? points**

Take-home/online assignments given periodically throughout the course. Assigned in lecture or online.

(h) **Final Exam**..... **100 points**

Save all class notes, labs, books, homework, etc. to help you review.

(i) **Make-Up Work** ... If you have a documented excuse (i.e. a doctor's note, an excused university absence, funeral verification, or extenuating circumstances) you may complete the missed work for full credit. Stipulations: **you must contact me before class** to discuss your issue. Only **two excuses** allowed. Any missed assignment is **due upon return to class**. If you missed two classes, you have two days (not just class days) to turn in your work (I accept assignments online, or bring it to my office). If you do not have a legitimate excuse, and you missed an assignment or quiz, you may complete it for **half credit within 24 hours** of missing the work (contact me if you don't see anything new posted on FC).

(j) **Losing Points** ... **Using electronic devices** (i.e. phone, computer, mp3, etc.) during an assessment, at an inappropriate time, or if it is disruptive to those around you.

(k) **Extra Credit**... There WILL be some. Advice: come to class, check FerrisCONNECT often, & take advantage of every extra credit opportunity! No extra credit can be made up (no matter what). Opportunities are offered to the entire class not on an individual basis (so don't ask).



- ★ **Check FerrisCONNECT often ... especially before class!**
- ★ **PRINT NOTES OUTLINE PRIOR TO LECTURE [and lab] (posted by 6 pm the day before class).**
- ★ **Be prepared for class: You must bring your CPS, notes, pencil, book, completed homework**
- ★ **This schedule is only tentative. I reserve the right for slight variations to accommodate our rate of progress, a topic revamping, or to address a pressing issue or interest the class may have.**

<u>Date</u>	<u>Lecture Topic</u>	<u>What Books to Bring to Class</u> <u>(ALWAYS Check Website Before Class)</u>
8/26 M	Class Introduction, Syllabus Discussion, FerrisCONNECT, BRAINSTORMING	
8/28 W	Seating Chart (check FerrisCONNECT), Notes: Scientific Method, Making Observations, Taxonomy + SPECIES OBSERVATIONS charts	
8/30 F	1ST Quiz Pre-read & print notes: 'Landscape Shapers of the Northwoods (NW)'	
9/2 M	NO CLASSES	Study
9/4 W	QUIZ NW Landscape + Ecology Basics	
9/6 F	Ecology: Populations	
9/9 M	Ecology: Communities	
9/11 W	Ecology: Species Interactions	
9/13 F	Ecology: Evolution I	
9/16 M	Ecology: Evolution II	
9/18 W	The Basics of Plants [& Trees] I	'Trees of Michigan'
9/20 F	The Basics of Plants [& Trees] II	'Trees of Michigan'
9/23 M	Ecology: The 4 Spheres	
9/25 W	Ecology: Energy Flow	
9/27 F	Ecology: Biogeochemical Cycles	
9/30 M	Ecology: Biodiversity	
10/2 W	Ecology: Biodiversity II & Conservation	
10/4 F	Ecology: Wildlife Management	
10/7 M	Terrestrial Habitats I: MI Habitats Defined	
10/9 W	Terrestrial Habitats II: Succession, Soils	
10/11 F	Terrestrial Habitats III: Field & Forest Communities	
10/14 M	MI Aquatic Habitats I: Water Prop. & Lakes	'Pond Life'
10/16 W	MI Aquatic Habitats II: Lakes II	'Pond Life'
10/18 F	MI Aquatic Habitats III: Rivers	'Pond Life'
10/21 M	MI Aquatic Habitats IV: Rivers II	'Pond Life'
10/23 W	MI Aquatic Habitats V: Wetlands	'Pond Life'
10/25 F	Insects (Arthropods)	'Insects'

10/28 M	Insects	'Insects'
10/30 W	Last day for "W" grade is 10/31! Please talk to me about withdrawing from this class before you do it. Lecture Topic: Insects	'Insects'
11/1 F	Fish	'Fish of Michigan Field Guide'
11/4 M	Fish	'Fish of Michigan Field Guide'
11/6 W	Fish	'Fish of Michigan Field Guide'
11/8 F	Amphibians	'Amphibians & Reptiles of the North Woods'
11/11 M	Amphibians	'Amphibians & Reptiles of the North Woods'
11/13 W	Reptiles	'Amphibians & Reptiles of the North Woods'
11/15 F	Reptiles	'Amphibians & Reptiles of the North Woods'
11/18 M	Birds	'Birds of Michigan'
11/20 W	Birds	'Birds of Michigan'
11/22 F	Birds	'Birds of Michigan'
11/25 M	Mammals	'Mammals of Michigan Field Guide'
11/27 W	Mammals	'Mammals of Michigan Field Guide'
11/29 F	NO CLASSES	STUDY
12/2 M	Mammals (ICA)	'Mammals of Michigan Field Guide'
12/4 W	Mammal ID Quiz (20 pts) – subject to change due to lab schedule	'Mammals of Michigan Field Guide'
12/6 F	Class Summary	All Class Notes
12/12 R	Comprehensive Final Exam 2-3:40 p.m. in SCI 126	





BIOL 116: Lab Schedule FALL 2013

- ★ All labs will meet in SCI 208, unless stated otherwise on the schedule, in lecture, or on FerrisConnect.
- ★ Any announcements about lab will be posted on FerrisConnect the day before your lab meets before 6:00 p.m. Outside for lab? Weather “iffy”? Check FC or call/text me!!!
- ★ This schedule is tentative & may change due to whim or weather ... stay tuned in.
- ★ Always come prepared with book(s), pencil, paper, class binder, & appropriate clothing/footwear for going outdoors.
- ★ Come to class! Two lab absences may result in failure of course.
- ★ If you must miss lab, please contact me prior to your absence in order to make arrangements for a different lab time.
- ★ Each lab has 10-50 points possible. (See ‘Grading Policy’ for more information).
- ★ Quizzes cover previous week’s lab material.
- ★ Nature Journal Assignments will be due at the beginning of lab periods (dates below are tentative).



<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Quiz</u>	<u>~Pts</u>
1	8/27-28	NO LABS – Take-Home Lab Homework: Choosing your Nature Spot & Making Observations	-	-
2	9/3-4	NO LABS	-	-
3	9/10-11	Meeting Place TBA in Lecture (Check FC): OUTSIDE (be prepared to get your feet wet): Aquatic/Terrestrial Collections (Books: ‘Pond Life’, ‘Insects’)	-	10
4	9/17-18	Meeting Place TBA in Lecture (Check FC): OUTSIDE - Tree Identification (Book: ‘Identifying Trees’)	-	10
5	9/24-25	Meeting Place TBA in Lecture (Check FC): OUTSIDE - Tree Identification <u>QUIZ</u> (Book: ‘Identifying Trees’ + Tree ID Notes)	Q1	20, 5
6	10/1-2	<u>NJ 1 Due!</u> Food Chain/Web (Books: Insects, Birds, Mammals)	-	10
7	10/8-9	Meeting Place TBA in Lecture (Check FC): OUTSIDE - Habitats & Orienteering OR ASL Project	-	-
8	10/15-16	SCI 208 + Outside Maps & Watersheds	-	-
9	10/22-23	Pond Life (Book: ‘Pond Life’)	-	10
10	10/29-10/30	<u>NJ 2 Due!</u> Insects (Books: ‘Pond Life’, ‘Insects’) + Pond Life ID Quiz	Q2	10, 20
11	11/5-6	Fish (Books: ‘Fish’, ‘Insects’) + Insects ID Quiz	Q3	10, 20
12	11/12-13	Amphibians (Books: ‘Amphibians/Reptiles’, ‘Fish’) + Fish ID Quiz	Q4	10, 20
13	11/19-20	Reptiles (Books: ‘Amphibians/Reptiles’) + Amphibian ID Quiz	Q5	10, 20
14	11/26-27	<u>NATURE JOURNAL DUE [in its entirety – see FC]!</u> Birds (Books: ‘Birds’, ‘Amphibians/Reptiles’) + Reptile ID Quiz	Q6	10, 20
15	12/3-4	Mammals (Books: ‘Mammals’, ‘Birds’) + Bird ID Quiz Mammal ID quiz will <i>likely</i> be given in lecture	Q7	10, 20
16	12/10-11	NO LABS	-	-

Keep Track of Your Grades!!! (All graded assignments need to be kept as a record of your progress)

Assignment Title

Total Possible Points

Points Earned

Syllabus for BIOL 121: General Biology 1, Fall 2014

Credits: 4, Prerequisite: CHEM 121 (co-req with departmental permission).

Sections 231 – 233. Lecture (all sections): MWF 1:00 – 1:50 PM in Sci. 126.

Labs, by section (lab instructor, room) start time:

251 (Roger Mitchell, Sci. 216) Tu 3:00 PM

252 (Roger Mitchell, Sci. 212) M 3:00 PM

253 (David Griffith, Sci. 216) W 9:00 AM

Instructor: Dr. Roger Mitchell. **Office hours:** ASC (Commons) room 2007: Monday, Wednesday, and Friday 12:00 noon – 1:00 PM, Monday 2:00 – 3:00 PM. Make an appointment, or drop by to see if I am available at some other time. Knock if the door is closed! You may call my office at any time: 591-5879. My email is: mitchelr@ferris.edu

Lab instructor for section 253: David Griffith. Contact: x5855, fitzwilc@ferris.edu. Office hours: SCI 141C: TW 8-9, W 1-2, F 1-2.

Materials you are required to have:

text: Campbell's Biology, 9th ed., Reece *et al.*

lab manual at Great Lakes Bookstore

lecture notes at Great Lakes Bookstore

#2 pencils for the lecture exams

your student ID for each exam

appropriate attire for lab safety. For labs involving chemical use students should not wear contacts without some form of eye protection. Full coverage of legs and feet (no sandals) is also recommended. Chemicals may damage clothing. You may bring lab coats if you wish. Gloves will be provided, if needed.

How to get to Great Lakes Book and Supply, 840 Clark, Big Rapids, (231) 796-1112: It is 1 street behind (west of) the Rite-Aid drugstore, which is across State Street from Williams Auditorium and the Starr building.

Outcomes:

General Education Outcomes: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course Outcomes: This course is the first of a two part introductory biology sequence, thus it will lay the foundation for further study in biology. A student succeeding in this course should be able to:

- 1) demonstrate by examination a majors-level introductory knowledge in ecology, cell division, Mendelian genetics, evolution, the diversity of the biological kingdoms (bacteria, Protista, Fungi, and Plantae), and plant structure and function.

- 2) demonstrate the ability to use mathematics to solve problems in Biology and utilize graphs or tables to present data effectively.
- 3) use the scientific method to formulate hypotheses, design experiments, collect and analyze data, and draw conclusions.
- 4) show an ability to utilize equipment (such as a microscope) safely and effectively to complete lab assignments.

Course Description: The first semester of a year-long sequence in introductory biology designed for the science major and as a prerequisite for advanced biology courses. The topics include an introduction to scientific thinking, ecology, cell division, Mendelian genetics, evolution, the diversity of the biological kingdoms (bacteria, Protista, Fungi, and Plantae), and plant structure and function. Laboratory exercises are designed to enhance the lecture material with hands-on experiences. Designed for students in science baccalaureate degree programs. This course meets General Education requirements: Scientific Understanding, Lab.

Policies and Course Requirements:

Exams and the total percentage. 25% lab grade, 75% for lecture exams, including the final exam. Part of the final will be based on the lectures after the third exam, and the remainder will be comprehensive. The three lecture exams 50 points each, and the final 75. Exams can only be made up at my discretion and with a legitimate excuse, with a 5% deduction per day (starting with exams taken on exam day at a different time). Students who schedule makeup exams in advance will normally take the same test as the rest of the class, or something similar. Late make-ups, if allowed, may either be essay tests or use the student's grade on the corresponding part of the final. I reserve the right to make additional assignments as a condition of giving makeup exams. Labs will be graded in part on attendance (with deductions for tardiness, failure to complete the assignments, and unsafe or excessively messy behavior), in part on lab worksheets, and in part on lab quizzes. There is no "extra credit." All of these components will be added to get a final total percentage, which will not be adjusted in any way.

Grades. The final total percentages will be curved against a normal grade distribution or modified normal grade distribution at the end of the course.

Dropping with the "W" grade must be done on or before **October 30**. Students receiving a grade of "F," "D-," or "D" at mid-term should plan to drop. Students with a grade of "D+" or "C-" should carefully consider their plans.

Incompletes will be given only at my discretion and will require proof of exceptional need. Consistent with university policy, the student must have passed 75% of the class prior to being forced to stop attending due to circumstances beyond their control. The "I" grade must be cleared or it will become an "F."

Attendance policy: Attendance will be taken in lab. If you miss a lab, you may get a "0" for that day's score. Labs cannot be made up for any reason. Missing more than two labs for any reason will result in failing the class. Excessive tardiness may count as an absence. Attendance may sometimes be taken in lecture, although it will not count directly for grading. Excused absences are on a case-by-case basis at my discretion. I generally only accept medical excuses when they are confirmed by a college or university counselor by email. Assigned seating will be used to aid in attendance taking in both lab and lecture.

Attending a different lab. Since you must attend a lab to receive a grade, you may be allowed to attend a different lab section with a legitimate excuse. Among other factors, you may be allowed to attend a different lab if you first obtain your lecture instructor's permission (in advance, except for medical emergencies), then the permission of the instructor of the lab you wish to attend, and then make sure that the lab-substitution form is filled out to route your lab materials to your regular instructor. You may only obtain permission to change a lab one lab at a time.

Cheating will result in course failure. Additional action may be taken by the university.

Disruption of class. I will take whatever action is necessary to maintain a lecture atmosphere conducive to learning. I reserve the right to force involuntary withdrawal or make additional assignments in response to tardiness or disruptive behavior. Lab instructors have the same authority, and may deduct points from the quizzes or choose not to administer a quiz to a tardy student.

Studying is the responsibility of each student, and strategies differ. The following is a minimal approach:

- 1) Read the text material for both lab and lecture before attending.
- 2) Attend every lecture and take careful notes.
- 3) Within a day of each lecture and lab, review your notes to make sure you understand everything.
- 4) If you have trouble understanding anything, get help at once. I am always happy to help students, and the university also has a tutoring service.
- 5) Review the material again before each exam. You should plan to have done all of the things listed above before you study for the exam.
- 6) If you still have difficulties, you may need to take notes from your book before lecture, and/or rewrite your lecture notes to improve your understanding. Answering the questions at the end of each chapter may also help.

The keys to doing well are to do all of the reading, go to every lecture, and not fall behind on studying.

Exam material will come from both the text and lecture, and may not be covered in both. Questions will test both your retention of the material presented, as well as your understanding of underlying concepts.

Your most important resource will be yourself. You will choose your own grade, by choosing how hard you work in the course, and how effectively you study. The actual grades assigned by the instructor is just a reflection of your performance.

Performance of past sections. The following table shows the final distribution of grades in this class at the end of the Fall 2009, 2012, and 2013 semesters.

	F '09	F '12	F '13
A	3	12	4
A-	2	6	2
B+	1	4	2
B	6	18	7
B-	6	4	7
C+	3	9	1
C	14	10	8
C-	3	3	2
D+	4	3	4
D	4	4	5
D-	1	0	1
F	3	13	7
W	14	5	14
total	64	91	64

I reserve the right to make needed and appropriate adjustments in the syllabus.

TENTATIVE LECTURE SCHEDULE:

Date	Lecture topic	Chapter
Aug. 25	biology and science	1
27		
29		
Sep. 3	ecology intro	52
5		
8	populations	53
10		
12	communities	54
15		
17	exam 1	
19		
22	ecosystems	55
23		
25	cell division	13
29		
Oct. 1	genes	14
3		
6		
8	chromosomes	15
10	Darwin and evolution	22
13		
15	exam 2	
17	population genetics	23
20	speciation	24
22	history of life	25
24		
27	systematics	26
29		
31	Bacteria and Archaea	27
Nov. 3		
5	Protista	28
7	Fungi	31
10	plant kingdom	29, 30
12	exam 3	
14		
17	plant anatomy	35
19	plant transport	
21		
24	plant nutrition	36
Dec. 1		
3		
5	if time permits: plant reproduction, plant responses and viruses	38, 39, 19

TENTATIVE LAB SCHEDULE

#	week of	subject
1	Aug 25	Using the Scientific Method: Pill Bug Behavior
2	Sept 1	LABOR DAY: NO LABS
3	Sept 8	Population Growth
4	Sept 15	Field Trip
5	Sept 22	Microscope, Cell Division
6	Sept 29	Mendelian Genetics I
7	Oct 6	Mendelian Genetics II
8	Oct 13	Biochemical Evidence of Evolution, Mendelian Genetics III, Adaptive Mutants in Yeast
9	Oct 20	Survey of Bacteria
10	Oct 27	Survey of Protists
11	Nov 3	Survey of Fungi
12	Nov 10	Survey of Plants
13	Nov 17	Plant Anatomy
14	Nov 24	THANKSGIVING: NO LAB
15	Dec 1	Plant Physiology

As always with living organisms, we may have to make adjustments.

BIOL 122 General Biology II

2015

Lecture: SCI 126 MWF 1:00-1:50PM

Lab section 241, SCI 216 Tuesday (T) 8:00AM – 11:50AM

Lab section 242, SCI 216 Tuesday (T) 12:00PM – 2:50PM

Lab section 243, SCI 216 Thursday (R) 12:00PM – 2:50PM

Instructor: Dr. Karen Barkel

Office hours: MW 11:00-11:50AM, 2:00-2:50PM, or by appointment

Contact info: Phone: 591-2544 email: karenbarkel@ferris.edu Office: 2116 ASC

Required Materials:

Lecture Materials: Biology, 9th edition by Campbell, 3 ringed binder

Laboratory Materials: General Biology 2 Laboratory Manual (Available at the Great Lakes Bookstore), notebook, calculator, 3 ringed binder

Required test materials: #2 pencils, student ID, Pack of scantron sheets (Form 882-E)

Notes and Recording: Class material will be presented during the lectures. It is your responsibility to attend class, take notes, and become informed of any announcements made during your absence. GET TO KNOW OTHER STUDENTS IN THE CLASS! The questions for the exams will be taken from the material presented in class and the chapters assigned in the textbook. You may use a tape recorder for the lectures.

Attendance: Attendance in lecture is expected. Please BE ON TIME!!!! Random bonus quizzes may be given during the semester, you must be present to get these points! Attendance in lab is MANDATORY. Labs can not be made up. More than 2 missed laboratories (for any reason) will result in a failing grade in the class.

Course objectives:

As this course is the second of a two-part introductory biology sequence, it will continue to lay the foundation for further study in biology. See the lecture schedule for a list of topics covered.

General Education Outcomes: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course outcomes: This course is the first of a two part introductory biology sequence, thus it will lay the foundation for further study in biology. A student succeeding in this course should be able to:

- 1) demonstrate by examination a majors-level introductory knowledge in molecular biology, cell biology (including bioenergetics and metabolism), molecular genetics, the diversity of Kingdom Animalia, and animal structure and function.
- 2) demonstrate the ability to use mathematics to solve problems in Biology and utilize graphs or tables to present data effectively.
- 3) use the scientific method to formulate hypotheses, design experiments, collect and analyze data, and draw conclusions.
- 4) show an ability to utilize equipment (such as a microscope) safely and effectively to complete lab assignments.

Exams: Examinations will be given during the normal lecture period on the dates are listed on the class schedule. Exams will include material covered in lecture and assigned readings in the textbook. Failure to take an exam at the scheduled time (see class schedule) will result in a grade of 0 for the exam. If you have a valid excuse, inform me ahead of time (except for hospitalization etc.), and provide written documentation within 2 weeks of the missed exam (proof of funeral, hospitalization, etc) the points missed will be added to the cumulative final exam. For example, if you missed exam 2 (with a valid excuse), the comprehensive final would be worth 300 points instead of 200 points. If given at least 2 weeks notice, you may be able to take an exam early if you have a school sponsored activity (with documentation). You will not receive your exams back but you may stop by my office (during my office hours/by appointment) to look them over. Exam grades will be posted on WebCT.

***Bring a scantron sheet (Form 882-E), 2 #2 pencils, and your student ID to each exam.

Grading: Final grades will be based on points earned in lecture (75%) and laboratory (25%). The Lecture grade (500 points) will be comprised of the average of 3 exams (100 points each) and a CUMULATIVE final (200 points) as well as any bonus quiz points earned during the semester. The final exam will include two parts, part one new material covered since the last exam (similar to a regular exam, 100 points), and part 2 Cumulative material (material from the whole semester!: 100 points). Lab grades will be based on the score earned on lab quizzes (10-20 points each) and lab participation (assessed by your lab instructor). See lab section for more detail

Grading Scale:

A ($\geq 94\%$)	C (73 - 76.9%)
A- (90 - 93.9%)	C- (70 - 72.9%)
B+ (87- 89.9%)	D+ (67 - 69.9%)
B (83-86.9%)	D (63 - 66.9%)
B- (80-82.9%)	D- (60 - 62.9%)
C+ (77 - 79.9%)	F ($\leq 59.9\%$)

Academic Integrity: Any form of cheating will not be tolerated, and will result in failure of the course. Additional action may be taken by the University.

To do well in this course:

- Attend all lectures and labs, and BE ON TIME
- Exhibit professional behavior
- Take good notes, and organize them
- Read the assigned sections of the text book both before and after class
- Study your notes EVERY WEEK, not just before the exam
- Ask for help when you don't understand the material
- Do the weekly study questions posted on Ferris Connect (every week!) to make sure you really do understand!

Electronic Devices (Cell phones) must be turned off in the lecture hall.

Lecture Schedule: (subject to change)

Week		Dates	New Topic	Chapter reading
1	M	Jan 12	Intro / chemistry	2
	W	Jan 14	Water	3
	F	Jan 16	Organic molecules	4/5
2	M	Jan 19	Martin Luther King Day (no class)	
	W	Jan 21	Macromolecules	5
	F	Jan 23	Cells	6
3	M	Jan 26		6
	W	Jan 28	Membrane Structure and function	7
	F	Jan 30		7
4	M	Feb 2	Intro to the Metabolism	8
	W	Feb 5		8
	F	Feb 7	Exam 1	
5	M	Feb 9	Cellular Respiration	9
	W	Feb 19		9
	F	Feb 13		9
6	M	Feb 16	Photosynthesis	10
	W	Feb 18		10
	F	Feb 20	DNA structure	16
7	M	Feb 23		16
	W	Feb 25	Transcription and Translation	17
	F	Feb 27		17
8	M	Mar 2	Gene Regulation / Technology	18 (part)
	W	Mar 4		
	F	Mar 6	Exam 2	
9	M-F	Mar 9-13	SPRING BREAK	
10	M	Mar 16	Animal Evolution	32
	W	Mar 18	Invertebrate Diversity	33
	F	Mar 20		33
11	M	Mar 23		33
	W	Mar 25		33
	F	Mar 27	Chordate Diversity	34
12	M	Mar 30		34
	W	Apr 1		34
	F	Apr 3	No class – mid semester recess	
13	M	Apr 7	Animal Structure	40 / 34
	W	Apr 9		
	F	Apr 11		40
14	M	Apr 13	Animal Nutrition	40/41
	W	Apr 15	Exam 3 – NEW DATE	41
	F	Apr 17	Animal Nutrition	41
15	M	Apr 20		
	W	Apr 22	Circulation	42
	F	Apr 24	Gas Exchange	42
16	M	Apr 27		
	W	Apr 29	Reproduction	46
	F	May 1		46
17	W	May 6 Wednesday 12:00-1:40pm	2 Part Final (Part 1 new material, Part 2 cumulative)	

Lab information

Lab Grades: The points earned in lab will count for 25% of your final course grade.

Lab participation: You can earn up to 5 points each lab period for participation. You can lose these 5 points by being late to lab, leaving lab early, not participating in the activity, being disruptive in class. It is up to the discretion of your lab instructor to assign these points so make sure you know what he or she expects from you. (you are given one grace day). Lab books may be checked during any lab period.

Labs, and thus participation points earned, can not be made up for any reason. However, if you have a valid reason for missing your section (school – sponsored activity etc) you may request to attend another lab section in its place (within the same week) and still get credit for the lab. Bring a card with your name, section number (regular lab section), and lecture instructor (Dr. Barkel) to the instructor of the replacement lab and request their permission to attend that section. To get credit, you must provide written documentation (with explanation) within 2 weeks of the missed lab to Dr. Barkel.

*****Missing more than 2 labs will result in a failing grade in the course**

Lab Quizzes: 150 points: Quizzes are worth 15 points each and will be given at the beginning of the lab period. Dates of each quiz are listed on the Lab schedule. The best 10 (of 11) quiz scores will count towards your lab grade. There are no make-ups for lab quizzes.

Lab Schedule: (subject to change)

Week of	Topic	
1) Jan. 13/15	Macromolecules	
2) Jan. 20/22	No lab this week: Martin Luther King Day	
3) Jan. 27/29	Osmosis & Diffusion	Quiz 1 (macromolecules)
4) Feb 3/5	Enzymes I	Quiz 2 (Osmosis)
5) Feb. 10/12	Enzymes II	Quiz 3 (Enzymes)
6) Feb. 17/19	Energy	Quiz 4 (Enzymes 2)
7) Feb. 24/26	DNA I. Transformation 1, electrophoresis 1	Quiz 5 (energy)
8) Mar. 3/5	DNA II: Transcription/translation, transformation 2, electrophoresis 2	Quiz 6 (DNA 1)
9) Mar. 10/12	No lab this week: Spring Break	
10) Mar. 17/19	Properties of DNA, transformation 3	
11) Mar. 24/26	Invertebrate lab 1	Quiz 7(DNA 2 and 3)
12) Mar. 31/Apr. 2	No lab this week: Easter Break	
13) Apr. 7/9	Invertebrate lab 2	Quiz 8 (Invert 1 material)
14) Apr 14/16	Histology	Quiz 9 (invert 2 material)
15) Apr 21/23	Vertebrate Anatomy	Quiz 10 (Histology)
16) Apr 28/30	Chordate Diversity	Quiz 11 (Vert anatomy)

BIOLOGY 205
HUMAN ANATOMY & PHYSIOLOGY
5 Credit Hours
Spring Semester 2015

Instructor: Dr. David Griffith

Office: 141C SCI

Phone: 591-5855

Office Hours: MTW: 1-2 PM, T: 10-11 AM; other hours by appointment

E-mail: griffida@ferris.edu; please do **NOT** use FerrisConnect for messages.

Course Web Site: FerrisConnect

Course Description

An integrated course in human anatomy and physiology which emphasizes structure and function as they relate to clinical considerations. Basic concepts of structure and function will be discussed at the cellular tissue and organ system levels. Laboratory will utilize cadavers in anatomical studies. Designed for students in allied health associate degree programs; and science education, medical technology and sports medicine baccalaureate degree programs. This course meets General Education requirements: Scientific Understanding, Lab.

Course Materials

1. Saladin's Anatomy & Physiology, 4th Ed (2007); or

Saladin's Anatomy & Physiology, 3rd Ed (2003);

(To save money, look for 1st, 2nd, or 3rd Ed. online.)

READ YOUR TEXT DAILY. Assignments for 4th Ed are on Pages 5, 6, and 7 of this syllabus.

Chapters same in all Editions; pages different. Bring your text to LAB but not to lecture.

2. BIOL 205 Lab Manual, by Friar; at Rankin Bookstore.

3. #2 pencil

Class Schedule

Lecture: MTWTh 12-12:50 SCI 126

Lab/Lecture Review: Th 1-3 SCI 222

Lab (SCI 222) Sec. 211 – M : 3-5:50 PM

Sec. 212 – T: 3-5:50 PM

Sec. 213 – W : 8-10:50 AM

Sec. 214 – W : 3-5:50 PM

General Education Outcomes:

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Course Specific Outcomes: by the end of the semester, you will be able to demonstrate on lecture exams and quizzes, and laboratory quizzes:

1. knowledge of definitions of basic anatomical terminology.
2. an understanding of the relationship between structure (anatomy) and function (physiology)
3. an understanding of the concept of homeostasis, and how it applies to physiology.
4. the ability to describe the major anatomical features and functions of the 11 organ systems.
5. the ability to identify the major parts of the organ systems in the laboratory.
6. an understanding of physiological concepts learned in the laboratory.
7. the ability to describe and understand case examples of systems pathology.
8. the ability to explain, using specific examples, of how homeostatic mechanisms apply to your daily activities, including diet and exercise.
9. the ability to critically analyze reports in the news media about new developments in health and medicine.

Grading

Lecture Exam 1: 100 points

Lecture Exam 2: 100 points

Lecture Exam 3: 100 points

Lecture Exam 4: 100 points

Lecture Exam 5 (Final): 100 points

Lecture quizzes (these will be given most weeks of the semester; they may be unannounced)

Textbook reading guides (these may be given from time to time to encourage reading the text)

Lab quizzes (these will be given most weeks of the semester)

Journal entry in FerrisConnect: 20 points.

Your grade will be based on the total number of points in lecture and lab.

Source of lecture exam questions: Questions will be taken primarily from lecture and the text.

Occasionally, articles may be assigned that may be used for questions as well. I reserve the right to ask questions from the assigned reading on every exam, even if the material **was not covered in class!** You are responsible for reading the text book. Each lecture exam will consist of approximately 50-100 multiple choice or matching questions. Short answer, definitions, and essays may be included. The comprehensive final exam will be 100 points, with approximately half the questions from the first 12 weeks, and half from the last 3 weeks. Your final exam average (%) may be used to replace your lowest score from the first four exams (unless your final has the worse average).

Note: There will be **no** opportunities for extra credit. All exams will count towards your final grade. Any students who have missed a lecture exam during the semester will have the average from the final exam replace the missing test score. If a student misses more than one exam, then a score of zero will be assigned to the second missed exam. **NO EXCUSES WILL BE ACCEPTED FOR A MISSING EXAM!** There are no make-ups for missed quizzes. All students must take the final exam, or else receive an 'F' for the course.

Grading Scale

A	93-100%	B-	80-82.9%	D+	67-69.5%
A-	90-92.9%	C+	77-79.9%	D	63-66.9%
B+	87-89.9%	C	73-76.9%	D-	60-62.9%
B	83-86.9%	C-	70-72.9%	F	Below 60%

Lecture Attendance Policy:

- a. Attendance will **not** be taken in the classroom. Therefore, if you do not wish to be in the lecture hall, **THEN DO NOT COME!** Students talking in the classroom are very distracting to the students who want to learn. If you want to fail the course due to your poor attitude towards learning, then **STAY HOME.**

b. Tardiness. Do **not** be late. “[At Ferris], tardiness is an insult.” (W.N Ferris, founder). Habitually late students (any time after class begins) may lose 2 points from their lecture grade. You are expected to be in your seat at least 30 seconds BEFORE class begins. I acknowledge that with attendance not being taken, that you may decide to skip class if you are running late. If this happens rarely, you should still come to class. However, if I encounter a situation where large numbers of students are showing up ten or fifteen minutes late to class, then I will put an end to tardiness. If you have a special situation which will cause you to be tardy, discuss the situation with me during the first week of class.

Electronic Devices

Electronic devices (cellular phones, walkmans, etc.) **must** be turned off in the lecture hall.

If your cell phone rings in class, you will be asked to leave. If I see you texting during exams or quizzes, including the laboratory, you will automatically fail the exam.

Lab Assignments

If you miss a lab, you must make it up during the same week by arranging to attend another lab. There are four lab codes and most are full. Strive to avoid changing a lab. (The labs are listed above along with the day and time that each lab meets.) If you have a special event, e.g. a field trip in another course, **PLAN AHEAD** to attend another lab. Don't get caught short. (**CALL** or **E-MAIL** me **IMMEDIATELY** if you miss a lab.)

a. You **MUST GET PERMISSION** from me to attend another lab. **There will be a two point deduction from your quiz score whenever you attend a different lab.** No exceptions!

b. A lab that is missed and not made up by attending another lab will result in a "zero" grade for that lab. Lab attendance is mandatory. A quiz will be given each lab session. This quiz must be taken during your lab period. As per departmental policy, if you miss more than two labs during the semester, you will automatically receive an F for the course.

If you show up late to lab (anytime after lab is scheduled to begin) you will have 2 points deducted from your lab quiz for that day!

Academic Misconduct

“When any society loses faith in honesty, its disintegration is a certainty.” W.N. Ferris, founder. Cheating will not be tolerated.

Students are referred to the section on **ACADEMIC MISCONDUCT** that is found on the final sheet attached to this syllabus. Note: you are not allowed to use cell phones during any exam or quiz in lecture or lab.

Disruptive Behaviors

Behaviors that are disruptive to learning will not be tolerated. Talking in class will **NOT** be tolerated. **ANY STUDENT WHO HABITUALLY PERSISTS IN TALKING DURING LECTURE WILL BE ASKED TO LEAVE.** (see syllabus attachment for further clarification). This applies to lab as well.

Children in the classroom

Students are strongly discouraged from bringing children to the lecture hall. Because of safety and liability reasons, under no circumstances will children be allowed in the laboratory.

Food and Beverages in the classroom

Water is acceptable, but food and beverages (e.g. pop) should not be consumed in class

TENTATIVE LECTURE SCHEDULE*

<u>DATE</u>	<u>TOPIC</u>	<u>Reading Assignment</u>
1-12	Introduction to the Human body	Ch 1
1-13	Introduction continued; The Chemistry of Life	Ch 2
1-14	The Chemistry of Life	Ch 2
1-15	Cell Structures and Their Functions	Ch 3

1-19	Martin Luther King Day: No Class	
1-20	Cell Structures and Their Functions	Ch 4 (126-142)
1-21	“	
1-22	Tissues, Glands, and Membranes	Ch 5

1-26	“	
1-27	Integumentary	Ch 6
1-28	“	
1-29	EXAM 1	

2-2	Skeletal	Ch 7
2-3	“	
2-4	Nervous system organization	Ch 12
2-5	Nervous system organization; Action Potentials	Ch 12

2-9	Nervous Tissue, Action Potentials	Ch 12
2-10	“	
2-11	Central Nervous System	Ch 14
2-12	“	Ch 14

2-16	“	
2-17	PNS	Ch 13
2-18	“	Ch 13
2-19	EXAM 2	

2-23	PNS	Ch 15
2-24	“	Ch 16
2-25	“	
2-26	“	

3-2	Sensory	Ch 16
3-3	“	
3-4	“	
3-5	“	
=====		
3-9	Spring recess: no classes for the week!	
=====		
3-16	Muscle Physiology	Ch 11
3-17	“	
3-18	“	
3-19	EXAM 3	

3-23	Endocrine	Ch 17
3-24	“	
3-25	Cardiovascular System: Blood; The Heart	Ch 18, 19
3-26	Last day to drop! “	
3-30	Cardiovascular System: Heart	Ch 19
3-31	“	
4-1	Cardiovascular System: Blood Vessels and Circulation	Ch 19
4-2	Mid-semester recess: no classes today!	
4-6	Digestion, Nutrition and Metabolism	Ch 25, 26
4-7	“	
4-8	“	
4-9	EXAM 4	
4-13	Lymphatic System	Ch 21
4-14	“	
4-15	Respiratory System	Ch 22
4-16	“	
4-20	Urinary System	Ch 23
4-21	“	
4-22		
4-23	Male Reproductive System	Ch 27
4-27	“	
4-28	Female Reproductive System	Ch 28
4-29	“	
4-30	“	

FINAL EXAM: Tuesday, May 5, at 12-1:40 PM

Note: you **cannot** take the final exam at a different time from your scheduled time without prior approval from the instructor

*Note: you will need to listen for announcements in class about changes to the schedule. If you miss class, then you are responsible for finding out about any changes that may have occurred.

BIOL-205 LABORATORY SCHEDULE SPRING 2015

Be sure to study lab assignments before coming to lab. Labs will begin with a pre-lab quiz over the material from the previous week's lab. Sometimes a quiz will be given on the current lab at the end.

ANATOMY LABS: Label and study all anatomy diagrams **before** coming to lab. **USE YOUR TEXT TO LABEL DIAGRAMS!**

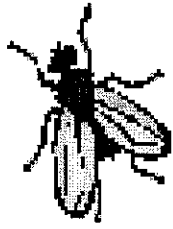
PHYSIOLOGY LABS: Read entire lab and review the Review Questions (on yellow pages) **before** coming to lab.

INSTRUCTIONS and READING ASSIGNMENT

<u>Week/Date</u>	<u>Lab #</u>	<u>LECTURE TOPIC</u>	(Review pages below in 4th Ed Saladin's A & P.)
1 1-12	Lab 3	Skeletal System Anatomy	See Text: pages 241-287. (Label diagrams in Lab 3.)
2 1-19	Martin Luther King Day: NO LABS THIS WEEK! (No class Monday, January 19)		
3 1-26	Lab 4	Cell Physiology	Read lab 4; Review Text: pages 102-105 (Diffusion)
4 2-2	Lab 2	Histology – Epithelium, Connective, Muscle, Nerve tissue:	Read p.1-9 of Lab 2; Review Text: 156-173
6 2-9	Lab 7	Membrane Action Potential	Review Text pages 453-459; Read Lab # 7.
5 2-16	Lab 5	Neural Anatomy	Review Text: 514-516, 519-521, Figs. 14.1, 14.2, 14.5, 14.6, 14.13 Bones of Skull Review Text: 244-249, 254 (Label diagrams in Lab 5.)
7 2-23	Lab 6	Nervous System Function	Review Text pages 502-507; Read Lab # 6.
8 3-2	Lab 8	Contraction of Skel. Muscles	Review Text pages ; Read 412-425; Lab # 8.
3-9	SPRING BREAK!		
9 3-16	Lab 9	Muscle Anatomy	Text: 326-330, 342-348, 352-358, 368-377; (Label diagrams in Lab 9)
	Lab 10	CVS Anatomy: Blood Cells	Text: (Review WBC on pages 697-700 before coming to lab.)
10 3-23	Lab 10	CVS Anatomy	Text: 780-799; (Label diagrams in Lab 10)
	Lab 11	Respiration Anatomy	Text: 855, 857, 862-863 (Label Lab 11)
	Lab 11	Digestion Anatomy	Text: 955-957, 961, 967-968, 975-977, 980-982, 991; (Label diagrams in Lab 11)
11 3-30	Mid semester recess begins on Thursday, April 2!		
Lab 14	Cardiac Muscle Physiology: Turtle Heart:	Review Text 731-733 (Read Lab # 14.)	
12 4-6	Lab 12	Circulatory System: Human ECG, Bld Pressure:	Review Text 762-765; 733-735 (Read Lab # 12.)
13 4-13	Lab 13	Urinary Anatomy	Text: 897-902 (Label diagrams in Lab 13)
	Lab 13	Reproductive Anatomy	Text: 1042-1048, 1067-1074 (Label diagrams in Lab 13)
14 4-20	Take Quiz over Lab 13; REVIEW for Lab Practical; Sign for 1.4-hour time-slot to take Lab Exam next week.		
15 4-27	LAB PRACTICAL EXAM OVER ALL LABS. Come on the day and time for which you signed.		

FOR YOUR SAFETY, PLEASE DO NOT BRING FOOD or BEVERAGES into LAB.

FOR THE SAFETY OF SMALL CHILDREN, THEY ARE NOT PERMITTED IN LAB.



Forensic Biology 2006

207

Dr. P.L. Watson
2113 ASC
Phone 1-231-591-2558
email @ watsonp@ferris.edu

course web page

<http://www.ferris.edu/htmls/academics/course.offerings/physbo/biology/watson/b307.htm>

Texts

1. Forensic Entomology by Byrd and Castner (not critical) (CRC Press)
2. Laboratory Notebook with duplicate canary carbon sheets. (required)
3. Lab book course pack (required)
4. Pocket data book (optional)

Lecture 10 am in Starr 136 Monday and Wednesday

Lab Section 211 @ 8 am to 11 am Thursday in Science 227

Section 212 @ 1:30 pm to 4:20 pm Thursday in Science 227

Grading

3 Lecture exams @ 100 points each	300
lab assignments and lab book	150
1 optional final (replaces lowest score)	(100)
2 lab exams @ 50 pts each	100
4 to ? quizzes in lecture @ 5 pts each	20 + points (extra points)
Total points	550 points

A = 508 (92.5%)	A- = 493 (89.5%)	B+ = 481 (87.5%)	B = 453 (82.5%)
B- = 437 (79.5%)	C+ = 426 (77.5%)	C = 398 (72.5%)	C- = 382(69.5%)
D+ = 371 (67.5%)	D = 343 (62.5%)	D- = 327 (59.5%)	F= 326 & below (59.4% & below)

Grade postings will be posted outside of our lab (Science 227) by the last four digits of your student number and on the web

Attendance policy: Lecture--none, but a missed quiz cannot be made up, **additional notes** given in class will also be your responsibility

Lab is mandatory !---missed labs = missed lab points

Excessive tardiness (5 minutes) will result in not being able to start an exam or lab exercise Note there are no make up exams except for documented excuses.

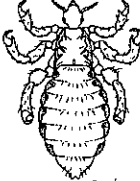
Questions Come to my office hours, **email me**, or call and leave a clear message as to the problem or question. I will take care of the problem or answer the question at our next meeting

Biol207
crime

Lecture notes on web
Lecture notes on web

Lecture Dates	Lecture topics	Readings
Aug. 28	Value and history of biology in forensics & scene investigations	Forensic Entomology pages 81-92+ notes
Aug 30	Ecology of the crime scene	Forensic Entomology pages 81-92 + notes
Sept. 4	Labor day	No class
Sept. 6	Ecology of the crime scene (biological)	Forensic Entomology pages 81-92 + notes
Sept 11.	Forensic Botany	Notes & handouts
Sept. 13	Forensic Botany	Notes & handouts
Sept. 18	Test 1	
Sept. 20	Introduction to Invertebrates	Forensic Entomology pages 1-43 + notes
Sept. 25	Collection of entomological evidence	Forensic Entomology pages 1-43 + notes
Sept. 27	Procedures in the entomology laboratory	Forensic Entomology pages 121-142 + notes
Oct. 2	Principles of forensic entomology	Forensic Entomology pages 121-142 + notes
Oct. 4	Principles of forensic entomology	Forensic Entomology pages 121-142 + notes
Oct. 9	Insects and bloodstain evidence	Forensic Entomology pages 353-378 + notes
Oct 11	Insects and living humans	Forensic Entomology pages 121-142 + notes
Oct. 16	Natural History of carrion feeding invertebrates	Forensic Entomology pages 121-142 + notes
Oct. 18	Natural History of carrion feeding invertebrates	Forensic Entomology pages 43-79 + notes
Oct. 23	Flies/beetles	Forensic Entomology pages 43-79 + notes
Oct. 25	Aquatic fauna	Forensic Entomology pages 43-79 + notes
Oct. 30	Soil fauna	Forensic Entomology pages 177-122 + notes
Nov. 1	Estimation of post mortem interval	Forensic Entomology pages 223-262 + notes
Nov. 6	Test 2	Forensic Entomology pages 263-302 + notes
Nov 8	DNA and genetics	Notes- Inman & Rudin pgs 29-34
Nov. 13	DNA typing	Notes- Inman & Rudin pgs 29-34
Nov. 15	Collection of DNA evidence	Notes- Inman & Rudin pgs 29-34
Nov. 20	RFLP analysis and PCR amplification	Notes- Inman & Rudin pgs 11-15
Nov. 22	Procedures of DNA analysis	Notes- Inman & Rudin pgs 37 - 55
Nov. 27	Probability and significance	Notes- Inman & Rudin pgs 59- 83
Nov. 29	Admissibility/ case studies	Notes- Inman & Rudin pgs 87-104
Dec. 4	Test 3	Notes- Inman & Rudin pgs 145-152
Dec. 6	Final Exam -TBA	
Dec 11-15	Exam week	

Personal record of class scores

TEST 1 _____	LABBOOK 1 _____	EXAM SCORES _____ LAB SCORES _____ QUIZ POINTS _____ TOTAL POINTS _____
TEST 2 _____	LABBOOK 2 _____	
TEST 3 _____		
TEST 4 _____	LAB quiz 1 _____	
TEST FINAL _____	LAB quiz 2 _____	
TOP 4 TESTS		



MICROBIAL ECOLOGY
BIOL 218, 3 Credit Hours
SPRING 2014

COURSE DESCRIPTION AND PREREQUISITES:

The course will cover an introduction to microbial cells; microbial interactions, both intraspecific and interspecific, including the roles of microbes in plant and animal ecology; microbial responses to abiotic environmental factors and their role in biogeochemical cycling and biodegradation; and the use of microbes in environmental applications, such as heavy metal and petroleum bioremediation, pest control, wastewater treatment, and the production of alternative energy sources. This course is designed for biology education, environmental biology, and environmental health students and meets General Education requirements: Scientific Understanding Lab. *The prerequisite for this course is passing Biol 121 with a C- or better.*

CONTACT INFORMATION:

Professor: Dr. Anne M. Spain
Office: ASC 2118
Email: annespain@ferris.edu
Office phone: 231.591.3190

COURSE INFORMATION:

Lecture: Starr Rm. 136
TR 12:00-12:50

You will be held responsible for all in-class announcements, assignments, handouts, etc., even if you are late or absent. See attendance policy for more detail.

Lab: Science Building Rm. 215
Section 221: MW 9:30-10:45 a.m.

OFFICE HOURS

TR 1:00 – 3:00 p.m.
Or by appointment

All students are highly encouraged to primarily use office hours for any and all questions regarding class material and grades. These office hours are an opportunity where you can come and go over recent exams and quizzes, or ask questions regarding class material for which you may need further explanation or help understanding. You are encouraged to make appointments but walk-ins are welcome and will be accommodated whenever possible. If you score below 60% on any lecture exam, **you are required** to schedule and attend at least one office hours session to go over your results.

REQUIRED COURSE MATERIALS:

Textbook: *Microbial Ecology*. By Larry L. Barton and Diana E. Northup. Wiley-Blackwell, 2011.

Laboratory Manual: *Benson's Microbial Applications*, 12th edition. By Alfred E. Brown. McGraw-Hill Education, 2011.

Other supplies: Cloth lab coat, bound laboratory notebook, marking pen (sharpie), and a scientific calculator (needed for lecture exams and laboratory exercises and quizzes). A no. 2 pencil will also be required on exam days. Access to a computer and printer will also be highly important – Lecture outlines and some lab materials will also be available on the designated FerrisConnect site for this course. It is advised that you print off your lecture outlines prior to each lecture class.

GENERAL EDUCATION LEARNING OUTCOMES:

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should: 1) have a working knowledge of the fundamental principles of a natural science discipline; 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences; 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas; and 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

SPECIFIC COURSE GOALS AND LEARNING OUTCOMES: Each of the general education outcomes listed above will be addressed and assessed over the course of the semester. Some will be dealt with in lecture, others in laboratory, and others in both. Listed below are several specific learning objectives for students in this course. By the end of this course, you should be able to:

- 1) Demonstrate a general majors-level knowledge and understanding in key areas of Microbial Ecology:
 - a) *The microbial cell and microbial ecology.* In this unit, you will give examples of and compare and contrast different types of microbial cells (including bacteria, archaea, and microeukaryotes); identify various cell structures and define their functions; and understand basic cellular processes, such as molecular genetics, metabolism, and growth. You will learn taxonomic vs. functional approaches to assessing microbial diversity, and learn about methods used to address questions in the field of microbial ecology.
 - b) *Microbial interactions:* In this unit, you will understand how environmental parameters affect microbial growth, and identify ways in which microbes interact with each other, their environment (e.g. soil, water, air), plants, and animals.
 - c) *Microbial applications:* In this unit, you will use your knowledge of microbial metabolism to understand how microbes can be used in various environmental and industrial applications, such as wastewater treatment, bioremediation of metals and petroleum, ethanol production, and food and beverage production.

Knowledge and understanding in these areas will be assessed via individual and group class quizzes and assignments, laboratory quizzes, lecture exams, and a comprehensive final exam.

2) Demonstrate proper laboratory skills and develop habits of good laboratory practices that extend to your everyday life and future careers. *This will be assessed via laboratory exercises, laboratory notebooks entries, laboratory quizzes, and the laboratory practical.*

3) Critically think about data collected upon observations from laboratory exercises and experiments. Plot data when appropriate and interpret any trends. Make inferences and predictions based upon the interpretations. *This will be assessed via laboratory quizzes, a written laboratory report, and the laboratory practical.*

4) Communicate effectively individually and in group settings and exchange ideas concerning course-related topics. Read, write, and speak about Microbiology with classmates and members of the community. *This will be assessed via short writing assignments, a written laboratory report, group quizzes and assignments, and short answer and essay questions on lecture exams.*

COURSE POLICIES:

Cheating and plagiarism: Any instance of cheating or failure to use one's own thoughts, words, or figures/tables (i.e. plagiarism) on a quiz, exam, or written assignment will result in a "0" for the entire graded item. Additional information regarding policies regarding academic misconduct can be found at: <http://www.ferris.edu/HTMLS/administration/studentaffairs/studenthandbook/general/homepage.htm>

Lecture Attendance: Students are **expected to 1) attend lecture regularly and 2) read assigned chapter readings BEFORE each class.** Lecture outlines will be provided on your FerrisConnect course site at least one day before each class and can be used as a tool to take notes from your assigned reading. Coming to class prepared in this way will greatly improve chances of success in this course, and will be reflected in individual and group quizzes and assignments. All graded materials must be completed and turned in on time, but you may turn in assignments early. Make up exams will be provided only in the case of an excused absence. You must contact me **within one day** of the missed exam and provide **written evidence** within one week to explain your absence. If you know in advance that you will be

absent for an exam, please contact me immediately. **For unexcused absences, there are no makeups for exams, in-class quizzes, and/or assignments.**

Lab Attendance: Because the lab is an essential component of this course, anyone with **more than two (2) unexcused absences from lab will receive an 'F' for the course.** There is only one lab section for this course, so there will not be lab make-up sessions available for either excused or unexcused absences.

The following are instances of excused absences:

1. Severe illness or hospitalization, with documentation from your physician
2. Jury duty, with a copy of your court summons
3. Bereavement, with a letter from a family member or obituary notice.
4. Ferris-sponsored sporting event, with a letter from your coach

The following are NOT instances of excused absences:

1. Oversleeping – get a better alarm clock
2. Work – You agreed to the class schedule when you signed up for the course
3. Appointments – see number two
4. Traveling – see number two
5. Other classes conflict – see number two
6. Jail or prison time – you have bigger problems than a missed deadline
7. Illness without documentation – you must have a physician's note
8. Forgot deadlines – they are your responsibility
9. Bad weather – if Ferris is open, our classes will meet as scheduled
10. Confusion – ask questions earlier rather than later!
11. Computer problems – there are over 100 computers available in the library alone

GRADING GUIDELINES: There is a total of 1000 points in this class; the distribution of these points is shown below

Calculation of Final Grade: This course is designed to be out of a total of 1000 possible points. Your final grade is based on the number of points that you earn out of these 1000 points. Your midterm grade will be posted by March 10, 2014. For both your midterm and final grades, there will be no curves or adjustments given. As well, there will be no extra credit assignments given; however, there may be bonus questions available on quizzes and tests. The point range for each possible grade is shown below:

FINAL POINTS	FINAL PERCENT	GRADE
930-1000	93.0-100%	A
900-929	90.0-92.9%	A-
870-899	87.0-89.9%	B+
830-869	83.0-86.9%	B
800-829	80.0-82.9%	B-
770-799	77.0-79.9%	C+
730-769	73.0-76.9%	C
700-729	70.0-72.9%	C-
670-699	67.0-69.9%	D+
630-669	63.0-66.9%	D
600-629	60.0-62.9%	D-
<600	<60%	F

Description of Course Components and Distribution of Points:

Component	Description	Points	% of Final Grade
Lecture: The lecture portion of this class makes up 67% of your final grade (670 points). On the next page is a detailed lecture schedule; below is a description of the graded components of the lab.			
Lecture Exams	Each lecture exam will consist of a combination of multiple choice, T/F, matching, fill-in-the-blank, and short answer, and/or essay questions.	500	50
Exam 1	Unit 1 exam (150 pts)		
Exam 2	Unit 2 exam (150 pts)		
Exam 3	Comprehensive final exam, covering material from Units 1-3 (200 pts)		
Lecture quizzes	Individual and group quizzes and assignments will be given in class randomly; thus, you must be in attendance to receive pts.	100	10
Short writing assignments	One short writing assignment (1-2 pages) will be assigned during each unit in the class. Each writing assignment will involve reading a research article and discussing a current topic in microbial ecology. Specific instructions will be given with each assignment.	45	4.5
Group evaluations	At the end of the semester, each group member will evaluate oneself as well as each of his/her fellow group members. Your grade will be based on your evaluations from your peers, but will be assigned by myself.	25	2.5
Lab: The laboratory portion of this class makes up 33% of your final grade (330 points). On the last page, you will find a detailed schedule; below is a description of the graded components of the lab.			
Laboratory quizzes	There will be ten 10-point quizzes given on the Wednesday of each week, <i>at the beginning of class</i> , covering any background/reading material covered, lab procedures performed, and/or data analyzed since the previous week's quiz. There will also be one bonus 10-point quiz given toward the end of the semester (Lab Quiz 11).	100	10
Lab Practical	At the end of the semester, there will be a 50-question laboratory practical. This will consist of twenty-five timed stations (two questions at each station) covering the materials seen and worked with over the course of the semester. The lab session held prior to the practical exam will be devoted to reviewing the materials for this exam.	100	10
Lab Notebook	You will be required to record <i>in pen</i> your methods and observations from all laboratory exercises and analyze these data in a bound lab notebook. A 40-point analytic rubric will be used to score your entries twice during the semester.	80	8
Lab Report	You will write a complete lab report (Abstract, Introduction, Materials and Methods, Results, and Discussion) for one lab experiment carried out this semester. Complete instructions will be provided in lab.	50	5
Total		1000	100

LECTURE SCHEDULE:

Day	Date	Lecture Title	Reading Assignment
<i>Unit One: Introduction to Microbial Cells and Microbial Ecology</i>			
T	Jan 14	Our Microbial Biosphere	1.1-1.2
R	Jan 16	The Microbial Cell	1.6-1.61
T	Jan 21		3.1-3.7.3
R	Jan 23	Microbial Metabolism and Energetics	1.6.2
T	Jan 28		3.9-3.10
R	Jan 30	Microbial Growth and Adaptation	1.6.3-1.6.4
T	Feb 4	Current Trend in Microbial Ecology	1.7-1.10
R	Feb 6	Microbial Evolution and Life on Early Earth	1.3-1.5.4
T	Feb 11	Microbial Diversity	2.1-2.4.2
R	Feb 13		2.6-2.10
T	Feb 18	Unit One Exam – 150 pts	
<i>Unit Two: Microbial Interactions</i>			
	Feb 20	Microbe-Microbe Interactions	6.1-6.9
T	Feb 25	Microbes and the Environment	N/A
R	Feb 27		4.1-4.3.2
T	Mar 4		4.4-4.6.2
R	Mar 6		10.1-10.5.4
<i>No classes for the week of Mar 10-Mar 14: SPRING BREAK!</i>			
T	Mar 18	Microbes and the Environment, cont	10.6-10.8.2
R	Mar 20	Plant-Microbe Interactions	7.1-7.7.3
T	Mar 25	Animal-Microbe Interactions	8.1-8.7.2
R	Mar 27	Microbial Communities	9.1-9.6.1
T	Apr 1		9.8-9.12
R	Apr 3	Unit Two Exam – 150 pts	
<i>Unit Three: Microbial Applications</i>			
T	Apr 8	Biodegradation of Natural Compounds	12.1-12.7.4
R	Apr 10	Wastewater Treatment and Compost Microbiology	12.10-12.11
T	Apr 15	Bioremediation	13.1-13.7.4
R	Apr 17	<i>Mid-semester recess: No classes!</i>	
T	Apr 22	Bioremediation, cont	13.8-13.9.5
R	Apr 24	Microbiology of Fermented Foods	12.8
T	Apr 29	Microbial Energy Production	12.9-12.9.4
R	May 1	Microbial Production of Natural Products	N/A
Thursday, May 9; 12:00-1:40 p.m. Comprehensive Final Exam (200 points)			

*Dates and topics are subject to change – Announcements regarding changes will always be made in class. Thus, if you miss class, it is your responsibility to find out if there were any changes to the lecture schedule.

LAB SCHEDULE:

Day	Date	Titles of Lab Exercises (Exercise No.)
M	Jan. 13	Lab Safety; Introduction to Keeping a Laboratory Notebook
W	Jan. 15	Brightfield Microscopy (3); Smear Preparation (11); Simple Staining (12)
M	Jan. 20	<i>No Labs</i>
W	Jan. 22	Preparation of Soil/Sediment Slurries (Handout); Ubiquity of Bacteria (7)
M	Jan. 27	Quiz 1 ; Ubiquity Follow-Up (7); Aseptic Technique (9); Pure Cultures (10)
W	Jan. 29	Aseptic Techniques and Pure Cultures Follow-Ups (9, 10); Gram-Staining (15)
M	Feb. 3	Quiz 2 ; Endospore Stain (16) and Capsule Stain (14); Acid Fast Stain demo (17)
W	Feb. 5	Cultivation of Anaerobes (21); Set up Winogradski Columns (54)
M	Feb. 10	Quiz 3 ; Anaerobes Follow-Up (21); Enumeration of Bacteria (22)
W	Feb. 12	Enumeration Follow-Up (22); Diversity of Cyanobacteria and Protists (6)
M	Feb. 17	Quiz 4 ; Fungal Diversity (8)
W	Feb. 19	Microbial Interactions: Commensalism, Synergism, and Antagonism (57, 58, 59)
M	Feb. 24	Quiz 5 ; Microbial Interactions Follow-Up (57, 58, 59)
W	Feb. 26	Effects of Environmental Parameters on Microbial Growth (29, 31, 32)
M	Mar. 3	Quiz 6 ; Lethal Effects of UV Exposure (33)
W	Mar. 5	Environmental Parameters and UV Exposure Follow-Ups (29, 31, 32, 33)
SPRING BREAK (MAR. 10-14): NO LABS		
M	Mar. 17	Denitrification and Ammonia Oxidation (Handout)
W	Mar. 19	Quiz 7 ; Ammonification (50); Free-Living N ₂ Fixation (52)
M	Mar. 24	Denitrification and Ammonia Oxidation Follow-Up (Handout)
W	Mar. 26	Ammonification Follow-Up (50); N ₂ Fixation, Pt. 2 (52)
M	Mar. 31	Quiz 8 ; N ₂ Fixation, Pt. 3 (52)
W	Apr. 2	Purple Non-Sulfur Phototrophs (55); Sulfate-Reducing Bacteria (56)
M	Apr. 7	Quiz 9 ; Isolation of an Antibiotic Producer (49)
W	Apr. 9	Phototrophs and SRB Follow-Ups (55, 56)
M	Apr. 14	Quiz 10 ; N ₂ Fixation, Pt. 4 (52); Antibiotic Producer, Pt 2 (49)
W	Apr. 16	Antibiotic Producer, Pt 3 (49); Alcohol Fermentation (65)
M	Apr. 21	Quiz 11 ; Antibiotic Producer, Pt 4 (49); Alcohol Fermentation Follow-Up (65)
W	Apr. 23	Visit to the Big Rapids Wastewater Treatment Plant
M	Apr. 28	Lab Practical Review Session
W	Apr. 30	Laboratory Practical Exam (*Lab Checkout)

* All lab coats left in the laboratory after check out will be held until Friday, May 17. After that, they will be donated to area schools.

BIOL 272 Marine Biology

2015

Lecture: SCI 137 MWF 10:00-10:50AM

Instructor: Dr. Karen Barkel

Office hours: MW 11:00-11:50AM, 2:00-2:50PM, or by appointment

Contact info: Phone: 591-2544 email: karenbarkel@ferris.edu Office: 2116 ASC

Required Materials:

Lecture Materials: **Marine** Biology, 9th edition by Castro and Huber, 3 ringed binder

Required test materials: #2 pencils, student ID, Pack of scantron sheets(Form 882-E)

Marine Biology is intended for students from any program that have an interest in learning more about organisms, communities, and ecosystems found in the marine environment. Students will learn about the process of science and how it relates to what we know (and don't know) about the marine environment. An emphasis will be placed on connections to current economic and political issues such as over-harvest, pollution, climate change, and the conservation of species and habitats.

General Education Outcomes: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course outcomes: A student succeeding in this course should be able to:

- 1) explain the physical features that make marine habitats unique, and how they influence the community of organisms that persist there;
- 2) interpret data from a scientific experiment, with an understanding of the limitations;
- 3) apply the concept of natural selection to examples of adaptations found in marine organisms.
- 4) distinguish different marine ecosystems, including the physical and biological features that make them unique;
- 5) identify examples of how the productivity and health of marine systems are linked to their every day lives.
- 6) connect the choices they make to the current and future status of marine organisms.

Notes: Class material will be presented during the lectures. It is your responsibility to attend class, take notes, and become informed of any announcements made during your absence. **GET TO KNOW OTHER STUDENTS IN THE CLASS!** The questions for the exams will be taken from the material presented in class and the chapters assigned in the textbook.

Attendance in lecture is expected. Please BE ON TIME!!!! Random quizzes will be given during lecture, you must be present to get these points!

Academic Integrity: Any form of cheating will not be tolerated, and will result in a zero for the exam, quiz or assignment and possible failure of the course. Additional action may be taken by the University.

Exams: Examinations will be given during the normal lecture period on the dates are listed on the class schedule (any changes will be discussed in class). Exams will include material covered in lecture and assigned readings in the textbook. Failure to take an exam at the scheduled time (see class schedule) will result in a grade of 0 for the exam. If you have a valid excuse, inform me ahead of time (except for hospitalization etc.), and provide written documentation within 2 weeks of the missed exam (proof of funeral, hospitalization, etc) the cumulative final exam may be used to replace the missed exam. If given at least 2 weeks notice, you may be able to take an exam early if you have a school-sponsored activity (with documentation). You will not receive your exams back but you may stop by my office (during my office hours/by appointment) to look them over. Exam grades will be posted on Ferris Connect.

***Bring a scantron sheet (Form 882-E), 2 #2 pencils, and your student ID to each exam.

Grading: Final grades will be based on points earned in lecture will be comprised of the average of 5 exams (100 points each) as well as any quiz points earned during the semester (given on a regular basis). The CUMULATIVE final (100) may replace an exam score, or may be used as a make up for an **excused** missed exam.

Grading Scale:

A (≥94%)
 A- (90 - 93.9%)
 B+ (87- 89.9%)
 B (83-86.9%)
 B- (80-82.9%)
 C+ (77 - 79.9%)

C (73 - 76.9%)
 C- (70 - 72.9%)
 D+ (67 - 69.9%)
 D (63 - 66.9%)
 D- (60 - 62.9%)
 F (≤ 59.9%)

To do well in this course:

- Attend all lectures and labs, and BE ON TIME
- Exhibit professional behavior
- Take good notes, and organize them
- Read the assigned sections of the text book both before class
- Study your notes EVERY WEEK, not just before the exam
- Ask for help when you don't understand the material
- Do the weekly study questions posted on Ferris Connect (every week!) to make sure you really do understand!
- Test yourself before the exams

Electronic Devices (Cell phones) must be turned off in the lecture room.

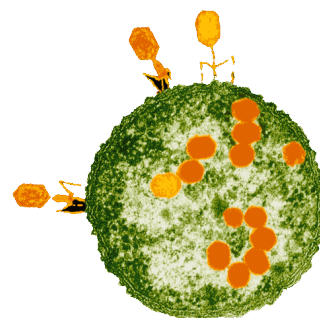
Lecture Schedule: (subject to change)

Week		Dates	New Topic	Chapter reading
1	M	Jan 12	Marine Biology, basic history of the discipline	1
	W	Jan 14		1
	F	Jan 16	Sea Floor	2
2	M	Jan 19	Martin Luther King Day (no class)	
	W	Jan 21	Sea Floor	2
	F	Jan 23	Seawater	3
3	M	Jan 26		3
	W	Jan 28	Basic concepts of Biology	4
	F	Jan 30		4
4	M	Feb 2	Exam 1	
	W	Feb 5	Microorganisms - from bacteria to zoo plankton	5
	F	Feb 7		5
5	M	Feb 9	Seaweed and Marine plants	6
	W	Feb 19		6
	F	Feb 13	Invertebrates	7
6	M	Feb 16		7
	W	Feb 18		7
	F	Feb 20		7
7	M	Feb 23	Exam 2	
	W	Feb 25	Lower Chordates and Fishes	8
	F	Feb 27		8
8	M	Mar 2	Marine Birds, Reptiles, and Mammals	9
	W	Mar 4		9
	F	Mar 6	Marine Ecology - An introduction to ecological concepts	10
9	M-F	Mar 9-13	SPRING BREAK	
10	M	Mar 16		10
	W	Mar 18		10
	F	Mar 20	Exam 3	
11	M	Mar 23	Intertidal zone	11
	W	Mar 25		11
	F	Mar 27	Estuaries	12

12	M	Mar 30		12
	W	Apr 1	Continental shelf	13
	F	Apr 3	No class – mid semester recess	
13	M	Apr 6	Continental shelf	13
	W	Apr 8	Coral Reefs	14
	F	Apr 10		14
14	M	Apr 13	Exam 4	
	W	Apr 15	Surface waters	15
	F	Apr 17	Deep Sea	16
15	M	Apr 20	Resources	17
	W	Apr 22		17
	F	Apr 24	Impact of Humans	18
16	M	Apr 27		18
	W	Apr 29	Policy	19
	F	May 1	Exam 5	
17	T	May 5, Tuesday 10:00-11:40pm	FINAL EXAM	

BIOL 286: General Microbiology

Course Syllabus, Spring 2015



In order to optimize student learning, the standards and requirements set forth in this syllabus may be modified during the semester. Notice of any such changes will be announced in class and posted on our FerrisConnect course homepage.

Class location and meeting time

Lectures will be held on Mondays and Wednesdays from **4:00 to 4:50 pm** in IRC-120. The laboratory sessions will meet on Tuesdays and Thursdays at either **12:00 to 1:15 pm**, **1:30 to 2:45 pm**, or **3:00 to 4:15 pm** in SCI-215. You are responsible for all announcements, assignments, handouts, etc., even if you are late or absent (see the attendance policy for more details).

Contact information

Instructor name:	Dr. Clifton Franklund	Ms. Kim Andrus
Office:	ASC 2011	ASC 2015E
Telephone:	(231) 591-2552	(231) 591-3678
Email:	franklc@ferris.edu	KimberlyAndrus@ferris.edu
Twitter:	@Dr_Franklund	
Web site:	http://franklund-micro.com	

Contacting Dr. Franklund

Office hours: [M | W | F] from 1:00 to 2:00 pm

I will maintain official office hours as indicated above. These are first come, first served – you are encouraged to make appointments but walk-ins are welcome and will be accommodated whenever possible. You can sign up times online at <http://cliftonfranklund.youcanbook.me>. In addition, I have posted my schedule outside of my office door. **All** of my “free” time is available to you as office hours. Simply find the day that works for you and sign up for a meeting (in 15-minute increments).

Email: You can expect me to reply to your email questions within 24 hours during the work week and within 48 hours on weekends and holidays.

If you score below 60% on any exam, I will **require** you to briefly meeting with me to discuss your performance. Bring your completed feedback email report, your exam, and your notes. We will work together to try to find strategies to improve your performance over time.

Prerequisites

CHEM 122: General Chemistry 2 or consent of the instructor

Course description

Introduction to the microbial world including microbial structure, function, metabolism, classification, genetics, control of microbial growth and immunity. The laboratory provides practical experience with fundamental concepts, techniques and instrumentation. This course is designed for students in the clinical laboratory science program and is open to other students by permission of the professor.

Required texts and materials

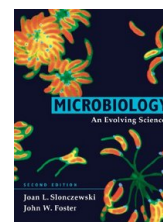
Textbook: *Microbiology: An Evolving Science 2nd edition* by Slonczewski and Foster. 2011 (ISBN 0-393-93447-0)

Lab notebook: We will be using the hardcover *Student Laboratory Notebook* published by the American Society for Microbiology Press, 2005. (ISBN 1-55581-358-5)

Required materials: We will be using Turning Technologies ResponseCard NXT clickers in class this semester. These will be required for in-class review questions, bonus quizzes and for taking lecture and lab exams.

A cloth lab coat, a Sharpie™, access to a digital camera (e.g. iPhone, android phone), and colored pencils (pink, red, green, blue, yellow, and black are needed) will be required for lab.

Optional materials: You should seriously consider getting a 3-inch D-ring binder for your class notes. Other optional materials include a scientific calculator, a USB flash drive, and a wax pencil for the laboratory. A copy of *A Student Handbook for Writing in Biology 3rd edition* by Knisely. 2009 is potentially useful, but completely optional.



Learning outcomes

I have several specific learning objectives for you in this course and they are listed below. Some of these will be covered in lab, others in lecture, and many in both. By the conclusion of this course, you should be able to:

A. Microbial Diversity - Give examples of and compare and contrast different types of microbial cells (including viruses, bacteria, fungi, and protozoa). Identify cell structures and define their functions.

Assessed via laboratory and online quizzes or reports, questions from lecture exams 1, 2 and 3, the laboratory practical, and the comprehensive final exam.

B. *Microbial Metabolism* - Explain the various metabolic strategies employed by microbes. Provide specific examples of how metabolism is linked to environmental cycling of elements and pathogenesis.

Assessed via laboratory and online quizzes or reports, questions from lecture exams 2, and 3, the laboratory practical, and the comprehensive final exam.

C. *Microbial Genetics* - Describe basic concepts involving how genetic information flows in microbial cells. Detail the importance of mutation, recombination, and lateral genetic exchange in virulence.

Assessed laboratory and online quizzes or reports, questions from lecture exam 3, the laboratory practical, and the comprehensive final exam.

D. *Host-Microbe Interactions* - Differentiate between the innate, humoral, and cellular defenses and identify points of interaction. Explain how inappropriate immune responses can result in host damage. Compare the different interactions possible between host and microbial cells. Describe several different molecular strategies employed by microbial pathogens and give several specific examples of each.

Assessed via laboratory and online quizzes or reports, the laboratory practical, and the comprehensive final exam.

E. *Laboratory Techniques* - Correctly perform proper laboratory skills and display a habit of good laboratory practices that extend to your everyday life. Perform simple and differential stains on isolates and properly use compound light microscopes to visualize and describe microbial cell morphologies.

Assessed via laboratory quizzes and notebook entries, and the laboratory practical.

F. *Critical Thinking* - Accurately follow instructions and collect data based upon observations from laboratory exercises or clinical case studies. Plot data when appropriate and interpret any trends. Make inferences and predictions based upon the interpretations.

Assessed via laboratory and online quizzes, laboratory notebook entries, and the laboratory practical.

G. *Communication* - Demonstrate an ability to work in group settings and exchange ideas concerning course-related topics. Read, write, and speak about Microbiology with classmates and members of the community.

Assessed via laboratory notebook entries.

H. *Metacognition* - Articulate preferences and dislikes (strengths and weaknesses) for learning new and complex information. Adopt new learning strategies to improve retention of information and comprehension of the course materials.

Assessed via post-exam bonus assignments and occasional class surveys.

A taxonomy of Microbiology skills

Each of the graded course activities will correspond to one or more of our six course outcomes. In addition, these activities can be involved different levels of cognitive skill or ability. These skills and their relative contribution to course assignments are described below.

Content Knowledge

IDENTIFYING – You will be expected to remember and correctly use appropriate scientific terms and concepts. This skill is assessed by measuring the ability to recall information in the same context in which it was presented during instruction. Approximately 15% of the course points will correspond to this skill.

CATEGORIZING – You will be expected to classify or provide examples of specific scientific concepts or constructs. This skill is assessed by measuring the ability to conceptually organize information in contexts different from those presented during instruction. Approximately 30% of the course points will correspond to this skill.

Critical Thinking

CALCULATING – You will be expected to correctly solve a variety of problems using mathematical reasoning. This skill is assessed by measuring the ability to select and apply appropriate formulae to solve novel problems. Approximately 10% of the course points will correspond to this skill.

INTERPRETING – You will be expected to analyze data provided in tables, images, or case studies to answer specific questions. This skill is assessed by measuring the ability to identify relevant facts and interpret them to address specific scientific problems or case studies. Approximately 15% of the course points will correspond to this skill.

PREDICTING – You will be expected to make sound inferences based upon their understanding of the interactions that make up a natural system. This skill is assessed by measuring the ability to make reasonable forecasts of the behavior of a specified system following a specified perturbation. Approximately 10% of the course points will correspond to this skill.

JUDGING – You will be expected to evaluate the validity of scientific statements or potential courses of action. This skill is assessed by measuring the ability to detect errors or inconsistencies in such statements. Approximately 5% of the course points will correspond to this skill.

Lab Skills

PERFORMING – You will be expected to use the scientific method to safely and correctly execute scientific exercises in the laboratory or field. This skill is assessed by measuring the ability to execute the exercises, record and interpret the observations, and report the results in an appropriate manner. Approximately 15% of the course points will correspond to this skill.

Instructional methods

BIOL 286: General Microbiology will be taught as a blended delivery class. The primary form of instruction for this course will be most likely be lecture. The material covered in lecture will be amplified and applied in a variety of required laboratory exercises. In addition, a number of important and required materials will be presented online via our FerrisConnect site. A complete online laboratory manual will be assembled during this semester. Your input will be important in its development. A small amount of out-of-class work will be required for this class. You will be expected to bring your clicker to every class session and participate in group discussions (both in class and online). We will regularly use the clickers to gather feedback, take concept check quizzes, and work collaboratively on case studies or problems. Your clicker responses may be included as part of your course score in the form of occasional bonus points.

Grading policies

I use an objective point-based system to grade all assigned work. The nature and relative point values of all assignments are explained in the following section. I have designed this course to be worth a total of **1,200 points**. Mid-term grades will be posted by **March 9, 2015** so that you may assess your class standing. Final grades for the course will be assigned based upon your total earned score as indicated in this table. ***These breakpoints are not negotiable.*** The bonus points should give you more than adequate buffer against any poor assignment performances.

Point Range	Grade	Percent
1,116 to 1,200 points	A	93-100%
1,080 to 1,115 points	A-	90-92.9%
1,044 to 1,079 points	B+	87-89.9%
996 to 1,043 points	B	83-86.9%
960 to 995 points	B-	80-82.9%
924 to 959 points	C+	77-79.9%
876 to 923 points	C	73-76.9%
840 to 875 points	C-	70-72.9%
804 to 839 points	D+	67-69.9%
756 to 803 points	D	63-66.9%
720 to 755 points	D-	60-62.9%
0 to 719 points	F	0-59.9%

Graded assignments

Lecture exams – There will be three 150-point comprehensive lecture exams (see the lecture schedule for dates). They will consist of multiple choice (four options) questions. The exam items will assess your comprehension of course materials at several different cognitive levels. They may be based upon diagrams, problems, data sets, or material drawn from the textbook or assigned readings.

- 450 points (37.5% of your final grade)

Laboratory quizzes – There will also be twelve 10-point laboratory quizzes (see the lab syllabus for dates). These will cover the prior lab’s material as well as the assigned readings for the current lab period. Questions may include matching, multiple-choice, and problem solving.

- *120 points (10.0% of your final grade)*

Laboratory notebook – You will be required to record your observations from laboratory exercises and analyze these data in a bound lab notebook. Your notebook entries will be periodically evaluated using a simple rubric (plus/check/minus/zero). Your notebook scores will be entered into the Blackboard grade book at two times during the semester. Keep up-to-date in your notebooks to ensure that you score all of these points!

- *60 points (5.0% of your final grade)*

Online Quizzes – A series of online quizzes will be made available on FerrisConnect. There will be one 10-point quiz for each lecture in the course. You may take these as often as you wish – your highest score will count toward your final course grade. This is meant to be a form of review and covers the textbook readings. Don’t procrastinate; they take time to complete and you will not benefit as much from one marathon session as you would from a “slow and steady” approach. There is no good reason not to score all of these points!

- *240 points (20.0% of your final grade)*

Reflective Learning Journal – Over the course of the semester, you will make periodic entries into an online learning journal. You will be reflecting about your progress in the course and responding to specific prompts. More precise instructions about this assignment, a grading rubric, and assignment deadlines can be found on our Blackboard site.

- *30 points 2.5% of your final grade)*

Laboratory Practical – At the end of the semester, there will be one 150-point laboratory practical. This will consist of twenty-five timed stations covering the materials seen and worked with over the course of the semester. Each station will have three multiple-choice questions. The penultimate lab session will be devoted to reviewing the materials for this exam.

- *150 points 12.5% of your final grade)*

Final Exam – There will be a comprehensive lecture exam. Its content drawn from material on in our four lecture modules (approximately half new material and half review questions). Like the lecture exams, it will consist of multiple-choice (four options) questions.

- *150 points (12.5% of your final grade)*

Bonus – At various points during the semester, bonus assignments may be given. The nature of the assignments, their due dates, and point values will be announced during the semester.

- *60 points (up to an extra 5% added back onto your final grade)*

Due dates for graded work

Your grade will be based upon many different assignments this semester. The following is a chronological compilation of the due dates (last acceptable date) for each assessment.

Assignment	Due Date	Points	Percent	Cumulative
Lab quiz 1	1/20/15	10	0.83%	0.83%
Lab quiz 2	1/27/15	10	0.83%	1.66%
Lab quiz 3	2/3/15	10	0.83%	2.50%
Online quizzes #1	2/8/15	60	5.00%	7.50%
Exam 1	2/9/15	150	12.50%	20.00%
Lab quiz 4	2/10/15	10	0.83%	20.83%
Lab quiz 5	2/17/15	10	0.83%	21.66%
Lab quiz 6	2/24/15	10	0.83%	22.50%
Lab quiz 7	3/3/15	10	0.83%	23.33%
Online quizzes #2	3/3/15	60	5.00%	28.33%
Exam 2	3/4/15	150	12.50%	40.83%
Notebook 1 posted	3/5/15	20	2.50%	43.33%
Lab quiz 8	3/24/15	10	0.83%	44.16%
Lab quiz 9	3/31/15	10	0.83%	45.00%
Online quizzes #3	4/5/15	60	5.00%	50.00%
Exam 3	4/6/15	150	12.50%	62.50%
Lab quiz 10	4/7/15	10	0.83%	63.33%
Lab quiz 11	4/14/15	10	0.83%	64.16%
Lab quiz 12	4/21/15	10	0.83%	65.00%
Notebook 2 posted	4/23/15	30	2.50%	67.50%
Laboratory practical	4/30/15	150	12.50%	80.00%
Journal posted	5/1/15	30	2.50%	82.50%
Online quizzes #4	5/3/15	60	5.00%	87.50%
Final exam	5/4/15	150	12.50%	100.00%
Total		1,200	100.00%	100.00%

Class attendance, late assignments, and make-up policies

You are expected to attend class regularly. I have noted a direct correlation in my prior classes between student attendance and class performance. However, it is ultimately up to you to show up for class. You will be responsible for all reading, discussions, and lecture materials. The

lab is an essential component of this course. **Therefore, anyone with more than two (2) unexcused absences from lab will receive an 'F' for the course.**

All graded materials must be completed on time. Make up exams will be provided only in the case of an excused absence. You must contact me within one week of the missed exam and provide written evidence to explain your absence. If you know in advance that you will be absent for an exam, please contact me immediately. I will attempt to arrange to accommodate you (within reason) with no penalty. You may always turn in assignments before their due dates. If you miss a lab, you may attend a different section in order to participate in graded work.

The following are instances of excused absences:

1. Hospitalization, with documentation from your physician
2. Severe illness, with documentation from your physician
3. Jury duty, with a copy of your court summons
4. Bereavement, with a letter from a family member
5. Ferris-sponsored sporting event, with a letter from your coach

The following are NOT instances of excused absences:

1. Oversleeping – get a better alarm clock
2. Work – You agreed to the class schedule when you signed up for the course
3. Appointments – see number two
4. Traveling – see number two
5. Other classes conflict – see number two
6. Jail or prison time – you have bigger problems than a missed deadline
7. Illness without documentation – you must have a physician's note
8. Forgot deadlines – they are your responsibility
9. Bad weather – if Ferris is open, our classes will meet as scheduled
10. Confusion – ask questions earlier rather than later!
11. Computer problems – there are over 100 computers available in the library alone

FerrisConnect

This semester, we will be extensively using Blackboard Learn 9.1 (branded FerrisConnect at FSU). This site will contain a variety of materials to supplement, but not replace, class attendance and reading. I am always interested in comments, corrections, or suggestions with regard to the electronically delivered course content! This semester, the site will contain the following:

1. A PDF copy of this syllabus.
2. Links to many different resources to help you to succeed in this class.
3. All course announcements pertaining to this class.

4. A calendar of all course assignments and deadlines.
5. Online communication tools for you to contact me or your classmates.
6. On-line access to your course grades.
7. Ancillary lecture materials including: 1) assigned readings with links to the e-textbook, 2) PDF copies of the lecture slides for your note-taking convenience, 3) a link to a Tegrity recording of the lecture (if Tegrity actually works that day), 4) a PDF “Microcast” of any worksheets covered in lecture using my Livescribe pen, 5) the daily clicker questions re-posted as an online quiz (for practice and review only), and 6) links to additional information on the internet offered by our textbook publisher (for review only).
8. Online quizzes and bonus materials – these **do count** toward your final grade in the course.
9. A completely online laboratory manual. This will consist of about 30 modules – one for each laboratory activity this semester.
10. Additional information about me, my background, and my interests.

I hope that you find this material to be helpful in preparing for exams and pursuing your interests. Please feel free to offer constructive criticism.

Registering your Turning Technologies clicker

To complete this process, you will need the following: a Turning Technologies clicker (NXT) and a computer with Internet access.

1. Turn on your computer.
2. Connect to the Internet using your favorite browser.
3. Go to the MyFSU website and log in. (<http://myfsu.ferris.edu/>)
4. Click on “FerrisConnect” icon at the top of the screen.
5. Click on the “Courses” icon at the top of the page.
6. Select “BIOL286: General Microbiology, Spring 2014” from the list of online courses.
7. Click on “Start Here (please)” in the left navigation menu
8. Click on the link called “Register Clicker”
9. Enter your clicker’s serial number.

If you are experiencing difficulty registering your clicker, please come to my office hours.

Statement of disability services at FSU

Ferris State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act and Section 504 of the Rehabilitation Act. If you are a student with a disability or think you may have a disability, contact the Disabilities Services office at 231.591.3057 (voice), or email <mailto:ecds@ferris.edu> to discuss your request further. More

information can be found on the web at

<http://www.ferris.edu/htmls/colleges/university/disability/>.

Any student registered with Disabilities Services should contact the instructor as soon as possible for assistance with classroom accommodations.

Academic misconduct policies at FSU

The university may discipline a student for academic misconduct, which is defined as any activity that tends to undermine the academic integrity of the institution. Academic misconduct includes, but is not limited to, the following:

Cheating - A student may not use unauthorized assistance, materials, information, or study aids in any academic exercise, nor should a student give assistance, materials, information, or study aids to another student in any academic exercise.

Fabrication - A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citations of the sources of information.

Facilitating Academic Dishonesty - A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct. A student is responsible for taking reasonable precautions to ensure his or her work is not accessed by or transferred to another individual wherein it may then be used to commit an act of academic misconduct.

Interference - A student must not steal, change, destroy, or impede another student's work. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain. A student must not give or offer a bribe, promise favors, or make threats with the intention of affecting a grade or the evaluation of academic performance.

Plagiarism - A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge indebtedness whenever he or she quotes or paraphrases another person's words, either oral or written and whenever he or she borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

Violation of Course Rules - A student must not violate course rules as contained in a course syllabus which are rationally related to the content of the course or to the enhancement of the learning process in the course.

Violation of Professional Standards and Ethics - A student must not violate the professional standards or ethical code related to one's intended profession as defined by the academic program or department.

Communication courtesy policy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and other online communication. If I deem any of them to be inappropriate or offensive, I will first contact the persons involved. For chronic problems, I will forward the messages to the chair of the department and appropriate action will be taken, not excluding expulsion from the course. The same rules apply online as they do in person. Be respectful of other students. Foul or inappropriate discourse will not be tolerated. Please take a moment and read the following link concerning the four hallmarks of "FerrisConnetiquette". <http://www.ferris.edu/HTMLS/administration/academicaffairs/online/FerrisConnetiquette.pdf>

Preparing for this course

This course will cover a diverse range of topics and will require you to possess some fundamental skills and knowledge. These will include a basic background in biology, chemistry, and math. In addition, you will need to have a working understanding of the metric system, common laboratory practices, and good study skills. Because of these demands, many students claim that this is a challenging class. I want you to succeed this semester! Take a little time right now to find out if your background in these fundamental topics is sufficient. Simply go to this site: http://www.mhhe.com/micro_prep/ and complete the online quizzes there. This site will help you to identify any weaknesses early on and will also give you some study suggestions as you begin the class. In addition, go to our Bonus Work folder and complete the pre-course test. I want to see what your preexisting knowledge of microbiology is like. Thanks.

Lecture Schedule

	Date	Topic	Chapters	Pages
	<i>M</i> Jan 12	<i>Course introduction and orientation</i>		<i>see syllabus</i>
Microbial Diversity	W Jan 14	Scope and History of Microbiology	1	2-38
	M Jan 19	<i>Martin Luther King Holiday - No classes!</i>		
	W Jan 21	Observing Microbes	2	39-72
	M Jan 26	Microbial Cells	3	73-114
	W Jan 28	Prokaryotic Diversity	18,19	675-754
	M Feb 02	Eukaryotic Diversity	20	755-792
	W Feb 04	Virus Structure and Function	6	181-217
M Feb 09	LECTURE EXAM ONE			
Microbial Metabolism	W Feb 11	Bacterial Growth	4	115-148
	M Feb 16	Environmental Influences on Growth	5	149-180
	W Feb 18	Catabolism	13	458-504
	M Feb 23	Respiration, Lithotrophy, and Photolysis	14	505-546
	W Feb 25	Food and Industrial Microbiology	16	583-619
	M Mar 02	Microbial Ecology	21,22	793-859
	W Mar 04	LECTURE EXAM TWO		16% OLD MATERIAL
M Mar 09	<i>Spring Break - No classes!</i>			
W Mar 11	<i>Spring Break - No classes!</i>			
Microbial Genetics	M Mar 16	Microbial Genomes	7	218-256
	W Mar 18	Gene Expression	8	257-302
	M Mar 23	Molecular Regulation 1	10	341-384
	W Mar 25	Molecular Regulation 2	10	341-384
	M Mar 30	Gene Transfer and Mutagenesis	9	301-340
	W Apr 01	Viruses and the Mobilome	11	385-426
	M Apr 06	LECTURE EXAM THREE		32% OLD MATERIAL
Host-Microbe	W Apr 08	Chemotherapy	27	1029-1062
	M Apr 13	Innate Immune Defenses	23	860-894
	W Apr 15	Adaptive Immune Defenses	24	895-936
	M Apr 20	Hypersensitivities and Vaccines	24	893-934
	W Apr 22	Microbial Pathogenesis	25	937-978
	M Apr 27	Microbial Diseases	26	979-1028
	W Apr 29	Course Wrap-Up and Review		<i>This is also snow day insurance</i>
M May 04	COMPREHENSIVE FINAL EXAM		48% PRIOR MATERIAL	

Laboratory Schedule

Date	Graded Work	Topic
T Jan 13		(1) Laboratory safety
R Jan 15		(2) Microscopy
T Jan 20	Quiz 1	(3) Cell morphology & (4) Aseptic technique <continuing>
R Jan 22		(5) Gram stain & Complete aseptic technique
T Jan 27	Quiz 2	(6) Capsule stain & (7) Endospore stain
R Jan 29		(8) Acid-fast stain & (9) Bacterial motility
T Feb 03	Quiz 3	(10) Protozoa & (11) Fungal slide culture <continuing>
R Feb 05		(12) Viable bacteria counts <continuing>
T Feb 10	Quiz 4	(13) Bacteriophage & Complete viable bacteria counts & Fungal slide culture
R Feb 12		(14) Bacterial growth curve & Complete bacteriophage
T Feb 17	Quiz 5	(15) Environmental conditions <continuing> & (16) Anaerobes <continuing>
R Feb 19		(17) Antimicrobial compounds <continuing> & Complete anaerobes
T Feb 24	Quiz 6	Complete antimicrobial compounds & Environmental conditions
R Feb 26		(18) Thermal death curves <continuing>
T Mar 03	Quiz 7	(19) Ultraviolet light & Complete thermal death curves
R Mar 05	Notebook 1 (1-18)	(20) Biochemical characterization demos & Complete ultraviolet light
T Mar 10		Spring Recess - No Class!
R Mar 12		Spring Recess - No Class!
T Mar 17		(21) Transformation <continuing> & (22) Hfr conjugation <continuing>
R Mar 19		(23) Lactose regulation <continuing> & Complete Hfr conjugation & Continue transformation <continuing>
T Mar 24	Quiz 8	Complete lactose regulation & Transformation
R Mar 26		(24) Symbioses <continuing> & (25) Bacterial unknown streaking <continuing>
T Mar 31	Quiz 9	(26) Exoenzymes <continuing> & Complete symbioses & Bacterial unknown staining <continuing>
R Apr 02		Complete exoenzymes & Bacterial unknown characterization <continuing>
T Apr 07	Quiz 10	Complete bacterial unknown identification
R Apr 09		(27) Wastewater treatment plant tour < -- field trip -- >
T Apr 14	Quiz 11	(28) Water quality testing <continuing>
R Apr 16		Mid-Semester Recess - No Class!
T Apr 21	Quiz 12	(29) Lysozyme <continuing> & Complete water quality testing
R Apr 23	Notebook 2 (19-30)	(30) White blood cells & Complete lysozyme
T Apr 28		Laboratory practical review session
R Apr 30		LABORATORY PRACTICAL EXAM

SYLLABUS ATTACHMENT
FERRIS STATE UNIVERSITY – COLLEGE OF ARTS AND SCIENCES
Spring 2015

ARE YOU CONSIDERING ADDING A MINOR OR MAJOR TO YOUR CURRENT PROGRAM?

Use **My Degree** to see what classes may already apply.

For more information, stop by the Arts and Sciences Dean's Office!

IMPORTANT DATES		
Late registration	Wed. – Fri	Jan 7 – 9
First day of classes	Monday	Jan 12
Last day for Drop/Add	Thursday	Jan 15
Martin Luther King Day (no classes)	Monday	Jan 19
Last Day for Online Grad Application	Friday	Mar 6
Mid-term grades due	Monday	Mar 9
Spring recess (no classes)	Sat, Mar 7 – Sun, Mar 15	Mar 7 – Mar 15
Last day for "W" grades (full semester)	Friday	Mar 26
Mid-term recess (no classes)	Thurs - Sun	April 2 - 5
Last day of classes	Friday	May 1
Examination Week	Mon – Fri	May 4 – May 8
Commencement	Friday, Saturday	May 8, 9
Final grades due by 1:00 pm	Monday	May 11

DEPARTMENT OFFICES

Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Lang/Lit	ASC 3080	591-3988
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Dean's Office	ASC 3052	591-3660

Sessions	Dates	Last Day to Withdraw
Full Session	Jan 12 – May 1	Mar 26
Session A	Jan 12 – Mar 3	Feb 12
Session B	Mar 4 – May 1	Apr 14
Session D	Jan 12 – Feb 13	Feb 2
Session E	Feb 16 – Mar 26	Mar 6
Session F	Mar 27 – May 1	Apr 20

WHAT YOU NEED TO KNOW

E-MAIL

All registered FSU students have a Ferris Gmail account. This is the only email to which all official University information about registration, financial aid, student activities, and class cancellations will be sent. Please check your account at least once a week. E-mail is our primary communication resource for students.

CLASS ATTENDANCE IS IMPORTANT!

Attendance usually has a high correlation with how well you do in a course. Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness to encourage students to be present for the full class period. Check your course syllabus or talk to your instructor about his/her policies.

HOW TO CONTACT A FACULTY MEMBER OR ADVISOR

If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, through the College of Arts and Sciences web page at <http://www.ferris.edu/htmls/colleges/artsands/>, or through the Directories & Maps link on the FSU home page.

DROPPING CLASSES OR WITHDRAWING

Dropping and adding only occurs during the first four days of the term. You can adjust your schedule **online during the first four days** or in person at the Timme Center (from 8-5 except for the last day when it is 12-5). *If you add a class you must pay for your additional charges by the fourth day or your schedule will be dropped.*

If you need to withdraw from a class after the official drop/add period, you must do so **OFFICIALLY**, through your dean's office, in order to avoid receiving an "F" grade in the course. **You may not withdraw online after the first four days of the term.** You will receive a "W" for the course. *You will not receive a refund.* If you need to totally withdraw from the University, you must do so **officially** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. **CHECK THE SESSIONS DATES SECTION ABOVE OR THE REGISTRATION AND ACADEMIC GUIDE FOR THE WITHDRAWAL DEADLINES FOR THE SEMESTER.** In cases of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES

The "I" is only considered for extenuating circumstances that have led to a student missing a portion of the course. The intent and appropriate use of the "I" grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended alternative to withdraw from a class (W). Extenuating circumstances are generally defined as those situations over which a student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an "I" will be considered, and they may be required to sign an agreement regarding course completion. An "I" grade automatically changes to an "F" after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

GRADUATION – ONLINE APPLICATION DEADLINE for participation in Spring Commencement Ceremony: **MARCH 6, 2015** Students should apply for their degree the semester prior to the degree completion term. To obtain a degree audit for either associate in arts degree, contact Dr. Roxanne Cullen (cullenr@ferris.edu), or associate in science degree, contact Jenice Winowiecki (wino2@ferris.edu). For a degree audit and clearance for bachelor degrees, contact your program coordinator. Online graduation application is **REQUIRED** and deadlines will be **ENFORCED** per the Provost's Office and Records Office. Apply for your degree by logging into your MyFSU (Academics & Services Tab, Student Records channel, Apply to Graduate link). For more information, contact the Dean's Office.

INCLEMENT WEATHER CONDITIONS

Only during the most severe weather conditions – which could potentially endanger the safety of students or staff – will the Big Rapids campus consider cancelling classes. The decision to cancel classes due to weather conditions at the Big Rapids site will be made as early as possible. In the event it is necessary to cancel classes, periodic announcements will be made on area radio and television stations. It is the student's responsibility to listen for these announcements. A student may also call the Ferris Information Line at 231-591-5602 to obtain information or check the Ferris website.

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person's ideas or work as your own, taking someone else's exam for them, violating computer software licenses or program/data ownership, etc. It is the expectation of the College of Arts and Sciences that all work you turn in is your own and is original for the course in which it is being submitted. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification.

Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated.

Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University. The full Disruptive Behavior Policy is available on the College of Arts and Sciences website at <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/CAS-disruptive-behavior-policy-final.pdf>

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of university life. Don't hesitate to explore and use these services at Ferris

ACADEMIC ADVISING

All students have an assigned advisor and should confer with that advisor regularly. Students who have declared a major should see an advisor in that major. To find out who your advisor is, login to MyFSU and click on the Academics and Services tab, then Registration Status/Advisor Information link.

ACADEMIC SUPPORT CENTER.....ASC 1017 – 591-3543

THE WRITING CENTER.....ASC 1017 – 591-2534

The Academic Support Center, Tutoring Services, and Writing Center join together to offer FSU students an array of academic support services. Tutors are available to answer questions for many courses. The Writing Center helps writers individually and in workshops with skills and assignments. There is also study skills assistance to help with note-taking, test-taking, memory and reading strategies, and time management.

DISABILITIES SERVICES.....STR 313 591-3057

According to the Americans with Disabilities Act, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. Students requiring a classroom accommodation due to a physical, learning, mental or emotional disability should contact the Disabilities Services Office.

SCHOLAR PROGRAM.....ASC 1021 591-5976

SCHOLAR is an academic support program that aids in the student's successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

PERSONAL COUNSELING, SEXUAL ASSAULT, SUBSTANCE ABUSE BIRKAM HEALTH CENTER 2nd Floor - 591-5968

Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment. **If you or a friend is in immediate crisis, call 911.**

EDUCATIONAL & CAREER COUNSELING.....STR 313 591-3057

Students wanting to examine their choice of major or career choice, learning styles or strategies can make one-on-one appointments with licensed counselors.

SAFETY

Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

OTHER RESOURCES

BIRKAM HEALTH CENTER.....1st Floor 231-591-2614

The Birkam Health Center provides fee-for-service medical care including evaluation and treatment for illness and injury anytime during the year. Patients are seen on a walk-in and by appointment basis.

FLITE LIBRARY.....231-591-2669

Regular hours for FLITE:

Monday – Thursday 7:30 am – Midnight
 Friday 7:30 am – 6:00 pm
 Saturday NOON – 5:00 pm
 Sunday 1:00 pm – Midnight

Extended Studies Court will begin late night hours January 20, 2015

*Sunday-Thursday/MIDNIGHT to 7:30 a.m.

*Friday/6 p.m. to MIDNIGHT *Saturday/5 p.m. to MIDNIGHT

FSU BOOKSTORE.....UNIVERSITY CENTER 231 - 591-2607

Regular hours for Bookstore (*subject to change*):

Monday – Thursday 9:00 am – 6:00 pm
 Friday 9:00 am – 5:00 pm
 Saturday NOON – 4:00 pm
 Sunday CLOSED

Now located at the University Center

HELPFUL NUMBERS

Admissions	2100	Inst. Testing	3628
Business Office	2125	Public Safety	5000
Financial Aid	2110	Records	2792
Housing	3745	TAC	4822

When calling from off campus, extensions can be called by using the prefix 231-591-_____.

Biology 300
Pathophysiology
Course Syllabus for BR Class
Spring 2015

Course Description: A study of general principles and causes of disease and resultant abnormal physiological functions of the organ systems. Included are discussions on cancer, aging, inflammation, stress, cardiovascular, nervous, respiratory, endocrine, excretory, digestive and musculoskeletal system dysfunction.

Instructor: Dr. Daisy Daubert
Office: 2012 Arts and Science Commons
Phone: (231) 591-2554
Email: dauberd@ferris.edu (best way to contact me)

Office hours:	Monday	2:15-3:15 pm	Outside the FSU offices in ATC	Grand Rapids
	Tuesday	1:30-2:30 pm	ASC 2012	Big Rapids
	Thursday	10:00-11:00 am	ASC 2012	Big Rapids
	Thursday	1:30-2:30 pm	ASC 2012	Big Rapids
		By appointment		

Lectures: Tu, Th 3:00-4:15 pm STR 136

Course Prerequisites: BIOL 205 or 322 with a grade of C- or better and CHEM 124, 214 or 321 with a grade of C- or better.

Texts (optional):

Berkowitz. 2007. Clinical Pathophysiology Made Ridiculously Simple, MedMaster, Inc. ISBN# 978-0-940780-80-4

Zaher. 2007. Pathology Made Ridiculously Simple, MedMaster, Inc. ISBN# 978-0-940780-77-4

McPhee and Hammer. 2010. Pathophysiology of Disease: An Introduction to Clinical Medicine. McGraw-Hill Companies, Inc. ISBN# 978-0-07-162167-0 (Available to you free online; access the book through our library database for Access Pharmacy.)

Longo, Fauci, Kasper, Hauser, Jameson, and Loscalzo. 2012. Harrison's Principles of Internal Medicine. 18th edition McGraw-Hill Companies, Inc. ISBN# 978-0-07174889-6 (Available to you free online; access the book through our library database for Access Pharmacy.)

Course Outcomes:

1. Describe the general mechanisms of disease in humans.
2. Predict effects of disease on normal physiology.
3. Describe the disease process for some of the leading causes of death in the US.

Lecture and Lab NOTES - FerrisConnect and the Internet:

Lecture PowerPoint files will be posted to FerrisConnect. Files may be posted before or after the lecture. Most lectures will be recorded on Tegrety for later viewing/listening through Ferris Connect. Do not count of Tegrety to work for every class. There are often technical difficulties with the program. You are responsible for all class material whether or not the class is recorded and available on Tegrety.

Although the internet has become a major source of scientific information, one should remember that, unlike scientific papers or textbooks, web sites do not undergo the process of peer review. Consequently, never assume that absolutely everything posted on the web is correct, actually assume the opposite. When surfing the net, choose web sites that belong to well-established institutions such as colleges and universities. I may post some sites on Ferris Connect that may become useful for study. If you find any sites that you'd like to share, please let me know and we can attach the links to the course site.

Evaluation (700 points total):

- Four exams – 100pts each
- Final exam – 200pts (comprehensive)
- Quizzes and activities – 100 pts total

Exams: will be given according to the attached schedule. The exams will test your mastery of material covered since the previous exam, with a portion that will be cumulative. Exams will be multiple choice/short answer/fill in the blank. Exam 5 will be given at the same time as the comprehensive final.

Final Exam: A comprehensive exam covering all of the material taught throughout the semester will be given.

Quizzes and activities: In each lecture there will either be a 5 point quiz or in-class activities worth 5 points. On some days there may be both a quiz and in-class activities. The quizzes will cover anything we have discussed in lecture since the previous exam. There will be more than 100 points worth of quizzes and activities. Your lowest individual scores will be dropped to give a total of 100 points. Because several quizzes/activities will be dropped, there will be no ability to make them up, even if you have an excused absence.

Course Policies

Grading:

93 – 100 = A	73 – 76.99 = C
90 – 92.99 = A-	70 – 72.99 = C-
87 - 89.99 = B+	67 – 69.99 = D+
83 – 86.99 = B	63 – 66.99 = D
80 – 82.99 = B-	60 – 62.99 = D-
77 – 79.99 = C+	Below 60 = F

This is a set scale and will NOT be changed.

Your grade is a reflection of what you have demonstrated learning. It is my responsibility to anyone who will see your transcript in the future to report what knowledge you have demonstrated learning from this class.

Class Attendance Policy: You must be present for the entire lecture in order for a quiz and/or activity grade to be recorded. If you leave early your quiz and/or assignment will not be graded and you will receive a zero on that quiz/activity unless you have made prior arrangements with me and have a valid reason for leaving early.

Anyone who misses a lecture exam must notify me in person, by phone, or email prior to that class and must arrange with me to take a make-up exam.

Since persons who take exams late have additional time to prepare for the exam, to be fair to the rest of the class, I will deduct 10% from the total points available on the test for each day the exam is delayed.

Responding in class: I will often ask questions of the class in an effort to get you to think about concepts and recall previously covered material. If there is little class involvement I may call on students. This is not to embarrass you, but to help you in thinking about the material covered. If you have a question about anything covered during class, please raise your hand and I will try to answer your question. Please refrain from talking to each other during class as it can be very

distracting to other students who are trying to follow the lecture. I reserve the right to ask you to leave the classroom if you are being disruptive to student learning.

Academic Integrity: Cheating of any kind will NOT be tolerated. Any reports of cheating or plagiarism will be forwarded to the Office of Student Conduct and may result in failure on the exam or quiz and/or the course.

I reserve the right to make needed and appropriate adjustments in this syllabus.

It is easy to succeed in Biology 300 as long as you approach this course with a certain degree of maturity and proper attitude. The few points below suggest some strategies that you may find helpful in your study of the lecture material.

1. Always read chapter material before coming to lecture. You are responsible for the entire content of lecture material. Because there is not enough time to discuss everything in detail, we will concentrate on those concepts that are either more difficult or critically important for the comprehension of the entire topic. Therefore, you must read the material ahead of time in order to place each lecture in proper context.

2. Study consistently. DO NOT wait with studying until the last 48 hours before the exam! The amount of information will overwhelm you! It is much more effective to spend a short amount of time (even 15-20 minutes) in the evening following each lecture trying to *understand* the material. This way you should establish good comprehension of each individual concept and can concentrate on "putting the pieces together" during week before the exam.

3. Ask questions. Many aspects of pathophysiology are complex - DO NOT HESITATE TO ASK QUESTIONS each time you run into a problem. You can see me in my office hours or make an appointment to see me. Or simply ask other student in the class or your study group.

4. A note on study groups. Research has shown that students who study in groups do not learn as the material as well as those who study on their own. Part of this is likely due to the lack of focus and the distractions that arise in study groups. If you do study in groups, one person should be responsible for keeping the focus on the studying. You should go into the meeting having arranged beforehand what you will study.

BIOLOGY 300 Pathophysiology
Lecture Schedule
Spring 2015

(Subject to change)

Day		Topic
Tu	Jan 13	Introduction to pathophysiology and cellular pathophysiology
Th	Jan 15	Cellular pathophysiology continued
Tu	Jan 20	Inflammation
Th	Jan 22	Inflammation continued and tissue repair
Tu	Jan 27	The immune system
Th	Jan 29	Altered immunity
Tu	Feb 3	EXAM 1
Th	Feb 5	Infection
Tu	Feb 10	Genetic and developmental disorders
Th	Feb 12	Genetic and developmental disorders continued
Tu	Feb 17	Neoplasia
Th	Feb 19	Neoplasia continued
Tu	Feb 24	EXAM 2
Th	Feb 26	Altered ventilation and diffusion
Tu	Mar 3	Altered perfusion
Th	Mar 5	Altered perfusion continued
Tu	Mar 10	HOLIDAY
Th	Mar 12	HOLIDAY
Tu	Mar 17	Altered hormonal and metabolic regulation
Th	Mar 19	Altered hormonal and metabolic regulation continued
Tu	Mar 24	EXAM 3
Th	Mar 26	Altered fluid, electrolyte and acid-base balance
Tu	Mar 31	Altered fluid, electrolyte and acid-base balance continued
Th	Apr 2	HOLIDAY
Tu	Apr 7	Altered neuronal transmission
Th	Apr 9	Altered neuronal transmission continued
Tu	Apr 14	Altered somatic and sensory function
Th	Apr 16	Altered elimination
Tu	Apr 21	Altered elimination continued
Th	Apr 23	EXAM 4
Tu	Apr 28	Altered nutrition and reproductive function
Th	Apr 30	Aging

Final Exam Monday May 4th 2:00-3:40pm

EXERCISE PHYSIOLOGY
BIO 301 – WINTER SEMESTER 2000

Instructor: Rich Canole
115G – Ewigleben Sports Complex (Asst. Track Office)
Office Hours: M-R 1:30-2:30 (may vary depending of meetings)
591-5255

Class Time/Location: T & R 8:00 – 9:15 a.m.
SCI 120 ** (could move to SRC 2)

Course Description: The study, scientific basis, and theory of how the body, and its systems, functions and adapts to physical activity. Also, an examination at the applications of such knowledge.

Objectives: 1) Gain an understanding of major principles, theories, and models of exercise physiology.
2) Gain an understanding of the biological systems involved in exercise physiology.
3) Gain an understanding of the application of the major concepts in #1 & 2.

Text: McArdle, W.D., Katch, F.I, Katch, V.I., Exercise Physiology: Energy, Nutrition, and Human Performance, 4th edition, Rand McNally, 1996.

Grading Criteria:	Tests (4, each 100)	400
	Final	150
	Research Paper or ACSM Objectives	50
	Homework	<u>≈150</u>
	Total	750

Grading Scale:	A	93%	C	73%
	A-	90%	C-	70%
	B+	87%	D+	67%
	B	83%	D	63%
	B-	80 %	D-	60%
	C+	77%		

Research Paper: Paper will be a literature research on a specific topic of applied exercise science. Paper should include an intro to the topic, explanation of the topic, current research findings on the topic, and conclusions on the topic. Also, included as part of the research paper will be a mini presentation. Additional and more detailed instructions will be handed out at a later date.

ACSM Objectives: These are essay questions designed to aid in your preparation to become certified. This may replace the research paper (to be decided by instructor). Each question will have to be thoroughly answered with references. Each student will present on question in class.

Tentative Class Schedule:

Week 1-2:	Introduction Nutrition No Class Monday, Jan. 17	Ch. 1-3
Week 4-5:	Energy & Energy Systems Test #1 Thursday, Feb 10.	Ch. 4-8
Week 6 - 8:	Cardiovascular & Pulmonary Systems Test #2 Thursday, March 2.	Ch. 12-17
Week 9:	Spring Break	
Week 10-13:	NeuroMuscular & Endocrine systems Training: Aerobic, Anaerobic, & Muscular Strength Aids to Performance and Conditioning Test #3 Thursday, April 6.	Ch. 18-20 Ch 21-22 Ch. 23
Week 14-15	Body Composition, Weight Management, Health aspects of Exercise Environmental Stress on Exercise Performance Test # 4 Thurs. April 20.	Ch. 27-30 Ch. 24-25
Week 16:	Overflow Day Presentations Review for final	
Week 17:	Final Thursday, May 4, 8:00 am	

Biology 321
Human Physiology – Anatomy 1
Course Syllabus
Fall Semester 2014

Course Description: First of two semesters of a comprehensive, integrated course in anatomy-physiology, developing logical correlations between structures and their functions with emphasis on the molecular and cellular basis of organ system structure and function. Topics: cell physiology; control mechanisms; nervous, muscle, and endocrine systems. Laboratories include cadavers in anatomical studies and animal experimentation demonstrating physiological principles. Designed for students in science baccalaureate degree programs.

Instructor: Dr. Daisy Daubert

Office: 2012 Arts and Science Commons

Phone: (231) 591-2554

Email: dauberd@ferris.edu (best way to contact me)

Office hours: Mondays, Tuesdays and Thursdays 10:00am-11:00am ASC 2012
 Wednesdays 4:00-5:00pm ASC 2012
 By appointment

Lectures: 221-224, 325 Tuesdays and Thursdays 12:00-1:15pm IRC 120
 or
 211-214 Tuesdays and Thursdays 1:30-2:45pm IRC 120

Labs:

211	Monday 12:00-2:50pm	SCI 228	Johnson
212	Monday 6:00-8:50pm	SCI 228	Daubert
213	Wednesday 3:00-5:50pm	SCI 228	Johnson
214	Wednesday 6:00-8:50pm	SCI 228	Daubert
221	Monday 3:00-5:50pm	SCI 228	Daubert
222	Tuesday 6:00-8:50pm	SCI 228	Scott
223	Wednesday 12:00-2:50pm	SCI 228	Johnson
224	Thursday 6:00-8:50pm	SCI 228	Johnson
325	Tuesday 3:00-5:50pm	SCI 228	Johnson

Course Prerequisites: BIOL 122 and CHEM 122 with a C- or better.

Required Texts:

Lecture Material

1. Connect Plus access for Vander's Human Physiology, 13^h Edition, Eds., Widmaier EP, Raff H, Strang KT, McGraw-Hill, Boston, MA
2. Turning Technologies clicker

Lab Material:

3. Laboratory Manual Anatomy and Physiology, 7th Edition, Wise E, McGraw-Hill, Boston, MA
OR
4. A Photographic Atlas for the Anatomy & Physiology Laboratory, 7th Edition, Van De Graaff KM, Morton DA, Crawley JL, Morton Publishing, Englewood, Colorado

Course Learning Outcomes: By the end of this course, students will be able to meet the following learning outcomes:

1. Students will be able to use a microscope effectively to identify the 4 tissue types (epithelial, connective, nervous, and muscular) within any human tissue.
2. Students will be able to identify and name designated anatomical structures (both histological and gross) within the following organ systems: integumentary system, the muscular system, the nervous system, the skeletal system, and the endocrine system.
3. Students will be able to explain physiological functions and mechanisms within the following organ systems: integumentary system, the muscular system, the nervous system, the skeletal system, and the endocrine system.
4. Students will be able to carry out experimental procedures, evaluate experimental data and interpret their data based on the anatomy and physiology that they have learned.

Lecture and Lab NOTES - FerrisConnect and the Internet:

All lecture and lab notes will be made available via FerrisConnect either before or after the class period. Most lectures will also be recorded via Tegrety for later viewing/listening through FerrisConnect.

Some lectures or lab lectures will be online only. On these days you will be responsible for watching the lectures before attending lecture. In class we will do activities that require you to have read the book and/or watched the lectures online.

Although the internet has become a major source of scientific information, one should remember that, unlike scientific papers or textbooks, web sites do not undergo the process of peer review. Consequently, never assume that absolutely everything posted on the web is correct, actually assume the opposite. When surfing the net, choose web sites that belong to well-established institutions such as colleges and universities. I will attach some sites that may become useful for study. If you find any sites that you'd like to share, please let me know and we can attach the links to the course site.

Evaluation:

- Four lecture exams – 100 pts each
- Final cumulative lecture exam – 100 pts
- LearnSmart modules – 100 points total
- In class activities, lecture quizzes, pre-labs and post-labs – 90 points
- Lab Quizzes – 6 @ 35 pts each
- Lab Final exam – 100 pts

Total points for class: 1000

Lecture exams: will be given according to the attached schedule. The exams will test your mastery of material covered since the previous exam. Exams will be multiple choice and taken with clickers and may include some short answer, fill in the blank questions. Exam 4 will be given at the same time as the comprehensive final.

Final Lecture Exam: A Comprehensive exam covering all of the material taught throughout the semester will be given.

McGraw Hill Connect LearnSmart Assignments: A LearnSmart module will be assigned before each lecture. The module is due at 11am the day of the lecture. The module will cover the material we will go over in class that day. By doing the reading and assignment before class you will be much better prepared for lecture. You will be aware of what you don't understand and can ask questions in class. Students who take this active learning step have been shown to perform much better on exams. Each LearnSmart module is worth 5 points. These assignments are worth 10% of your final course grade and could mean the difference between a C and a B. There will be more than 100 points worth of LearnSmart modules. Your lowest individual scores will be dropped to give a total of 100 points. Because several assignments will be dropped, there will be no ability to make them up due to technology or other issues. It would be in your best interest to complete the assignments early so you can contact McGraw Hill or TAC with any technology issues that may arise. Remember there are computers in FLITE that are available 24 hours a day.

You can contact McGraw Hill at 1-800-331-5094. You can also chat with them at

<http://mpss.mhhe.com/> Their hours are:

Sunday 1pm-midnight

Monday-Thursday 9am-midnight

Friday 9am-7pm

Saturday 11am-5pm

Lecture Quizzes: There will be a quizzes or questions asked during most lecture periods. These quizzes/questions will cover material from previous lectures as well as topics we may have just covered in class. The goal of these questions is to help you to stay up on your studying and check your understanding. These are a good for you to gauge how well you are doing in the course and in your understanding of the material.

In Class Assignments: There may be activities to do in lab or lecture for credit. These activities may include worksheets designed to get you to think about a complex physiological topic, or may involve labeling anatomical diagrams and histological photomicrographs.

Pre-Labs and Post-Labs: There will be online post-lab assignments in Ferris Connect for each of the physiology labs. These will be due the Monday following the lab at 11am. For some labs there may also be pre-lab assignments in Ferris Connect. These will be due the Monday of the week of that lab at 11am.

About Lecture Quizzes, In Class Assignments Pre-labs and Post-labs: There will be more than 90 points worth of quizzes, in class assignments and post-labs. Your lowest individual scores will be

dropped to give a total of 90 points. Because several quizzes/assignments/post-labs will be dropped, there will be no ability to make them up, even if you have an excused absence.

Lab Quizzes: a quiz will be given at the beginning of lab as marked on the attached schedule. These quizzes will be over the anatomy cover in the previous lab

Lab Final: a comprehensive lab final will be given. Material from all anatomy labs will be covered on this exam. This exam will consist of between 150 and 200 questions. This exam is required and will count toward 10% of your grade. If you do better on this lab final exam than on the other lab quizzes, this final exam grade can replace your lab grade.

Course Policies

Grading:

93 – 100 = A	73 – 76.99 = C
90 – 92.99 = A-	70 – 72.99 = C-
87 - 89.99 = B+	67 – 69.99 = D+
83 – 86.99 = B	63 – 66.99 = D
80 – 82.99 = B-	60 – 62.99 = D-
77 – 79.99 = C+	Below 60 = F

This scale is final.

Your grade is a reflection of what you have demonstrated learning. It is my responsibility to anyone who will see your transcript in the future to report what knowledge you have demonstrated learning from this class.

Intelligence comes from constant inquiry and refinement of what you know. You must be an active participant in this process.

Class Attendance Policy: There will be quizzes or questions in lecture on most days. In order to get the points for these questions you must be present.

Anyone who misses a lecture exam must notify me in person, by phone, or email prior to that class and must arrange with me to take a make-up exam.

Since persons who take exams late have additional time to prepare for the exam, to be fair to the rest of the class, I will deduct 5% of the total points available from the score for each day the exam is delayed.

Lab attendance is MANDATORY. There will be no make-up labs. If you have a valid excuse for missing lab, please see me *immediately*. Otherwise, you may not take the quiz for that lab and thus the missed lab will be recorded as a “0”. Two missed labs for ANY reason will result in a failing grade.

Academic Integrity: Cheating of any kind will NOT be tolerated. Any reports of cheating or plagiarism will be forwarded to the Office of Student Conduct and may result in failing the assignment/exam or the course.

I reserve the right to make needed and appropriate adjustments in this syllabus.

It is not hard to succeed in Biology 321/322 as long as you approach this course with a certain degree of maturity and proper attitude. The few points suggest some strategies that you may find helpful in your study of the lecture material.

1. Always read chapter material BEFORE coming to lecture. You are responsible for the entire content of lecture material. Because there is not enough time to discuss everything in detail, we will concentrate on those concepts that are either more difficult or critically important for the comprehension of the entire topic. Therefore, you must read the material ahead of time in order to place each lecture in proper context. Also since lecture quizzes may contain questions related to the reading you must do the reading in order to do well on the quizzes.

2. Study consistently. DO NOT wait with studying until the last 48 hours before the exam! The amount of information will overwhelm you! It is much more effective to spend a short amount of time (even 15-20 minutes) in the evening following each lecture trying to *understand* the material. This way you should establish good comprehension of each individual concept and can concentrate on "putting the pieces together" during week before the exam.

3. Ask questions. Many aspects of physiology are complex - DO NOT HESITATE TO ASK QUESTIONS each time you run into a problem. You can see me in my office hours or make an appointment to see me. Also there is often extra time in lab that you can ask. Or simply ask other student in the class.

BIOLOGY 321 Human Anatomy and Physiology
Lecture Schedule
Fall Semester 2014

(Subject to change)

Week	Day		Lecture	Reading
1	T	Aug 26	Introduction to Anatomy and Physiology	Chap 1 pg 1-16
	R	Aug 28	Membranes, Proteins and Ligands, Enzymes	Chap 3 pg 48-51, 68-78
2	T	Sep 2	Diffusion, Mediated Transport, Osmosis	Chap 4, pg 96-110
	R	Sep 4	Endocytosis, Exocytosis, Epithelial Transport	Chap 4, pg 110-115
3	T	Sep 9	Control of Cells	Chap 5, pg 120-133
	R	Sep 11	Neural Tissue, Electricity, Resting Membrane Potent.	Chap 6, pg 138-150
4	T	Sep 16	Action Potentials, Anatomy of Synapses, NT release	Chap 6, pg 152-162
	R	Sep 18	Post-Synaptic cell, Synaptic Integration and Strength	Chap 6, pg 162-167
5	T	Sep 23	EXAM 1	
	R	Sep 25	Neurotransmitters, Neuroeffector Communication	Chap 6, pg 167-172
6	T	Sep 30	Brain, Spinal Cord, Peripheral and Autonomic NS	Chap 6, pg 173-184
	R	Oct 2	Blood Supply, BBB, CSF	Chap 6, pg 184-186
7	T	Oct 7	Sensory physiology General Principles	Chap 7, pg 191-201
	R	Oct 9	Somatic Sensation	Chap 7, pg 203-207
8	T	Oct 14	Vision	Chap 7, pg 207-217
	R	Oct 16	Hearing	Chap 7, pg 217-223
9	T	Oct 21	EXAM 2	
	R	Oct 23	Vestibular System, Chemical Senses	Chap 7, pg 223-228
10	T	Oct 28	Skeletal Muscle structure and the NMJ	Chap 9, pg 257-265
	R	Oct 30	Excitation-Contraction, Sliding Filament, Twitches	Chap 9, pg 265-272
11	T	Nov 4	Load, Frequency, Length, Metabolism, Fibers, Whole	Chap 9, pg 272-281
	R	Nov 6	Smooth and Cardiac Muscle	Chap 9, pg 286-294
12	T	Nov 11	Motor Control Hierarchy and Local Control	Chap 10, pg 300-307
	R	Nov 13	Brain Motor Centers, Descending Pathways, Tone, Posture	Chap 10, pg 308-312
13	T	Nov 18	EXAM 3	
	R	Nov 20	Endocrine System – general principles	Chap 11, pg 319-332
14	T	Nov 25	Hypothalamus and Pituitary	Chap 11, pg 333-339
	R	Nov 27	Thanksgiving Holiday	
15	T	Dec 2	Endocrine and Neural Control of Nutrient Utilization	Chap 16, pg 578-585
	R	Dec 4	Thyroid Hormone and Calcium Homeostasis	Chap 11, pg 340-344, 353-357

Final Exam – Sections 221-224, 325 - Tuesday December 9, 2014 12:00-1:40pm in IRC 120

Sections 211-214 – Wednesday December 10, 2014 2:00-3:40pm in IRC 120

BIOLOGY 321 Human Anatomy and Physiology

LAB Schedule Fall Semester 2013

Week	Dates	Subject
1	Aug 25-28	Human Anatomy Tissues – Epithelial, Connective
2	Sep 1-4	NO LABS
3 Quiz	Sep 8-11	Tissues –Muscle, Nerve, Integumentary System
4 Quiz	Sep 15-18	**Cell membrane permeability
5	Sep 22-25	Spinal cord and spinal nerves and neural histology
6 Quiz	Sep 29-Oct 2	Brain and cranial nerves
7 Quiz	Oct 6-9	**Compound action potential
8	Oct 13-16	**Special senses – Anatomy and Physiology Sensory Taste Vision Hearing
9	Oct 20-23	Skeletal system - Bones
10 Quiz	Oct 27-30	Skeletal muscle anatomy
11 Quiz	Nov 3-6	**Skeletal muscle physiology
12	Nov 10-13	**Neural – Smooth muscle physiology
13	Nov 17-20	Open Lab for Review
14	Nov 24-25	Open Lab on Monday and Tuesday
15	Dec 1-4	Comprehensive lab final

** - Physiology labs

Biology 322 - Human Anatomy and Physiology

Course Syllabus

Spring Semester 2013

Course Description: Second of two semesters of a comprehensive, integrated course in anatomy-physiology developing logical correlations between structures and their function. Topics: respiratory, digestive, metabolic, cardiovascular, excretory and reproductive systems. Designed for students in science baccalaureate degree programs.

Instructor: Dr. M. Beth Zimmer, PhD
Office: 2120 Arts and Science Commons
Phone: (231) 591-5022
Email: MaryZimmer@ferris.edu
Office hours: Monday 12:00pm – 2:00pm
Tuesday 9 – 11:00am
By appointment

Lectures: M, W, F 11:00-11:50pm SCI 126
Labs: 211 Tuesday 12:00-2:50pm SCI 228
212 Tuesday 3:00-5:50pm SCI 228
213 Wednesday 12:00-2:50pm SCI 228

Course Prerequisites: BIOL 122, 321 and CHEM 122

Required Texts:

1. **Lecture Material:** Vander's Human Physiology, 11th or 12th Edition, Eds., Widmaier EP, Raff H, Strang KT, McGraw-Hill, Boston, MA (any recent edition will do)
2. **Lab Material:** Seeley's Anatomy and Physiology, 9th edition Laboratory Manual, Ed., Wise, McGraw-Hill, Boston, MA

Course Outcomes:

1. Students will be able to identify and name designated anatomical structures (both histological and gross) within the following organ systems: the digestive system, the respiratory system, the cardiovascular system, the male and female reproductive system, and the renal system.
2. Students will be able to explain physiological functions and mechanisms within the following organ systems: the digestive system, the respiratory system, the cardiovascular system, the male and female reproductive system, and the renal system.
3. Students will be able to apply their knowledge of anatomy and physiology to think critically about the application of anatomical and physiologic concepts to case studies: analyze the specific situation and predict the outcome and the possible consequences of additional changes.
4. Students will be able to carry out experimental procedures, evaluate experimental data and form an understanding of the process that comes from the results of the experiment. Students will also be able to write reports based on their results using the scientific method.

Lecture and Lab NOTES - FerrisConnect and the Internet:

All lecture and lab notes will be made available via FerrisConnect.

Although the internet has become a major source of scientific information, one should remember that, unlike scientific papers or textbooks, web sites do not undergo the process of peer review. Consequently, never assume that absolutely everything posted on the web is correct, actually assume the opposite. When surfing the net, choose web sites that belong to well-established institutions such as colleges and universities. I will attach

some sites that may become useful for study. If you find any sites that you'd like to share, please let me know and we can attach the links to the course site.

Evaluation:

The lecture mark is based on: (500 pts total)

- Three lecture exams – 100pts each
- Final exam – 200pts total (100pts cumulative material and 100pts Last 4 weeks of material)

The lab mark is based on: (200 pts total)

- Quizzes – 6 at 20 pts each (100 pts total)
- Lab Final Comprehensive exam – 100 pts

There will also be occasional extra credit points available throughout the semester.

Lecture exams: will be given approximately every 4 weeks. They will consist of questions that pertain to the previous ~4 week's information (you will be told which subject areas are on a particular exam). Specific details will be given out prior to each exam.

Final Exam: A comprehensive final exam covering all of the material taught throughout the semester will be given. Along with this will be another exam that will cover the material from the previous ~4 week's information.

Lab Quizzes: will be given at the start of lab sections and consist primarily of anatomical identification, short answer, fill-in-the-blank type questions designed to test students' comprehension of lab material.

Comprehensive Lab Exam: A comprehensive lab exam will be given on the last day of scheduled lab. This will include both anatomy and physiology labs covered in the lab section only. More details will be provided later in the course.

Course Policies

Grading:

93 – 100 = A	73 – 76.9 = C
90 – 92.9 = A-	70 – 72.9 = C-
87 - 89.9 = B+	67 – 69.9 = D+
83 – 86.9 = B	63 – 66.9 = D
80 – 82.9 = B-	60 – 62.9 = D-
77 – 79.9 = C+	Below 60 = F

Attendance: Attendance at lectures is expected. There is a positive correlation between students who attend lecture regularly and good grades. I will not take attendance, but it is in your best interest to attend lecture. I will on occasion assign some extra credit points to those people that attend lecture. If you need to miss lecture and it is a valid excuse, please email me a quick note to be excused and not lose any extra credit points.

Lab attendance is MANDATORY. There will be no make-up labs. If you have a valid excuse for missing lab, please *see me or contact me immediately (phone, email)*. Otherwise, any missed lab will be recorded as a "0" (no make-up tests or quizzes without valid excuse). Any 2 missed labs for ANY reason will result in a failing grade.

Academic Integrity: Cheating of any kind will NOT be tolerated. Any reports of cheating or plagiarism will be forwarded to the Office of Student Conduct and be treated accordingly.

It is easy to succeed in Biology 321/322 as long as you approach this course with a certain degree of maturity and proper attitude. The few points suggest some strategies that you may find helpful in your study of the lecture material.

- 1. Always read chapter material before coming to lecture.** You are responsible for the entire content of lecture material. Because there is not enough time to discuss everything in detail, we will concentrate on those concepts that are either more difficult or critically important for the comprehension of the entire topic. Therefore, you must read the material ahead of time in order to place each lecture in proper context.
- 2. Study consistently.** DO NOT wait with studying until the last 48 hours before the exam! The amount of information will overwhelm you! It is much more effective to spend a short amount of time (even 15-20 minutes) in the evening following each lecture trying to *understand* the material. This way you should establish good comprehension of each individual concept and can concentrate on "putting the pieces together" during week before the exam.
- 3. Ask questions.** Many aspects of physiology are complex - DO NOT HESITATE TO ASK QUESTIONS each time you run into a problem. You can see me in my office hours or make an appointment to see me. Or simply ask other student in the class or your study group. This can be done in small study groups (see #4) or over the Internet.
- 4. Study in small groups.** I strongly encourage students to study in small groups. It won't be long before you will get to know other students in the class, you may know some already. Try to establish a small study group and try to get together once a week to reinforce each other's comprehension of the material. Ask and answer questions aloud. If you can explain a concept aloud then you will have mastered the concept, try it! Such interactions will help you to assess your knowledge and point the areas that you overlooked in studying on your own.

BIOLOGY 322 Human Physiology and Anatomy-2

Lecture Schedule

Spring Semester 2013

(Subject to change)

Week	Day		Lecture	Vander's Physiology Reading	
				Version 11 (Red)	Version 12 (Blue)
1	M	Jan 13	Course Introduction - Introduction to cardiovascular system	Chap 12, pg 365-366	Chap 12, pg 359-360
	W	Jan 15	Cardiac physiology	Chap 12, pg 366-371	Chap 12, pg 360-364
	F	Jan 17	Cardiac physiology	Chap 12, pg 371-373	Chap 12, pg 364-367
2	M	Jan 20	Martin Luther King Day – No class		
	W	Jan 22	Cardiac physiology	Chap 12, pg 373-377	Chap 12, pg 367-370
	F	Jan 24	Cardiac physiology	Chap 12, pg 377- 380	Chap 12, pg 370-373
3	M	Jan 27	Cardiac physiology	Chap 12, pg 380-382	Chap 12, pg 373-375
	W	Jan 29	Heart and homeostasis	Chap 12, pg 380-382	Chap 12, pg 373-375
	F	Jan 31	Blood vessel anatomy	Chap 12, pg 384-389	Chap 12, pg 377-382
4	M	Feb 3	Dynamics of blood circulation	Chap 12, pg 389-394	Chap 12, pg 382-385
	W	Feb 5	Control of blood flow and pressure	Chap 12, pg 405-410	Chap 12, pg 397-402
	F	Feb 7	EXAM 1		
5	M	Feb 10	Control of blood flow and pressure	Chap 12, pg 410-412 and pg 394-399	Chap 12, pg 402-404 and pg 385-392
	W	Feb 12	Blood	Chap 12, pg 425-431	Chap 12, pg 417-422
	F	Feb 14	Blood	Chap 12, pg 431-437	Chap 12, pg 422-429
6	M	Feb 17	Respiratory system anatomy	Chap 13, pg 443-446	Chap 13, pg 435-438
	W	Feb 19	Ventilation	Chap 13, pg 446-454	Chap 13, pg 438-446
	F	Feb 21	Lung function – lung volumes	Chap 13, pg 454-457	Chap 13, pg 446-448
7	M	Feb 24	Principles of gas exchange	Chap 13, pg 457-462	Chap 13, pg 448-454
	W	Feb 26	Oxygen and CO2 transport	Chap 13, pg 463-469	Chap 13, pg 454-460
	F	Feb 28	Control of ventilation	Chap 13, pg 469-476	Chap 13, pg 460-467
8	M	Mar 3	Exercise physiology	Chap 9, pg 277-278	Chap 9, pg 273-274
	W	Mar 5	Exercise physiology	Chap 12, pg 415-419	Chap 12, pg 407-410
	F	Mar 7	EXAM 2	Chap 13, pg 474-475	Chap 13, pg 464-465
9	M	Mar 10	SPRING RECESS – NO CLASS		
	W	Mar 12	NO CLASS		
	F	Mar 14	NO CLASS		
10	M	Mar 17	Renal anatomy	Chap 14, pg 486-489	Chap 14, pg 476-480
	W	Mar 19	Renal physiology	Chap 14, pg 489-497	Chap 14, pg 480-486
	F	Mar 21	Renal physiology	Chap 14, pg 500-506	Chap 14, pg 490-495
11	M	Mar 24	Renal physiology	Chap 14, pg 506 -514	Chap 14, pg 495-504
	W	Mar 26	Water, electrolytes, acid-base	Chap 14, pg 517-522	Chap 14, pg 506-511
	F	Mar 28	Water, electrolytes, acid-base		
12	M	Mar 31	Digestive system physiology	Chap 14, pg 498-499	Chap 14, pg 487-488
	W	Apr 2	Digestive system physiology	Chap 15, pg 528-534	Chap 15, pg 516-521
	F	Apr 4	Digestive system physiology	Chap 15, pg 540-543	Chap 15, pg 528-530
13	M	Apr 7	Digestive system physiology	Chap 15, pg 543-548	Chap 15, pg 530-536
	W	Apr 9	Digestive system physiology	Chap 15, pg 554-557	Chap 15, pg 541-544
	F	Apr 11	EXAM 3		

14	M	Apr 14	Digestive system physiology	Chap 15, pg 536-540	Chap 15, pg 523-528
	W	Apr 16	Digestive system physiology	Chap 15, pg 553-554	Chap 15, pg 539-541
	F	Apr 18	NO CLASS – mid semester break	Chap 15, pg 551-552	Chap 15, pg 538-539
15	M	Apr 21	Digestive system physiology	Chap 15, pg 557-561	Chap 15, pg 544-550
	W	Apr 23	Male Reproductive Physiology	Chap 17, pg 602-610	Chap 17, pg 590-599
	F	Apr 25	Male Reproductive Anatomy	Chap 17, pg 611-613	Chap 17, pg 599-602
16	M	Apr 28	Female Reproductive Anatomy	Chap 17, pg 615-619	Chap 17, pg 603-609
	W	Apr 30	Female Reproductive Physiology	Chap 17, pg 619-627	Chap 17, pg 609-616
	F	May 2	Female Reproductive Physiology	Chap 17, pg 627-634	Chap 17, pg 616-621

Exam 4 and Final Cumulative Exam - Thursday, May 8 - 10:00am 11:40am

LAB Schedule Spring Semester 2014

Week	Dates	Quizzes	Subject	Reading
1	Jan 14-15		Heart Anatomy	Exercise 27 pg 359-371
2	Jan 21-22		NO LABS	
3	Jan 28-29	Quiz	** Cardiac Physiology **	Handout
4	Feb 4-5	<i>(Lecture Exam 1)</i>	** Functions of the heart ** ** ECG and Blood pressure **	Handout
5	Feb 11-12		Blood vessels of the upper and lower body Lymphatic System	Exercise 30 – 33 Pg 391-440
6	Feb 18-19	Quiz	Respiratory Anatomy	Exercise 35 Pg 447-458
7	Feb 25-26	Quiz	**Respiratory Function**	Handout Exercise 36
8	Mar 4-5	<i>(Lecture Exam 2)</i>	NO LABS	Exercise 40 Pg 507-516
9	Mar 11-12		Spring Break - NO LABS	
10	Mar 18-19		Renal Anatomy	Exercise 38 Pg 447-497
11	Mar 25-26	Quiz	Digestion Anatomy	Exercise 42-43 Pg 523-546
12	Apr 1-2	Quiz	** Digestion Physiology **	
13	Apr 8-9	<i>(Lecture Exam 3)</i>	Open Lab for Review	Handout
14	Apr 15-16		Reproductive Anatomy/Open Lab	
15	Apr 22-23		Comprehensive lab final	
16	Apr 29-30		NO LABS	

**ZOOLOGY
BIOL 330
COURSE SYLLABUS
SPRING SEMESTER 2015**

Instructor: Dr James Scott
Office: 2013 Arts and Science Commons
Telephone: FSU Office: 591-2620 if no ans. leave message on phone mail.
Clinic 796-3507 Only in case of emergency.
Home: 796-7583 evenings
Cell 250-7531
E-Mail: James_Scott@ferris.edu
Office Hours: Tuesday and Thursday 8-8:50AM MCO 331
Wednesday 10:00AM – 11:50AM ASC2013
All other office hours by appointment*
*It is my desire to be available to you at all times and therefore I have offered several ways for you to contact me if necessary. If you need to meet with me I will be happy to work something out will my schedule and yours

Required Materials:

Text:

Animal Diversity, Hickman, Roberts, Keen, Larson and Eisenhour, 6th Edition, 2011, ISBN 978-0-07-302806-4.

Laboratory Manual:

Laboratory Studies in Animal Diversity, Hickman and Kats, 6th Edition, 2011, ISBN 978-0-07-34597-6.

Ferris Connect:

During the semester you will be required to log on to FerrisConnect for many purposes such as to download and copy lecture outline materials, read notes from your instructor, retrieve exam and quiz scores and to check current course grades. Please check the FerrisConnect BIOL330 home page often so that you will not miss any of this important material. If you have any difficulty logging on and retrieving materials please let me know as soon as possible so that I or someone on our computer support staff can help you.

Class Schedule:

Lecture:	STR 136	M,W,F	12:00 noon - 12:50PM
Laboratory	SCI 231	R	3:00 – 5:50 PM

Course Description:

Zoology is the study of the diversity of invertebrate and vertebrate animals. The goals of this course are: (1) to examine the evolutionary mechanisms that lead to the diversity of animals on our planet; (2) to survey the animal kingdom by comparing the unique structures and functions that are used to classify organisms into major phylogenetic groups; and (3) to gain experience with these organisms in the laboratory. The laboratory portion of the course includes examination of representative organisms using slides, specimens and dissections.

Course Outcomes:

- Identify the major taxonomic groups from protista to the mammals
- Develop skills to successfully utilize taxonomic keys
- Recognize the anatomical structural changes associated with evolutionary development of major organ systems
- Develop skills in dissection and identification of major anatomical structures across all major taxonomic groups.
- Develop the ability to identify, isolate and describe the function of major organ structures across taxonomic groups.

Outcome Assessment Plans:

I will assess the learning outcomes of this material by giving periodic Lecture exams and quizzes and Laboratory practical examinations.

Students will undertake weekly dissection exercises in the Laboratory portion of the course. During these dissection exercises the students will demonstrate that they can access major anatomical structures via dissection techniques. Success of this outcome will be determined by the students ability to demonstrate the necessary skills to access these structures.

Written exams will contain graphics associated with the major anatomical structures discussed in lecture materials and isolated during laboratory activities.

The administration of a pre-exam covering all of the material that will be presented during this semester will occur at the beginning of the semester. At the end of the course during the comprehensive final exam the students will be asked similar questions that were given in this pre-exam. With the statistics that I receive from presenting these questions pre and post I will be able to assess your ability to accomplish your learning objectives and will be able to adjust the course to better meet these objectives.

Grading Policies:

Exams

There will be 3 scheduled lecture exams during the semester each worth 100 points and a 200 point final exam given during final exam week. This exam given during final exam week will consist of two parts; one half will include new material since the previous exam and the other half, all material since the beginning of the semester.

Quizzes

I anticipate giving periodic, unannounced, lecture quizzes covering material from the previous two lectures. Knowing that these quizzes can be given at any time will require you to keep current on your text reading and lecture note review.

Lecture exams and quizzes will be based on material presented in lecture, Blackboard Learn and required reading and will consist of multiple choice, true and false, short answer, and essay questions

Laboratory Assessment

In addition to lecture examinations there will be weekly 10 point laboratory quizzes plus an approximately 75 point lab practical examination at the conclusion of the laboratory period.

Lecture and laboratory exams and quizzes will account for approximately 650 points in the course

GRADING SCALE:

The total points achieved by the student in this course will be converted into a percent total and the final grade will be determined according to the following scale:

93 - 100 = A	73 - 76.9 = C
90 - 92.9 = A-	70 - 72.9 = C-
87 - 89.9 = B+	67 - 69.9 = D+
83 - 86.9 = B	63 - 66.9 = D
80 - 82.9 = B-	60 - 62.9 = D-
77 - 79.9 = C+	Below 60 = F

Attendance:

Lecture attendance is not mandatory (i.e. roll will not be taken) although you must be aware that there is a direct link between good attendance and good grades. Do not depend on others to take good notes. If you hear the lecture, take good notes, and study your own notes you will be much more successful in this course.

Lecture period attendance on exam days is mandatory. If you miss a lecture exam, you must contact me within 24 hours with an acceptable, verifiable excuse. Only then will a make up exam be considered.

Attendance during Laboratory periods is required. The Biology Department policy states: Unexcused absence in two or more laboratory periods during the semester is grounds for failure of the course.

**Biology 330
Zoology
Tentative Lecture Schedule Spring 2015**

Date	Topic	Required Reading
1-12 1-14 1-16	Introduction to Zoology The Theories of Evolution and Heredity Origin of Living Systems - Tegrity	Chapter 1 Chapter 1
1-19 1-21 1-23	MLK Day – No Lecture Principles of Development - Tegrity Architectural Patterns of an Animal	Chapter 3
1-26 1-28 1-30	Taxonomy and Phylogeny of Animals Unicellular Eukaryotes: Protozoan Groups Unicellular Eukaryotes: Protozoan Groups	Chapter 4 Chapter 5 Chapter 5
2-2 2-4 2-6	Sponges and Radiate Animals Sponges and Radiate Animals Acoelomate Bilateral Animals	Chapter 6 Chapter 7 Chapter 8
2-9 2-11 2-13	Acoelomate Bilateral Animals Exam 1 Gnathiferans and Smaller Lophotrochozoans	Chapter 8 Chapter 9
2-16 2-18 2-20	Mollusks Mollusks Annelids	Chapter 10 Chapter 10 Chapter 11
2-23 2-25 2-27	Smaller Ecdysozoans Arthropods Arthropods	Chapter 12 Chapter 13 Chapter 13
3-2 3-4 3-6	Hemichordates and Echinoderms Hemichordates and Echinoderms Exam 2	Chapter 14 Chapter 14

3-7 through 3-15 SPRING BREAK

**Biology 330
Zoology
Tentative Lecture Schedule Spring 2015**

Date	Topic	Required Reading
3-16	Vertebrate Beginnings - Chordates	Chapter 15
3-18	Fishes	Chapter 16
3-20	Fishes	Chapter 16
3-23	Early Tetrapods	Chapter 17
3-25	Early Tetrapods and modern Amphibians	Chapter 17
3-27	Early Tetrapods and modern Amphibians	
3-30	Amniote Origins and Nonavian Reptiles	Chapter 18
4-1	Amniote Origins and Nonavian Reptiles	Chapter 18
4-3	Easter Recess	
4-6	Birds	Chapter 19
4-8	Birds	Chapter 19
4-10	Mammals	Chapter 20
4-13	Exam 3	
4-15	Mammals Continued	Chapter 20
4-17	Support, Protection and Movement	Handout
4-20	Homeostasis: Osmotic Regulation, excretion and Temperature Regulation	Handout
4-22	Homeostasis: Osmotic Regulation, excretion and Temperature Regulation	Handout
4-24	Homeostasis: Internal Fluids and Respiration	Handout
4-27	Digestion and Nutrition	Handout
4-29	Nervous Coordination: Nervous System and Sense Organs	Handout
5-1	Chemical Coordination: The Endocrine System	Handout

Final Exam Date, Time and Location TBA

**Biology 330
Zoology
Laboratory Schedule Spring 2015**

Date	Topic	Lab Book Exercise
Jan 15	Introduction, Lab Rules, Use of Taxonomic Keys and Microscope	1 & 3
Jan 22	MLK week – no Lab	
Jan 29	Protozoan Groups	4
Feb 5	The Sponges, The Radiate Animals	5 & 6
Feb 12	The Flatworms, Five Protostome Phyla	7 & 8
Feb 19	The Molluscs, The Annelids	9 & 10
Feb 26	The Arthropod	11, 12 & 13
Mar 5	The Echinoderms, Phylum Chordata	14 & 15
Mar 12	Spring Break Week – No Lab	
Mar 19	The Cartilaginous Fishes	16
Mar 26	The Boney Fishes	16
Apr 2	Class Amphibia	17
Apr 9	Non-Avian Reptiles	18
Apr 16	The Birds	19
Apr 23	The Mammals	20
April 30	Final Laboratory Practical Exam	

BIOL 340 Evolution Spring 2015

Instructor: Dr. Mary R. Murnik

Office: ASC 2117

Telephone: 231-591-2546

e-mail: murnikm@ferris.edu

Office Hours: TR 8:20-9:10 am, 3:00-3:50 pm

BIOL 340 Evolution 3 credits,

The study of the process of evolution, including the origin of species and fossil evidence in the geological record. Considers evidence of evolutionary relationships, including molecular homologies recently discovered by genome projects, the evolution of metabolic pathways, symbiotic relationships and the evolution of eukaryotes. Designed for science and non-science students and is applicable toward the Biology major.

This is a Writing Intensive Course. **Prerequisite: BIOL 122**

Course Objectives:

BIOL 340 involves the study of the process of evolution, including the origin of species, fossil evidence in the geological record, and molecular evidence of evolutionary relationships. The purpose of this course is to increase your understanding of the evidence for organic evolution, the theories that have been offered to explain how evolution has occurred, and the fundamental principles in the study of evolution. You will analyze the relationships between biological organisms and consider the evidence of evolutionary relationships, including molecular homologies that have been recently discovered by genome projects, the evolution of metabolic pathways, symbiotic relationships and the evolution of eukaryotes. You will gain a broader understanding of how biologists think, and you will develop your skills in critical thinking, reasoning, and expressing yourself orally and in writing. This course meets requirements as a Writing Intensive course.

Core Course Objective: Students who complete BIOL 340 will understand and be able to discuss clearly the basic concepts of and evidence for biological evolution.

Texts:

Evolution, 5th edition, B. Hall & B. Hallgrímsson, Jones and Bartlett, 2013

Evolution Lecture Guide, Mary R. Murnik, Great Lakes Books, 2013-2014

The Miniature Guide to Critical Thinking, Richard Paul & Linda Elder,

Foundation for Critical Thinking, any edition

Additional course materials and information will be distributed in class. Internet references are given in class and in the text, and you are encouraged to seek other references both in print and on the internet, ascertaining whether the source employs peer review and is recognized as a credible scientific reference.

Learning Outcomes A student succeeding in this course should be able to...	Measurable Outcome Assessment (items pertain to all outcomes, not just to that in the same row)
demonstrate understanding of the evidence for organic evolution, the theories that have been offered to explain how evolution has occurred, and the fundamental principles in the study of evolution	Comparison of class responses to specific questions on pre- and post-tests
analyze the relationships between biological organisms and consider the evidence of evolutionary relationships, including molecular homologies that have been recently discovered by genome projects, the evolution of metabolic pathways, symbiotic relationships and the evolution of eukaryotes	Student performance on daily assignments provides timely assessment of their mastery of the concepts. Student responses to the regular questioning in class indicate whether students understand the concepts being considered at that time, and provide the opportunity to re-visit the concepts right then if they are not.
Demonstrate understanding of how biologists think, and demonstrate skills in critical thinking, reasoning, and expressing their reasoning orally and in writing.	Writing assignments , both papers and daily assignments, allow assessment of students' reasoning through biological concepts. Students assess their own work on a rubric indicating the objectives of writing their papers, and instructor assessment is given on the same form.

Attendance and Participation

Attendance and participation at all scheduled class sessions is expected. Your participation in class discussions is very important. We all have different backgrounds and interests that can contribute to this course. At times we will work in groups when considering evolutionary topics.

Absences will result in lowering your grade, because graded in-class writing assignments and/or take-home assignments are submitted on most class days. You may be asked to respond in class concerning concepts that we have considered. You may relate the current material to topics that you considered in previous courses, you may question the ideas being discussed, or you may critically review a video segment that was presented. Ideas and questions may also be submitted in writing to be reviewed at the beginning of the next class. **Take-home assignments must be turned in at the beginning of the next class session.**

Moreover, during lecture periods, randomly-selected students will be asked to analyze an evolutionary situation, concept or controversy. Responses will be assessed and 100 pts

of the final grade total will be based on your participation. (This is clearly related to the core course objective.)

Participation grades will be determined by the **average of your responses** when called upon in class. **Questions** will be asked first, and all students may discuss their interpretations, responses, etc. After the short discussion period, one student will be called upon based on the random drawing of their name from the “deck” of name cards. The student may again briefly talk to other students about the response, or ask me questions for clarification. Responses will be graded on a scale, eg.

- 10 -excellent, exhibiting sound comprehension of the concept being considered,
- 9 -very good, showing good understanding,
- 8 -shows understanding,
- 7 -does not exhibit comprehension,
- 6 -non-responsive, not attempting to deal with the question, or
- 0 -not present, no valid excuse presented prior to lecture. (*This could significantly affect your participation grade, since most students are called on 4-6 times in a semester.*)

Cell phones must be turned off, and interpersonal conversations cease, during the class period. Students should not read or send text messages nor use iPods, iPads, nor other electronic devices during any class period. Those who do may be asked to leave the classroom.

“In the Ferris Institute, tardiness is an insult.” Woodbridge Ferris Please make every effort to arrive in class before 1:30 pm. Tardy arrivals disturb other students, and miss any announcements at the beginning of class. If you are late, please enter as quietly as possible.

Tests:

Most of your grade in this course will be determined by assignments, papers and participation. The mid-term and cumulative final examinations are objective tests that assess evolutionary understanding; they contribute 200 points to the course grade.

Students may not use calculators, iPods, cell phones, etc., while taking tests. Students may not leave the classroom during an examination.

Cheating:

The FSU policy on cheating is described in the Student Handbook on the Ferris website. Cheating or plagiarism usually results in automatic failure in the course.

Grades:

Grades in this course will be based on the assigned papers, the class writing assignments, your participation grade, and the two objective examinations.

	Maximum Points
Papers (Sci. Rev. 100 pts, Pop. Sci. 50 pts)	150
Class writing assignments	150, approximately
Participation grade	100
Midterm & Final, 100 pt. Ea.	200
Possible pop Quizzes	50

The grading scale is:

A	93-100%	B-	80-82%%	D+	67-69%
A-	90-92%	C+	77-79%	D	63-66%
B+	87-89%	C	73-76%	D-	60-62%
B	83-86%	C-	70-72%	F	below 60%

Papers:

You will write two edited, typewritten papers. One paper will be in the format of a science review article (described below, worth 100 points), and the other paper will be a popular science article (worth 50 points) with headlines, attention-getting introductory paragraphs and informal references within the articles. Writing your papers should increase your understanding of evolutionary topics. Remember to attach a Writing Assessment Form to each paper submitted, with your assessments.

If you turn a paper in after the due date, there is a penalty of 5 pts per week day (e.g. a paper due on Tuesday and turned in at the beginning of class on Thursday will lose 10 pts.) If you turn the paper in at another time at the Biological Sciences department office, be sure to have the secretary mark the time of receipt on your paper.

Paper Topics:

Topics may be assigned for each paper. Let the instructor know if you have a particular interest. If topics are not assigned, your chosen topic should be approved by the instructor at least two weeks before the paper is due. The paper must primarily consider evolutionary aspects of a biological topic. Later papers may continue and expand upon topics presented in the earlier paper, or a new topic may be selected.

Meetings with the instructor:

You may talk with the instructor to discuss your interests and ideas, strategies for writing for different audiences, writing styles, etc. The instructor may be able to provide information about references about the topic of your paper which you might find useful.

Drafts:

You are encouraged to submit drafts of your papers, no later than two class days before the paper is due so that the instructor can review your drafts and give suggestions by the class day before the paper is due.

References:

*At least **two science-peer-reviewed references** should be cited for each paper. References should be articles in scientific journals or magazines (or their web sites, and those of science museums.). In some cases a science book may be chosen (usually not a text.) Internet research is encouraged, but you must be careful to only use material which has been reviewed by other scientists (articles in scientific journals and magazines are reviewed.) Material can be placed on the internet which is misleading, false or incomplete, out of context, etc. For that reason, you need to use judgment in using internet sites. If you wish to include a non-peer-reviewed article (from the internet or general press), you should have reviewed articles that also present supportive, relevant information on that topic. Consider the scientific viewpoint in your paper, in some cases contrasting the information from the non-peer-reviewed source. Caution: Wikipedia is not a scientifically reviewed site. You may look into this source, but you cannot rely on this information.*

You should attach copies of your reference materials to your paper. *No credit will be given for a paper lacking reference citations and copies of references. Copies of cited pages should be submitted, with pertinent material highlighted.*

Reference materials borrowed from the instructor must be returned by the date the paper or assignment is due for which the materials were provided. Unreturned materials may result in a hold on registration activity.

Paper Formats:

1. *Popular article format*

This paper should be in the format of a science article in a newspaper or popular science magazine. This should be typewritten and contain:

- a. A **headline**, with your name underneath
- b. A body consisting of approximately 1000 words, with an introductory paragraph which introduces the content in an interesting way, and with more specific information in the following paragraphs. If you have access to software that will format your article in **newspaper-like columns**, you *may* use that format.
- c. General **acknowledgement of references** should be done informally within the text of the paper (e.g. “According to Cavalli Sforza, an internationally recognized population geneticist from Stanford,...”)
- d. A **list of your references** should be included (as well as copies of the pages with pertinent information highlighted).

2. *Scientific review paper*

The review paper should be typewritten, double spaced, and contain:

- a. a **title page**, with title, course, name and date
- b. a **body** of at least five pages (approximately 1250 words) with three parts:
1) introduction, 2) discussion section, and 3) summary
- c. a **reference list**
 - a. List by number, with the first article being cited as # 1
eg.
 1. Cavalli-Sforza, L. L., Paolo Menozzi and Alberto Piazza, 1994.
The History and Geography of Human Genes, Princeton University Press, Princeton
 2. Carroll, S. B., 2005. *Endless Forms Most Beautiful*,
W.W. Norton, New York
 3. Gilad, Y., G. K. Oshlack, T.P. Speed, and K.P. White, 2006. Expression profiling in primates reveals a rapid evolution of human transcription factors *Nature* 440:242-245
 - b. Cite your references by their numbers within the body of the paper, with the first reference being (1), *e.g.*, Comparisons of banded metaphase chromosomes of man, chimpanzee, gorilla and orangutan have revealed a general homology of chromosomal bands in the four species and suggested a common ancestor for the chimpanzee, gorilla and man. (1)

Lecture Schedule

Reading & writing assignments will be assigned daily

(assignments below refer to chapters or pages in Strickberger text)

1/13

Introduction to BIOL 340

1. The Emergence of Evolutionary Thought

Great Chain of Being, Growing awareness of change: Lyell and earth change, Cuvier's catastrophism, Kelvin and the age of the earth, Lamarck. Questions from biogeography, comparative anatomy, fossils, geologic time, Darwin and the Theory of Natural Selection. (Chapters 1, 10, pages 20-24)

1/15

2. Science and Critical Thinking

All theories are "flat earth models", scientific criteria, all theories have problems and puzzles. How do we think? Are there different levels?

- What constitutes “good thinking” or critical thinking? (Paul & Elder booklet.)
- 1/20 **3. Considering some arguments which have been presented against the theory of evolution**
Old earth evidence, the second law of thermodynamics, the Creation vs Evolution continuum. (Chapter 28)
- 1/22 **4. Plate Tectonics, continental drift; Fossil formation**
Plate tectonics, continental drift and its impact on evolution. Geological dating, sedimentary environments; Formation of fossils, trace fossils. (Chapter 5)
- 1/27 **5. Origin of the solar system**
Evidence for the Big Bang, nature of the universe, origin of the earth. (Chapter 4)
- 1/29,2/3 **6. Origin of Life and the Precambrian Fossil Record**
Conditions on early Earth, fossilization, the oldest known fossils, chemical indicators, banded iron formations. synthesis of biological molecules, self-replicating molecules, evolution of metabolic pathways, evolution of photosynthesis, oxygen toxicity. What *is* life? (Chapters 6, 7, 8)
- 2/5 **7. Emergence of Eukaryotes**
Symbiosis, endosymbiosis, organelles, evolution of sexual reproduction, Eukaryotic themes (Chapter 9)
- 2/10 **Eukaryotic Themes and**
8. The Organization of Life
The “kingdoms” (Chapters 2,3,17)
- 2/12 **Paper I due** (popular science article)
- 2/12,17 **9. Genetics and Evolution**
Variation, sources of variation, genetic equilibrium, gene flow and drift, natural selection: stabilizing, disruptive or directional, group selection, K vs r strategists, mimicry, neutral alleles (Chapters 11,12,14, 15, 18,19)
- 2/19,24 **10. Adaptation and Speciation**
Reproductive isolating mechanisms, origin of species, evolutionary patterns and trends, homologous vs analogous structure, punctuated equilibrium vs phyletic gradualism , adaptive radiation (Chapters 3, 16, 22, 23)
- 2/26 **Mid-Term Examination**
- 3/3 **11. Evolution of Animals**

Protists, metazoans, Ediacaran fauna, evolution of skeletons, the Cambrian Event, Burgess Shale animals (Chapters 17, including pp 349-357)

- 3/5 **12. Evolution of early vertebrates**
The evolution of the Chordata, amphioxus, osteostrachans, evolution of jaws, cartilaginous fishes, placoderms, bony fishes, lobefins and lungfish, coelacanth, hox genes and duplications (Chapter 17)
- 3/19,24 **13. Leaving the Water**
First land animals, amphibians and reptiles
- 3/26** **Paper 2 due** (Science review article)
- 3/26,31 **14. Origin of Land Plants**
The first land plants, the primeval landscape (Chapter 21)
- 15. The Dinosaurian World**
Late Triassic: The Beginning of the Age of Dinosaurs
Jurassic: Dinosaurs Dominate
Cretaceous: Transition, then hard times
(480-483)
- 4/2 **16. Evolution of Flight and Warm-Blooded Dinosaurs; Ratites**
Preadaptation for flight, flying insects, early gliding vertebrates, pterosaurs, birds, flightless birds (483-485)
- 4/7,9 **17. Extinction** (pp 471-478, 492-493)
Is there an extinction cycle? Do species get old? What about asteroids?
- 18. Evolution of Mammals**
Cynodonts, mammalian reproduction, (pp 478-480, 490-491)
- 4/14 **19. Evolution of Primates and Hominoids**
Prosimians, anthropoids, emergence of hominoids, Ardipithecus
(Chapter 20 to p. 500)
- 4/16-30 **12. Becoming Human**
Australopiths, the genus *Homo: habilis, erectus, sapiens*; Neandertals, When did we emerge from Africa? Out-of-Africa vs Multiregional theories, Why did we leave the trees? (Chapter 20: 500-536)

5/6 (Wednesday) Comprehensive Final Examination, 2-3:40 pm, SCI 137

Note: Changes may be made in the lecture schedule depending on student progress and interest. It is your responsibility to attend class, do assigned work, and be informed about assignments, deadlines and schedules.

Additional internet assignments are required.

BIOL 340
Abbreviated
Lecture Schedule

Spring 2015
(For assignments, see full schedule)

Date(s)	Topics (see details in syllabus)
1/13	1. The Emergence of Evolutionary Thought
1/15	2. Science and Critical Thinking
1/20	3. Considering some arguments which have been presented against the theory of evolution
1/22	4. Plate Tectonics, continental drift; fossil formation
	5. Origin of the solar system
1/27,29	6. Origin of Life and the Precambrian Fossil Record
2/3,10	7. Emergence of Eukaryotes
	8. The Organization of Life, and Eukaryotic Themes
2/12	Paper I due (popular science article)
2/12,17	9. Genetics and Evolution
2/19,24	10. Adaptation and Speciation
2/26	Mid-Term Examination
3/3	11. Evolution of Animals
3/5	12. Evolution of early vertebrates
3/19,24	13. Leaving the Water
3/26	Paper 2 due (Science review article)
3/26,31	14. Origin of Land Plants
	15. The Dinosaurian World
4/2	16. Evolution of Flight and Warm-Blooded Dinosaurs
4/7,9	17. Extinction , 18. Evolution of Mammals
4/14	19. Evolution of Primates and Hominoids
4/16-30	19. Becoming Human
5/6	(Wednesday) Comprehensive Final Examination, <u>2-3:40 pm</u>, SCI 137

Note: Changes may be made in the lecture schedule depending on student progress and interest. It is your responsibility to attend class, do assigned work, and be informed about assignments, deadlines and schedules.

Ornithology

Biology 343

Fall 2014

Paul H. Klatt
2114 ACS Building
591-2671
PaulKlatt@ferris.edu

Texts: Ornithology, Gill (3rd ed), 2007.
The Kirtland's Warbler, Rapai, 2012.
The Sibley Field Guide to Birds of Eastern
North America, 2003.

Office hours: Thursday and Friday 3:00-5:00 pm
Class: Lect - SCI 137, 2:00 pm, MW
Lab - SCI 208, 8 R

Grading Scale:

A (94% and up)	C (73-76.9%)	Exam I	100
A- (90-93.9%)	C- (70-72.9%)	Exam II	100
B+ (87-89.9%)	D+ (67-69.9%)	Exam III	100
B (83-86.9%)	D (63-66.9%)	<u>Lab Points</u>	<u>100</u>
B- (80-82.9%)	D- (60-62.9%)	Total	400
C+ (77-79.9%)	F (59.9% and below)		



Course Description: The purpose of this course is to gain an understanding of and an appreciation for the biology of birds. Lectures will address various aspects of avian biology, including evolution, behavior, anatomy, physiology, ecology, and biodiversity. Labs will involve examination of preserved specimens, dissections, and field trips for development of field identification skills. Three credit course that requires BIOL 122 with C- or better.

Specific Course Outcomes: A student succeeding in this course should be able to:

- 1) demonstrate by examination understanding and depth of knowledge in the biology of birds.
- 2) demonstrate through active discussion awareness of current topics in west Michigan Ornithology and conservation, specifically The Kirtland's Warbler.
- 3) identify some of the more common birds by sight and sound.

Exams: Lecture Exams cannot be made up. Students who are absent on exam day, and do not have a legitimate excuse, will receive a zero on that exam. **Cheating** will result in failure of the course. Additional action may be taken by the University.

Electronic Devices must be turned off in the lecture hall.

Tentative Schedule:

<u>Date</u>	<u>Lecture</u>	<u>Chapter</u>
Aug. 25	Introduction and the Diversity of Birds	01
— 27	History	02
Sept. 01	[Labor Day Holiday]	
— 03	cont.	
— 08	Systematics	03
— 10	Feathers	04
— 15	cont.	
— 17	Annual cycles of Birds	09
— 22	Migration and Navigation	10
— 24	Exam I - 100 points	
— 29	Social Behavior	11
Oct. 01	Mates	12
— 06	Breeding Systems	13
— 08	Bird Sex	14
— 13	Nests and Incubation	15
— 15	Parents and their Offspring	16
— 20	Lifetime Reproductive Success	17
— 22	Populations	18
— 27	Species	19
— 29	Exam II - 100 points	
Nov. 03	Communities	20
— 05	Conservation	21
— 10	Flight	05
— 12	cont.	
— 17	Physiology	06
— 19	cont.	
— 24	Brain, Senses, and Intelligence	07
— 26	[Thanksgiving Holiday]	
Dec. 01	cont.	
— 03	Vocalizations	08
— 11	Exam III - 100 points, 2:00-3:40 pm	

Special Needs: Any student that needs special accommodations for learning or has special needs is invited to discuss these matters with the instructor as soon as possible.

Final Note: Enjoy the course and take pride in your work. The University experience is what you make it. This syllabus is subject to change at any time.

“Birds connect people with nature because they are beautiful, have fascinating lives, and in many ways remind us of ourselves.” -- *The Private Lives of Birds*, Bridget Stutchbury

Lab Information

Lab: Lab will consist of exercises to be turned in and quizzes over some reading material.

Tentative Schedule:

<u>Date</u>	<u>Topic</u>
1) 28 Aug.	Forest
2) 04 Sept.	Field
3) 11 Sept.	Wetland
4) 18 Sept.	Feathers
5) 25 Sept.	Topography
6) 02 Oct.	Gaviiformes, Podicipidiformes, Pelecaniformes, Ciconiiformes, Galliformes, Cuculiformes
7) 09 Oct.	Falconiformes, Anseriformes
8) 16 Oct.	Charadriiformes, Columbiformes, Cuculiformes, Strigiformes <i>The Kirtland's Warbler</i> Part One, pages 0-95.
9) 23 Oct.	Caprimulgiformes, Apodiformes, Coraciiformes, Piciformes, Passeriformes
10) 30 Oct.	Passeriformes cont. <i>The Kirtland's Warbler</i> Parts Two and Three, pages 96-192.
11) 06 Nov.	Skeleton
12) 13 Nov.	Internal Anatomy I (Muscles, Digestive)
13) 20 Nov.	Internal Anatomy II (Circulatory, Respiratory)
14) 27 Nov.	[Thanksgiving Holiday]
15) 04 Dec.	Internal Anatomy III (Urogenital, Nervous)



BIOLOGY 344
ENTOMOLOGY
4 Credit Hours
SUMMER Semester 2011

Instructor: Dr. David Griffith

Office: 141C SCI

Phone: 591-5855

Office Hours: Hours by appointment

E-mail: griffida@ferris.edu; please do **NOT** use FerrisConnect for e-mails.

Course Web Site: <http://myhomepage.ferris.edu/~griffida/>

Course Description

Morphology, ecology, natural history and identification of the largest group of invertebrates, the insects. Emphasis on ecological, medical and economically important species. Designed for students in baccalaureate degree programs in science education and applied biology. This course meets General Education requirements: Scientific Understanding, Lab. Pre-Requisites: [BIOL 122](#) with a grade of C- or better.

Course Materials

1. How to Know the Insects, 3rd Ed., by Bland and Jaques
2. #2 pencil

Class Schedule

Lecture:	TR:	11-1:05	SCI 137
Lab :	TR :	2-5:20	SCI 227

Grading Scale

A	93-100%	B-	80-82.9%	D+	67-69.5%
A-	90-93.9%	C+	77-79.9%	D	63-66.9%
B+	87-89.9%	C	73-76.9%	D-	60-62.9%
B	83-86.9%	C-	70-72.9%	F	Below 60%

Grading

Lecture Exam 1: 100 points

Lecture Exam 2: 100 points

Lecture Exam 3: 100 points

Lecture quizzes: approximately 20-30 points, depending on how many are given.

Lab quiz: 50 points

Collection: 150 points

Your grade will be based on your total number of points (see grading scale above).

Source of lecture exam questions: Questions will be taken primarily from the lecture. Occasionally, articles may be assigned that may be used for questions as well. Each lecture exam will consist of approximately 50-100 multiple choice or matching questions. Short answer, definitions, and essays may be included. Note: There will be **no** opportunities for extra credit. All exams will count towards your final grade. Any students who have missed a lecture exam during the semester will have the average from the final exam replace the missing test score. If a student misses more than one exam, then a score of zero will be assigned to the second missed exam. **NO EXCUSES WILL BE ACCEPTED FOR A MISSING EXAM!** There are no make-ups for missed quizzes unless prior arrangements have been made.

General Education Outcomes:

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Course Specific Outcomes: by the end of the semester, you will be able to demonstrate on lecture exams and quizzes, and laboratory quizzes a majors-level knowledge in:

1. the correct terminology associated with Entomology
2. Identification of orders and important families
3. morphological and physiological adaptations of insects
4. evolution and ecology of insects
5. the economic and medical impact of insects

Lecture Attendance Policy:

- a. Attendance will **not** be taken in the classroom. Therefore, if you do not wish to be in the lecture hall, THEN DO NOT COME! Students talking in the classroom are very distracting to the students who want to learn. If you want to fail the course due to your poor attitude towards learning, then STAY HOME.
- b. Tardiness. Do **not** be late. “[At Ferris], tardiness is an insult.” (W.N. Ferris, founder). Habitually late students (any time after class begins) may lose 2 points from their lecture grade. You are expected to be in your seat at least 30 seconds BEFORE class begins. I acknowledge that with attendance not being taken, that you may decide to skip class if you are running late. If this happens rarely, you should still come to class. However, if I encounter a situation where large numbers of students are showing up ten or fifteen minutes late to class, then I will put an end to tardiness. If you have a special situation which will cause you to be tardy, discuss the situation with me during the first week of class.

Electronic Devices

Electronic devices (cellular phones, walkmans, etc.) **must** be turned off in the lecture hall.

If your cell phone rings in class, you will be asked to leave. If I see you texting during exams or quizzes, including the laboratory, you will automatically fail the exam or quiz.

Lab Assignments

Your lab grade will come from your insect collections and a single lab quiz. The lab quiz will be worth 50 points, and will cover the major orders of insects. The rest of your lab grade will come from your collections. Each of you will be responsible for collecting and correctly identifying 50 different species of insects to the family level of classification. You will need a minimum of 30 different families. The collection will be worth 150 points, with 50 points coming from the presentation style of your collection. Points will be deducted anytime an insect is incorrectly pinned, labeled, or identified. Your collection is due **Thursday, August 4**

Disruptive Behaviors

Behaviors that are disruptive to learning will not be tolerated. Talking in class will **NOT** be tolerated. ANY STUDENT WHO HABITUALLY PERSISTS IN TALKING DURING LECTURE WILL BE ASKED TO LEAVE. (see syllabus attachment for further clarification). This applies to lab as well.

Academic Misconduct

“When any society loses faith in honesty, its disintegration is a certainty.” W.N. Ferris, founder. Cheating will not be tolerated. Students are referred to the section on **ACADEMIC MISCONDUCT** that is found on the final sheet attached to this syllabus. Note: you are not allowed to use cell phones during any exam or quiz in lecture or lab.

Children in the classroom

Students are strongly discouraged from bringing children to the lecture hall. Because of safety and liability reasons, under no circumstances will children be allowed in the laboratory.

Food and Beverages in the classroom

Water is acceptable, but food and beverages (e.g. pop) should not be consumed in class

Note: you will need to listen for announcements in class about changes to the schedule or the syllabus. If you miss class, then you are responsible for finding out about any changes that may have occurred

FINAL EXAM: TUESDAY, AUGUST 9 at 11 AM IN SCI 137

Note: you cannot take the final exam at a different time from your scheduled time without prior approval from the instructor

TENTATIVE LECTURE SCHEDULE*

<u>DATE</u>	<u>TOPIC</u>
6-30	1-Introduction & Survey of Arthropoda; 2-External Anatomy of Insects
7-5 7-7	2-External Anatomy (continued); 3-Internal Anatomy and Physiology 3-Internal Anatomy (continued)
7-12 7-14	EXAM 1 ; 4-Insect Diversity 5-Sensory Systems and Behavior; 6-Reproduction, Diapause, and Dispersal;
7-19 7-21	7-Development and Life Histories; 8-Systematics & Evolution of Insects; 8-Systematics & Evolution of Insects (continued); Lab quiz on insect orders @ 2 PM in SCI 227
7-26 7-28	EXAM 2 ; 9-Insect Ecology; 10-Biological control: Predation and Parasitism 10-Biological control: Predation and Parasitism (continued) 11-Insect Societies
8-2 8-4	12-Medical Entomology 13-Pest Management; INSECT COLLECTIONS ARE DUE TODAY!
8-9	EXAM 3

*Subject to change

BIOL 346

ECOLOGICAL ASSESSMENT



Syllabus

Fall 2013

Dr. Gary Rodabaugh, CHMM
Ferris State University
College of Arts & Sciences
820 Campus Drive
Biology Department
ASC 2016
Big Rapids, Michigan 49307

Phone: 231-591-2308
FAX: 231-591-2540
rodabaugh@ferris.edu

BIOL 346: Ecological Assessment

This is a course that studies the ecological impact of environmental issues through sampling and measurement of environmental indicators. Students will study sensitive ecological systems, then measure, investigate and evaluate the impacts of human and natural events on those ecosystems. In addition to the typical and common human impacts on ecosystems, the hazards of human introduction of invasive species will also be studied.

Textbook: Out of print. None required this year, but you must purchase the lab field notebook from the bookstore.

Auxiliary Readings: Handouts posted on FerrisConnect

Required Supplies:

- Michigan Fishing License (Resident restricted license at \$15). You can purchase the fishing license online at <http://www.mdnr-elicence.com/welcome.asp>

You must have your fishing license for the lab during the second week of the Fall semester.

- You are required to purchase a GOOD dissecting kit with scalpel, hemostat, probe, scissors, etc..

- An excellent kit is available at Sportsmans Guide at this link: <http://www.sportsmansguide.com/net/cb/elite-first-aid-surgical-set.aspx?a=679754>

Labs

All labs, until November 15, are held in the field. For the first month we are on the water collecting fish, plankton, benthic and water samples.

The second month is spent collecting samples of trees, soils and animal species.

The third month is generally spent in the lab working on the samples and data collected in the first two months.

IF YOU MISS 2
FIELD LABS YOU
FAIL THE COURSE!



Safety

Safety is the primary concern while in the field. Students MUST follow safety rules or they will be removed from the field.

Rules:

1. Always use the buddy system and know where your partner is.
2. No horseplay!
3. Only the Professor or those who have completed a First Aid course are allowed to work on injured students.



Course Objectives

Upon completion of the course, the student will be able to:

- Evaluate the impact of chemicals on the environment
- Assess the ecological impacts of human development/ construction activities
- Identify the ecological impact of chemical movement in the environment
- Assess the ecological impacts of natural events/disasters
- Assess the ecological impacts of highly populated areas
- Assess the ecological impacts of water pollution
- Determine the proper sampling methodology for ecological studies
- Complete basic statistical analysis of environmental data
- Conduct proper handling/preservation of ecological samples
- Complete laboratory exercises in the following areas:
 - > Water sampling and data analysis
 - > Plankton sampling and identification
 - > Fish sampling, identification, aging, preservation
 - > Benthos sampling, identification, preservation
 - > Creating museum specimen mounts
 - > Identification of invasive species
- Recognize anthropogenic ecological issues
- Collect data in a manner that meets regulatory and legal requirements
- Utilize recognized and experimental techniques for collecting ecological samples
- Utilize appropriate statistical analysis for ecological samples
- Recognize and follow state, local and federal regulations related to collection of environmental samples
- Create and maintain proper field logbooks
- Utilize chain of custody documents
- Collect and properly preserve specimens in a manner suitable for museum and/or classroom use
- Follow recognized environmental, health and safety rules associated with environmental sampling
- Produce quality reports associated with ecological assessments

Grades

THE FOLLOWING GRADING SCALE WILL BE USED. WATCH FERRISCONNECT FOR YOUR WEEKLY GRADES. NOTE: I ROUND UP WHEN WE GET TO THE FINAL GRADES.

A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D+	67-69
D	64-66
D-	60-63
F	59 OR LESS

NOTE: THE NUMBER OF TESTS AND FIELD PROJECTS ARE VARIABLE, SO THE TOTAL POINTS AVAILABLE DEPENDS ON THE NUMBER OF PROJECTS WE CAN COMPLETE OVER THE SEMESTER.

FALL 2012 IS THE FIRST SEMESTER WHERE STUDENTS ARE REQUIRED TO TAKE WEEKLY ONLINE QUIZZES BEFORE ATTENDING FIELD LAB SESSIONS. IF YOU DON'T COMPLETE AND PASS THE QUIZ, YOU DON'T GET TO PARTICIPATE IN LAB.

Lecture & Lab Tentative Schedule

Weekly schedule: Note that the schedule outlined here is somewhat dependent upon weather conditions. Although the student must be prepared to sample in adverse conditions, weather conditions that present a hazard to the students (such as lightning storms) will result in alteration of scheduled labs. These readings are from the free lab manual you received at the first class meeting.

Week	Date	Online and/or Lecture	Lab
1	8/30	Syllabus discussion	Jellyfish if available
2	9/6	Intro & Safety & Aquatic Vertebrates (Ch 1&4)	Fish collection
3	9/13	Ecology & Aquatic Invertebrates (Ch 2&5)	Plankton collection
4	9/20	Regulations & Benthos(Ch 3&6)	Benthos collection
5	9/27	Water sampling & analysis techniques (Ch 8)	Water sampling
6	10/4	Stream flow rate calculation (Ch 8)	Stream sampling
7	10/11	Terrestrial Invertebrates (Ch 7)	Water analysis
8	10/18	Soils & Groundwater (Ch 8&9)	Soil collection & classification
9	10/25	Forests (Ch 11)	Forest/tree sampling
10	11/1	Terrestrial Vertebrates (Ch 10)	Optional weekend trapping lab
11	11/8	(Lectures Begin) Contaminant Movement	Buffer lab for weather delays
12	11/15	Specimen mounting techniques (Ch 13)	Museum mounts
13	11/22	Information & semester wrap-up	Museum mounts
14	11/29	Thanksgiving recess - no lecture	No lab
15	12/6	Last exam covering last 5 weeks of lecture	Museum mounts
16	12/12-15	Final exam time is used to wrap up course, paper returns, mounts	

Field labs are very important in this class. If you miss more than 2 field labs, you will receive a failing grade for the course. Even if you miss a lab, you will be responsible for the data collected during that lab and the respective laboratory paper.



Papers

You will do a lot of writing in this course. Essentially you are acting as consultants by collecting data, interpreting the information and writing a consulting report. You will have the following papers due during the semester:

Paper 1: A major paper on your aquatic sampling. Aquatic report containing information from the fish, plankton, benthos and water labs. This information will all come from a specific local lake. SEE THE NOTE BELOW/RIGHT FOR MORE INFORMATION ON THIS PAPER!

Paper 2: A short paper on measuring stream velocity.

Paper 3: A short paper on soil and forest measurements.



Paper 1 is your major paper for the semester. Your first draft is optional and will be due at midterm, the professor will edit the paper and return it to the student for a final edit and submission. This paper is due in its final form on November 16. It must contain the appropriate data, graphics, photographs and statistics for the best grade. A detailed description of the paper requirements will be handed out during the third week of class.

IMPORTANT STUFF!

HERE IS SOME CRITICAL INFORMATION THAT YOU NEED TO PAY CLOSE ATTENTION TO:

- YOU ARE REQUIRED TO TAKE AN ONLINE TEST EACH WEEK BEFORE YOU COME TO LAB. THE ONLINE MATERIALS COVER THE ACTIVITIES IN THE LAB, SO IF YOU DON'T COMPLETE THE ONLINE TEST BEFORE THE LAB, YOU WILL NOT BE ALLOWED TO PARTICIPATE IN LAB ACTIVITIES THAT WEEK. HOWEVER, YOU ARE STILL RESPONSIBLE FOR GATHERING THE DATA FROM YOUR FELLOW STUDENTS.

- ATTENDANCE IS TAKEN FOR LABS. YOU SHOULD HAVE NO DOUBT THAT IF YOU ARE UNEXCUSED FOR TWO LABS, YOU WILL FAIL THE COURSE.

- OTHER THAN THE ONLINE TESTS, YOU WILL HAVE A SINGLE ESSAY TEST ON THE LAST DAY OF CLASS THAT COVERS THE LAST 5 WEEKS OF LECTURE MATERIAL. NO FINAL EXAM DURING EXAM WEEK.

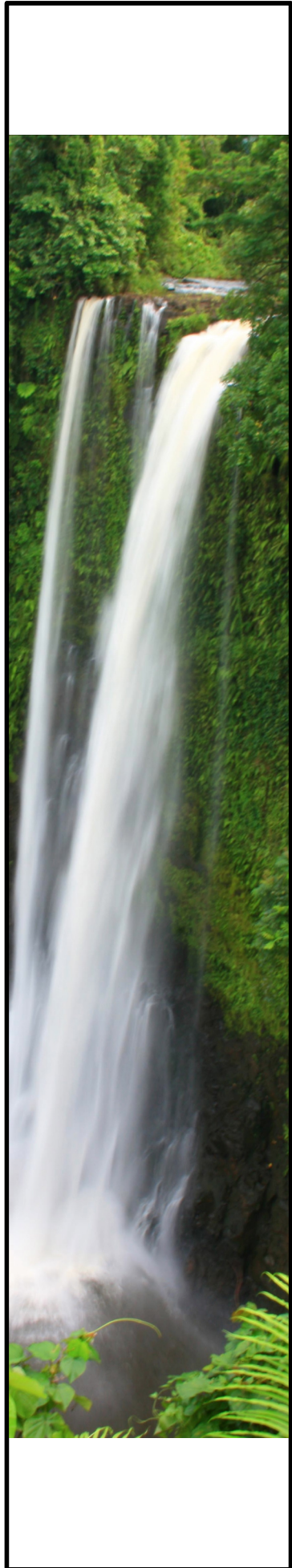
- PAPER #1 COVERS ALL OF THE DATA YOU COLLECT DURING YOUR FIRST 4 WEEKS ON THE LAKE. THE AVERAGE STUDENT HAS PRODUCED PAPERS THAT RANGE FROM 20-40 PAGES OVER THE PAST COUPLE OF YEARS. MORE INFO WILL BE POSTED ON FERRISCONNECT.

- PAPERS 2 & 3 ARE SHORT PAPERS DUE EARLIER IN THE SEMESTER THAT DISCUSS BOTH FOREST SAMPLING AND STREAM SAMPLING ACTIVITIES.

- THE PROF WROTE A TEXTBOOK FOR THE COURSE THAT IS DEDICATED TO THE FIELD ACTIVITIES YOU WILL EXPERIENCE. SINCE THIS IS AN EARLY DRAFT, YOU WILL EACH RECEIVE A COPY AT NO CHARGE. HOWEVER, YOU STILL HAVE TO PURCHASE THE FIELD LOG BOOK AND THE DISSECTING KIT.

- YOU MUST MEET IN THE LABORATORY ON TIME EACH WEEK! WE TAKE VANS TO THE LOCATIONS AND WE ARE USUALLY GONE WITHIN A FEW MINUTES AFTER THE STARTING TIME OF THE LAB.

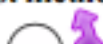
- NO SANDALS IN THE LAB. YOU MUST WEAR CLOSED-TOED SHOES, SNEAKERS, SLIPONS OR SOMETHING YOU DON'T MIND GETTING WET. WE DO SUPPLY BOOTS FOR FIELD WORK IF NEEDED.



Consensual Relationships Between University Employees and Students:

Consensual relationships of an amorous or sexual nature that might be appropriate in other circumstances are deemed inappropriate when they occur between an employee of the University and a student for whom he or she has a professional responsibility. For example, such a relationship would be inappropriate between a faculty member, administrator, supervisor, advisor, coach, or residential staff member and a student for whom he or she has professional responsibility. Even when both parties have consented to the development of such a relationship, the relationship can raise serious concerns about the validity of consent, conflicts of interest, and unfair treatment for others and may result in serious consequences. Employees and students of the University are expected to make responsible choice.

It is the policy of Ferris State University that any University employee who has professional responsibility for students shall not assume or maintain professional responsibility for any student with whom the University employee has engaged in an amorous or sexual relationship. Whether the relationship predated the assumption of professional responsibility or arose out of the professional association, the University employee will immediately disclose the relationship to the relevant unit administrator. The unit administrator will immediately arrange a meeting of the parties to the relationship to discuss alternative oversight of the student, and attempt to cooperatively agree to changes that will move professional responsibility of the student to another University employee. If no agreement is reached, the unit administrator will determine and direct the best method to deal with the situation.



SYLLABUS ATTACHMENT
COLLEGE OF ARTS AND SCIENCES – FERRIS STATE UNIVERSITY
FALL 2013

ARE YOU CONSIDERING ADDING A MINOR OR MAJOR TO YOUR CURRENT PROGRAM?

Use **My Degree** to see what classes may already apply.
For more information, stop by the Arts and Sciences Dean's Office!

IMPORTANT DATES		
Late registration	Wed. – Fri.	Aug. 21 – 23
First day of classes	Monday	Aug. 26
Last day for Drop/Add	Thursday	Aug. 29
Labor Day (no classes)	Monday	Sept. 2
Mid-term grades due	Monday	Oct. 21
Last day for "W" grades	Thursday	Oct. 31
Thanksgiving recess begins (no classes)	Wed (noon)	Nov. 27
Thanksgiving recess ends (classes resume)	Monday	Dec. 2
Last day of classes	Friday	Dec. 6
Examination Week	Mon – Fri	Dec. 9 - 13
Commencement	Saturday	Dec. 14
Final grades due by 1:00 pm	Monday	Dec. 16
Grades available to students on MyFSU	Tuesday (after 8AM)	Dec. 17

Sessions	Dates	Last Day to Withdraw
Full Session	Aug. 26 – Dec. 6	Oct. 31
Session A	Aug. 26 – Oct. 15	Sept. 26
Session B	Oct. 16 – Dec. 6	Nov. 15
Session D	Aug. 26 – Sept. 27	Sept. 16
Session E	Sept. 30 – Oct. 31	Oct. 18
Session F	Nov. 1 – Dec. 6	Nov. 21

DEPARTMENT OFFICES		
Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Languages & Literature	ASC 3080	591-3988
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Dean's Office	ASC 3052	591-3660

WHAT YOU NEED TO KNOW

E-MAIL

All registered FSU students have a Ferris Gmail account. This is the only e-mail to which all official University information about registration, financial aid, student activities, and class cancellations will be sent. Please check your account at least once a week. E-mail is our primary communication resource for students.

CLASS ATTENDANCE IS IMPORTANT!

Attendance usually has a high correlation with how well you do in a course. Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness to encourage students to be present for the full class period. Check your course syllabus or talk to your instructor about his/her policies.

HOW TO CONTACT A FACULTY MEMBER OR ADVISOR

If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, through the College of Arts and Sciences web page at <http://www.ferris.edu/htmls/colleges/artsands/>, or through the Directories & Maps link on the FSU home page.

DROPPING CLASSES OR WITHDRAWING */**

Dropping and adding only occurs during the first four days of the term. You can adjust your schedule **online during the first four days** or in person at the Timme Center (from 8-5 except for the last day when it is 12-5). *If you add a class you must pay for your additional charges by the fourth day or your schedule will be dropped.*

If you need to withdraw from a class after the official drop/add period, you must do so **OFFICIALLY**, through your dean's office, in order to avoid

receiving an "F" grade in the course. **You may not withdraw online after the first four days of the term.** You will receive a "W" for the course. *You will not receive a refund.* If you need to totally withdraw from the University, you must do so **officially** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. **CHECK THE SESSIONS DATES SECTION ABOVE OR THE REGISTRATION AND ACADEMIC GUIDE FOR THE WITHDRAWAL DEADLINES FOR THE SEMESTER.**

In cases of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES

The "I" is only considered for extenuating circumstances that have led to a student missing a portion of the course. The intent and appropriate use of the "I" grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended alternative to withdraw from a class (W). Extenuating circumstances are generally defined as those situations over which a student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an "I" will be considered, and they may be required to sign an agreement regarding course completion. An "I" grade automatically changes to an "F" after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

GRADUATION

Students should apply for graduation the semester prior to their last semester of completion. For associates in arts or associates in science degrees, this needs to be completed at the Dean’s Office. For bachelor degrees, this needs to be completed with your program coordinator. Be aware of deadlines for participation in commencement.

INCLEMENT WEATHER CONDITIONS

Only during the most severe weather conditions – which could potentially endanger the safety of students or staff – will the Big Rapids campus consider cancelling classes. The decision to cancel classes due to weather conditions at the Big Rapids site will be made as early as possible. In the event it is necessary to cancel classes, periodic announcements will be made on area radio and television stations. It is the student’s responsibility to listen for these announcements. A student may also call the Ferris Information Line at 231-591-5602 to obtain information or check the Ferris website.

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person’s ideas or work as your own, taking someone else’s exam for them, violating computer software licenses or program/data ownership, etc. It is the expectation of the College of Arts and Sciences that all work you turn in is your own and is original for the course in which it is being submitted. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification.

Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated.

Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University. The full Disruptive Behavior Policy is available on the College of Arts and Sciences website at <http://www.ferris.edu/htmls/colleges/artsands/student-resources/disruptive-behavior.htm>

For additional policies and helpful information, check out the College of Arts & Sciences Student Resources page at <http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/>

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of university life. Don’t hesitate to explore and use these services at Ferris.

ACADEMIC ADVISING

All students have an assigned advisor and should confer with that advisor regularly. Students who have declared a major should see an advisor in that major. To find out who your advisor is, login to MyFSU and click on the Academics and Services tab, then Registration Status / Advisor Information link.

ACADEMIC SUPPORT CENTER.....ASC 1017 – 591-3543

THE WRITING CENTER.....ASC 1017 – 591-2534

The Academic Support Center, Tutoring Services, and Writing Center join together to offer FSU students an array of academic support services. Tutors are available to answer questions for many courses. The Writing Center helps writers individually and in workshops with skills and assignments. There is also study skills assistance to help with note-taking, test-taking, memory and reading strategies, and time management.

DISABILITIES SERVICES.....STR 313 – 591-3057

According to the Americans with Disabilities Act, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. Students requiring a classroom accommodation due to a physical, learning, mental or emotional disability should contact the Disabilities Services Office.

SCHOLAR PROGRAM.....ASC 1021 – 591-5976

SCHOLAR is an academic support program that aids in the student’s successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

PERSONAL COUNSELING, SEXUAL ASSAULT, SUBSTANCE ABUSE BIRKAM

HEALTH CENTER 2nd Floor - 591-5968 Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment.

If you or a friend is in immediate crisis, call 911.

EDUCATIONAL & CAREER COUNSELINGSTR 313 – 591-3057

Students wanting to examine their choice of major or career choice, learning styles or strategies can make one-on-one appointments with licensed counselors.

SAFETY

Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

OTHER RESOURCES

BIRKAM HEALTH CENTER.....1st Floor - 591-2614

The Birkam Health Center provides fee-for-service medical care including evaluation and treatment for illness and injury anytime during the year. Patients are seen on a walk-in and by appointment basis.

FLITE LIBRARY.....591-2669

Regular hours for FLITE:

Monday – Thursday 7:30 a.m. – MIDNIGHT

Friday 7:30 a.m. – 6:00 p.m.

Saturday NOON – 4:00 p.m.

Sunday 1:00 p.m. – MIDNIGHT

(Extended Studies Court will begin late night hours September 17, 2013

*Sunday-Thursday/MIDNIGHT to 7:30 a.m. *Friday/6 p.m. to MIDNIGHT

*Saturday/5 p.m. to MIDNIGHT)

FSU BOOKSTORE.....14265 NORTHLAND DR. 231 591-2607

Regular on-campus hours for the Bookstore **:

Monday – Thursday 9:00 a.m. – 6:00 p.m.

Friday 9:00 a.m. – 5:00 p.m.

Saturday 12:00 p.m. – 4:00 p.m.

Sunday CLOSED

New location is at the Save-A-Lot Shopping Center Plaza.

HELPFUL NUMBERS

Admissions	2100	Inst. Testing	3628
Business Office	2125	Public Safety	5000
Financial Aid	2110	Records	2792
Housing	3745	TAC	4822

When calling from off campus, extensions can be called by using the prefix 231-591-_____.

BIO 347 Environmental Conservation

Fall 2014

Lecture TR 12-12:50 in STR 136

Lab: M 12-2:50PM, T 8-10:50AM, W 12-2:50PM in SCI 235

Instructor: Dr. Karen Barkel

Office hours: MW 9-11am or by appointment

Office: 2116 ASC

Phone: 591-2544

email: karenbarkel@ferris.edu

Required Materials:

Lecture Text: Essentials of Conservation Biology 6th edition, Primack

Lab Manual: Environmental Conservation Lab Manual (at Great Lakes Bookstore)

Calculator, Flash drive, 1 Packet of SCANTRON cards (form 882-E)

Course objectives:

To introduce you to the major factors contributing to the current extinction crisis and encourage you to think critically about these issues. To demonstrate how disciplines such as taxonomy, ecology, genetics, population biology, economics and sociology interact to shape the future of healthy ecosystems.

Outcomes:

1) Demonstrate by examination an understanding and in-depth knowledge of the major issues in the discipline of Conservation Biology.

2) Demonstrate through active discussion, an awareness of current conservation issues.

3) Use the scientific method to collect, analyze, interpret, display experimental data, and draw conclusions based on the analysis.

Notes and Recording: Class material will be presented during the lectures. It is your responsibility to attend class, take notes, and become informed of any announcements made during your absence. **GET TO KNOW OTHER STUDENTS IN THE CLASS!** The questions for the exams will be taken from the material presented in class and the chapters assigned in the textbook. You may use a tape recorder for the lectures.

Attendance: Attendance in lecture is expected. Please **BE ON TIME!!!!** Attendance in lab is **MANDATORY**. >2 missed laboratories will result in a failing grade in the class.

Exams: Examinations will be given during the normal lecture period on the dates are listed on the class schedule. There are **NO MAKEUP EXAMS**. Failure to take an exam at the scheduled time (see class schedule) will result in a grade of **0** for the exam. If you have a valid excuse, inform me ahead of time, and provide documentation within 2 weeks of the missed exam (proof of funeral, hospitalization, etc), you may replace the missed exam with the grade on the final (which is comprehensive. Thus instead of being worth 100 points, the final would be worth 200 points). If given at least 2 weeks notice, you may be able to take an exam early if you have a school-sponsored activity (with documentation). Exams will cover material covered in lecture and lab (films and papers discussed). You will not receive your exams back but you may stop by my office (during my office hours) to look them over. Exam grades will be posted on Ferris Connect.

Grading: Final grades will be based on points earned in lecture and laboratory (total = 660). Lecture grade (500 points) will be based on the average of 3 exams (100 points each) and a 2 part final (200 points). Part 1 of the final will cover new material since exam 3(100 points), while part 2 is **CUMMULATIVE** (100points). Quizzes may be given in lecture if deemed necessary. Lab grades (160 points) will be based on the score earned on a lab exam (100 points) and participation (60 points).

Grading Scale:

A (≥94%)

A- (90 - 93.9%)

B+ (87- 89.9%)

B (83-86.9%)

B- (80-82.9%)

C+ (77 - 79.9%)

C (73 - 76.9%)

C- (70 - 72.9%)

D+ (67 - 69.9%)

D (63 - 66.9%)

D- (60 - 62.9%)

F (≤ 59.9%)

Academic Integrity: Any form of cheating will not be tolerated, and will result in a 0 for the assignment or exam in question. Additional action may be taken by the University.

To do well in this course:

Attend all lectures and labs, and **BE ON TIME**

Exhibit professional behavior (you may be asked to leave if you don't)

Take good notes, and organize them

Read the assigned sections of the text book before class

Study your notes **EVERY WEEK**, not just before the exam

Ask questions when there is something you don't understand

Lecture Schedule: (subject to change)

Week	Dates	New Topic	Chapter reading **
1	Aug 26 Aug 28	Intro Conservation Biology Biological diversity	1 (6) 2
2	Sept 2 Sept 4	Location of diversity	2-3
3	Sept 9 Sept 11	Ecological economics Indirect Use Value	4 5
4	Sept 16 Sept 18	Indirect Use Value Extinction Patterns	5 7
5	Sept 23 Sept 25	Extinction Patterns Exam 1	7
6	Sept 30 Oct 2	Causes of extinction Destruction, degradation, fragmentation	9
7	Oct 7 Oct 9	Causes of extinction overexploitation , exotics and disease	9/10
8	Oct 14 Oct 16	Causes of extinction overexploitation , exotics and disease	10
9	Oct 21 Oct 23	Vulnerability Small populations	8 11
10	Oct 28 Oct 30	Small populations Exam 2	11
11	Nov 4 Nov 6	Applied Population Biology Establishing new populations	12 13
12	Nov 11 Nov 13	Ex situ strategies Protected areas	14 15
13	Nov 18 Nov 20	Reserve design	16 17/18
14	Nov 25 Nov 27	Management (time permitting) Thanksgiving Holiday (no class)	17/18 --
15	Dec 2 Dec 4	Restoration cont	19
16	Dec. 9 12-1:40pm	Exam 3 /Final	

** Additional reading assignments will be given out during the semester

Lab Schedule: (subject to change)

All labs will meet in SCI 235 unless noted below

<u>Week of</u>	<u>Topic</u>
1) Aug 25	Intro to hypothesis testing / Lab intro
2) Sept 1	No lab (Labor Day)
3) Sept 8	Set up plant experiment, Set up Island Biogeography exps
4) Sept 15	Sample collection for Biodiversity, Water testing
5) Sept 22	Process Biodiversity samples, water data
6) Sept 29	Computer Lab (FLITE 110) Intro to data analysis, Biodiversity data / Water quality data
7) Oct 6	Finish plant experiment SCI 235 / Film
8) Oct 13	Computer lab (FLITE 110): Reserve Size exercise, Data analysis of Plant experiment/
9) Oct 20	Collect samples for Biogeography study SCI 235 / MSY exercise
10) Oct 27	Human population exercise / Cemetery trip meet in SCI 235
11) Nov 3	Process samples for Island Biogeography exp SCI 235
12) Nov 10	Toxicology experiment SCI 235
13) Nov. 17	Computer lab (FLITE 110) Toxicology exp data, Data analysis Biogeography exercise
14) Nov 24	No lab (Thanksgiving)
15) Dec 1	Lab exam (FLITE 110)

Animal Behavior

Biology 348

Fall 2014

Paul H. Klatt
2114 ASC Building
591-2671
PaulKlatt@ferris.edu

Text: Perspectives on Animal Behavior, 3rd ed
and King Solomon's Ring.
Class: Starr 136, 10:00 am, MWF
Office hours: Thursday and Friday 3:00-5:00 pm

Grading Scale:

A (94% and up)	C (73-76.9%)	Exam I	100
A- (90-93.9%)	C- (70-72.9%)	Exam II	100
B+ (87-89.9%)	D+ (67-69.9%)	Exam III	100
B (83-86.9%)	D (63-66.9%)	<u>Exam IV</u>	<u>100</u>
B- (80-82.9%)	D- (60-62.9%)	Total	400
C+ (77-79.9%)	F (59.9% and below)		

Course Description: In this course, we explore the diversity of animal behavior in order to understand how behavior is organized and controlled, how it develops, why it is performed, and why it takes a particular form. The theme of the course is that behavior is the product of natural selection. The emphases are on viewing behavior as a species attribute, following the approach of comparative ethology, and as an individual attribute, interpreting behavior to be a "strategy" that contributes to an organism's fitness.

Specific Course Outcomes: A student succeeding in this course should be able to:

- 1) Demonstrate understanding and depth of knowledge in Animal Behavior (learning, spatial distribution, foraging, sexual selection, parental care, mating systems, conflict, altruism, and communication).
- 2) Demonstrate the ability to understand and apply the scientific methods and techniques used by researchers in the field.
- 3) Demonstrate effective written communication skills.

Exams: Lecture Exams cannot be made up. Students who are absent on exam day, and do not have a legitimate excuse, will receive a zero on that exam. **Cheating** will result in failure of the course. Additional action may be taken by the University.

Tentative Schedule:

<u>Date</u>	<u>Lecture</u>	<u>Chapter</u>
Aug. 25	Introduction	01
27	History of the Study of Behavior	02
29	cont.	
Sept. 01	[Labor Day Holiday]	
03	cont.	
05	Genetic Analysis of Behavior	03
08	cont.	

	10	Natural Selection and Behavior	04
—	12	Learning and Cognition	05
	15	Physiological Analysis - Nerves	06
	17	cont.	
—	19	Exam I - 100 points	
	22	Physiological Analysis - Hormones	07
	24	cont.	
—	26	Development of Behavior	08
	29	cont.	
Oct.	01	Biological Clocks	09
—	03	cont.	
	06	Mechanisms of Orientation and Navigation	10
	08	cont.	
—	10	cont.	
	13	Ecology and Evolution of Spatial Distribution	11
	15	cont.	
—	17	Exam II - 100 points	
	20	Foraging Behavior	12
	22	cont.	
—	24	Antipredator Behavior	13
	27	Sexual Selection	14
	29	cont.	
	31	cont.	
Nov.	03	cont.	
	05	Parental Care and Mating Systems	15
—	07	cont.	
	10	Exam III - 100 points	
	12	Conflict	18
—	14	cont.	
	17	cont.	
	19	Group Living, Altruism, and Cooperation	19
—	21	cont.	
	24	cont.	
	26	Communication: Channels and Functions	16
	28	[Thanksgiving Holiday]	
Dec.	01	cont.	
	03	Evolution of Communication	17
—	05	cont.	
	09	Exam IV - 100 points, 10:00 am - 11:40 am	

“The evolution for the capacity to simulate seems to have culminated in subjective consciousness. Why this should have happened is, to me, the most profound mystery facing modern biology. Perhaps consciousness arises when the brain’s simulation of the world becomes so complete that it must include a model of itself.”
 -- *The Selfish Gene*, Richard Dawkins

BIOL 349: MEDICAL PARASITOLOGY

T 1:00 – 2:00, STR. 136

Dr. Fadayomi Spring 2010

Office: ASC 2009

Phone: 591-5628 (o); 591-5638 (lab)

Email: fadayok@ferris.edu

Office Hours: M 10:00 – 12:00; T 8:30 – 9:00; W 10:00 – 11:00

Prerequisite: One year of college biology

Course Objectives

At the completion of this course, students will be able to:

1. Describe basic concepts of parasitology including parasite relationship with various hosts.
2. Describe the life cycles of medically important parasites (protozoan, helminthes and arthropods).
3. Describe key concepts in epidemiology, geographical distribution, prevention and control of medically important parasites.
4. Identify common parasites of humans especially stages that are used in diagnosis.
5. Describe the major pathology and symptoms associated with the infection of medically important parasites.

Textbook: Markell and Voge's Medical Parasitology by Markell, John and Krotoski, 9th ed. Lecture Guide by Fadayomi (available at Great Lakes book store).

Assessment:

Four (4) lecture exams

- Examination questions will be taken from the contents of the lecture notes and text and class handout materials. Some lab information may also be included on your test.
- Examination will cover memory, comprehension and application of the subject matter.
- Exam dates will be announced at a later date and students are required and expected to take the exams at the scheduled time otherwise; a grade of zero will be awarded for missed exams.
- Make-up exams will be given only after a valid excuse has been provided; these exams may be more difficult.

Four (4) lab quizzes

Clinical findings and description of many parasites in the form of case studies will be posted on Ferris Connect.

- All students are required to identify the parasites on time. **Late entries will not be graded.**

Presentation

- Each student or a pair of student will prepare and present detailed well-rounded discussion on a parasite. Your presentation may be oral, poster or in the form of an informative brochure. A list of parasite to pick from will be provided on FerrisConnect

Grading Scale

A = 95-100%	B = 80-85%	C = 70 – 74%	D = 60 – 64%
A ⁻ = 90 – 94%	B ⁻ = 78-79%	C ⁻ = 68 – 69%	D ⁻ = 57 – 59%
B ⁺ = 86 – 89%	C ⁺ = 75 – 77%	D ⁺ = 65 – 67%	F = Below 57%

BIOL 349: MEDICAL PARASITOLOGY

Attendance:

Prompt attendance to all lectures is required and expected. If you miss a lecture, you are responsible for the lecture contents and any assignments given during the lecture.

Disruptive Behaviors:

Behaviors that are disruptive to learning will not be tolerated (see attached handout for further clarification).

Electronic Devices:

Electronic devices (cellular phones, walkmans, etc.) **must** be turned off in the lecture hall.

Cheating:

Cheating will result in a grade of zero on the exam. The case may also be reported to the Dean for further action.

FerrisConnect:

Review questions, assignments and grades will be available on FerrisConnect.

BIOL 349: MEDICAL PARASITOLOGY

Lecture Schedule

Spring 2010

Chapter	Topic
2	The Nature of Parasitism
8	Intestinal Nematodes Infective in the Egg Stage
8	Intestinal Nematodes Infective in the Larval Stage
9	Blood and Tissue-Dwelling Nematodes
	Exam 1
7	Intestinal Cestodes
7	Tissue Cestodes
6	Trematodes Infective in Metacercarial Stage
6	Trematodes Infective in Cercarial Stage
	Exam 2
3	Lumen-Dwelling Protozoa Amebae The Flagellates The Ciliate The Apicomplexa (Sporozoa)
4	Blood and Tissue-Dwelling Protozoa <i>Plasmodium</i> sp
	Exam 3
5	Blood and Tissue-Dwelling Protozoa Hemoflagellates
3, 5	Emerging Parasitic Diseases Tissue Coccidia
10	Emerging Parasitic Diseases Myiasis
	Final Exam (Cummulative) May 6, 12:00 – 1-40pm

BIOL 349: MEDICAL PARASITOLOGY

Laboratory Schedule

Spring 2010

Each pair of student will be assigned a slide box containing permanently preserved specimen. Once assigned, please check your slides for cracks, chips and missing slides. Complete, sign and return the attached form to me. Keep a record of the box number for future reference since this will be your slide box for the entire semester. Students will be responsible for missing or broken slides at the end of the semester. Occasional accidentally slide breakage is budgeted for but please be careful in handling slides so as to minimize breakages since each slide averages about \$5.00. BE SURE TO OPEN SLIDE BOXES SO THAT THE LID IS FACING UPRIGHT.

One common way of misplacing slides is to accidentally leave them on the stage of your microscope at the end of the laboratory period, so please check microscope stages before you leave the lab. Your lab manual provides a step-by-step instruction on what to look for on each slide and the CD provides an opportunity to study the parasites away from the lab. Sometime, demonstrations may be set up to supplement the slide collections. These demonstrations will be set up for ONE laboratory period only and may be included on your test so it is important that you examine them carefully during the laboratory period.

Attendance: Attendance in lab is mandatory.

Exams: Lab quizzes will include identification of specimen, morphology, pathology, the life cycles, sites of infection, intermediate and definitive hosts. This information can be found in the lab manual, handouts, assigned text and lecture notes. Laboratory quizzes will be mostly identification and life cycles. You must take the quiz at the designated time since there will be no make-up lab quizzes.

Text: Laboratory manual by Fadayomi (available at Great Lakes book store).

BIOL 349: MEDICAL PARASITOLOGY

Laboratory Schedule

Spring 2010

Date	Topic
January 14	Lecture (Sci 120)
January 21, 28	<i>Enterobius vermicularis</i> <i>Trichuris trichiura</i> <i>Necator americanus</i> and <i>A. caninum</i> <i>Strongyloides stercoralis</i> <i>Trichinella spiralis</i> <i>Wuchereria bancrofti</i>
February 4	Quiz 1 (nematodes) Lecture
February 11, 18	<i>Hymenolepis nana</i> <i>Hymenolepis diminuta</i> <i>Dipylidium caninum</i> <i>Taenia solium</i> <i>Taenia saginata</i> <i>Diphyllobothrium latum</i> <i>Echinococcus granulosus</i>
February 25	Quiz #2 (cestodes) Fecal Examination
March 6-14	Mid semester recess (no class)
March 18, 25	<i>Schistosoma japonicum</i> , <i>S. mansoni</i> , <i>S. haematobium</i> <i>Fasciola hepatica</i> <i>Clonorchis sinensis</i> <i>Paragonimus westermani</i>
April 1-4	Spring recess (no class)
April 8	Quiz #3 (trematodes)
April 8, 15, 22	<i>Entamoeba histolytica</i> <i>Entamoeba coli</i> <i>Iodamoeba bushlii</i> <i>Endolimax nana</i> <i>Balantidium coli</i> <i>Giardia lamblia</i> <i>Chilomastix mesnili</i> <i>Trichomonas vaginalis</i> <i>Trypanosoma cruzi</i> African trypanosomes <i>Leishmania</i> spp <i>Plasmodium falciparum</i> <i>Plasmodium vivax</i>
April 29	Quiz #4 (protozoans)



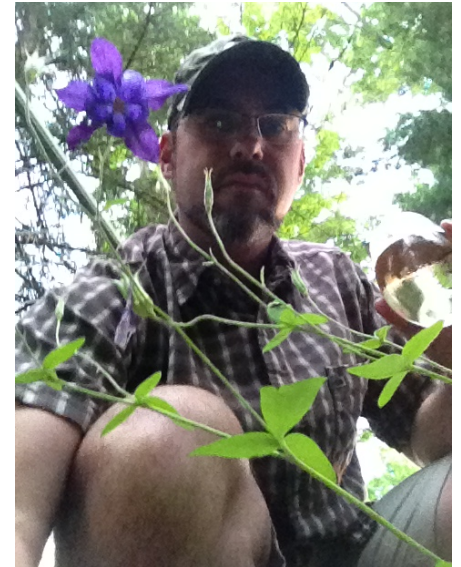
Hibiscus in flower: Malvaceae

PLANTS AND FUNGI BIOLOGY 350 COURSE SYLLABUS



Peziza fungus cup: Ascomycota

Instructor: Dr. Scott Herron
Office: 2017 ASC and SCI 233 (Wild Rice Research Lab)
Telephone: 231-591-2087
Email: herrons@ferris.edu
Office Hours: Monday: 2:00-2:50 pm ASC 2017
 Tuesday: 1:30-2:00 pm SCI 235
 Wednesday: 2:00-2:50; 4:15-4:45 pm ASC 2017
 Thursday 1:30-2:00 pm SCI 235
 All other meetings by appointment only



Course Description:

This course will examine the biology of plants and fungi from a systematic perspective. Lectures will address essential aspects of plant and fungal biology, including evolution, morphology, anatomy, physiology, and ecology. Labs will utilize a hands-on approach to taxonomy, plant propagation and microscopy, and field trips will be utilized to demonstrate plant community structure and field identification of Michigan's plants and macro-fungi. 4.000 Credit hours. Typically offered Spring Semester. This is a Web-enhanced course. **Prerequisites:** BIOL 122 C- or better. Credits for course completion: 4

Class Schedule:	Lecture: Section 211	M & W	3:00-4:15 PM
CRN: 11811	<u>Lecture Room: STR 136</u>		
	Lab: Section 211	Thurs	8:00-10:50 AM
	<u>Lab Room: SCI 235</u>		

Course Specific Outcomes:

Outcome #1 - Students will demonstrate an understanding of basic botanical knowledge.

Assessment for Outcome #1 - Quizzes and examinations and the oral presentation will be used to evaluate student understanding of the material.

Outcome #2 - Students will demonstrate skill in identification of plants and macrofungi.

Assessment for Outcome #2 – A lab practicum ID exam, using living or preserved specimens, along with lab exercise worksheets will be used to evaluate identification skills.

Outcome #3 – Students will apply the fundamental botanical concepts to propagate plants sexually and asexually in the greenhouse.

Assessment for Outcome #3 – Instructor observation of propagation techniques along with lab reports will be evaluated on the techniques and ability to successfully learn growing/propagating techniques.

Outcome #4 - Students will demonstrate knowledge of fundamental similarities and differences of fungi from plants, and the ecological connections of fungi to plants and their ecosystems.

Assessment for Outcome #4 – Quizzes, lab worksheets, and examinations will be used to evaluate students' abilities to differentiate key features, functions and interactions of fungi and plants.

Textbooks:

Lecture book (Required)- *Biology of Plants* by Peter H. Raven, Ray F. Evert, and Susan E. Eichhorn, Seventh Edition, 2005, W. H. Freeman Press.

Laboratory (Required)- Exercises for the Botany Laboratory, by Joel A. Kazmierski, 1999, Morton Publishing Company.

Laboratory (Required)-A Photographic Atlas for the Botany Laboratory by Rushforth, Robbins, Crawley & Van De Graaff, 6th ed., Morton Publishing Comp.

Lectures Grades:

There will be three 100 point lecture exams (see lecture schedule for dates). Exam questions may be a combination of multiple-choice, true/false, labeling and/or short essay questions. Exams will be taken from the lectures, textbook and class handouts. **A Comprehensive Final Exam may be given at a date/time determined by the professor and agreed to by the students, if deemed necessary to evaluate course outcomes.**

Students are required and expected to take the exams and quizzes at scheduled times. Failure to take exams and quizzes at the scheduled time will result in a grade of zero.

Online quizzes will be assigned throughout the semester, to assess your effort to keep up with the assigned readings. These quizzes will be out of 5 points per chapter assigned.

Student Presentations:

Each student will be required to prepare and deliver **one oral presentation/activity** on the topic as defined by the instructor. This **presentation** will be **worth 30 points** and will be done in lecture, but the **style of presentation** will be the choice of the student. The goal is to enhance the learning of the material from the defined chapter. It is your responsibility to read the chapter assigned, compile notes and information from whatever sources will enhance the delivery of your presentation. Instructor feedback will be provided to the student.

Lab Grades:

Each of lab exercise question sections will be worth 5 points, and will due by the end of the lab period assigned. Lab quizzes (10 points each) in the beginning of lab will account for additional points. A **lab practical on March 5** will be worth **50 points** and will assess the **first seven weeks of identification** of plants and fungi.

Grade Calculation:

Grades will be determined by comparing the students' total number of points to the number of points possible in the course. I expect that there will be **approximately 330 points** possible in lecture and 245 points in laboratory, totaling ~575 points.

Communicating Results:

Lab reports are assignments where you are required to demonstrate your writing, analyzing, and reflection capabilities. You will work in a small group to explore the **scientific method** and type up a lab report **worth 30 points** as assigned in lab (Tentatively **Due April 16**).

Letter grades will be assigned according to the following scale:

A = 94-100%	B = 83-86.9%	C = 73-76.9%	D = 63-66.9%
A- = 90-93.9%	B- = 80-82.9%	C- = 70-72.9%	D- = 60-62.9%
B+ = 87-89.9%	C+ = 77-79.9%	D+ = 67-69.9%	F = Below 60%

- Cheating:** Cheating on exams or quizzes will result in a grade of zero on the assignment. The case may also be reported to the Dean for further action.
- Attendance Policy:** Prompt attendance to all classes is required and expected. If you miss lecture, you are responsible for the lecture contents and any assignments given out during the lecture. **Attendance in all lab sessions is required as there will be no make up lab period.** If you have a valid reason for an absence, see Dr. Herron with your documentation as soon as you return. *Failure to attend more than two lab periods is grounds for class failure (F) as stated in Biology Departmental policies, and yes I have exercised my use of this policy in the past.*
- Study Suggestions:** Come to class regularly and be on time. Show your classmates and me respect in the classroom. **Organize your notes clearly, remembering that you are responsible for your own learning. Read your class handouts, lab book and lecture readings** and fill in missing information. Ask questions regularly, during lecture, lab, or office hours. Study with classmates. Use student development services for tutoring if needed, but see me first. Make sure to check Ferris Connect weekly for new lecture material as well as grades and emails that I may send you. You must login thru My FSU (<https://myfsu.ferris.edu>), where you will be shown a list of the classes you are registered for (be sure it shows the current semester), and select the Plants and Fungi link, which will take you to the Ferris Connect/Blackboard portal.

BIOLOGY 350 (Plants and Fungi)
TENTATIVE LECTURE SCHEDULE

Date	Subject	Chapter	Student Activity
1/12	Introduction to Botany	1	
1/14	Evolution and Systematics of Plants	12	
1/19	No Class <MLK Holiday>		
1/21	Evolution and Systematics of Plants & Fungi	12	1
1/26	Diversity of Fungi	14	2
1/28	Diversity of Fungi	14	3
2/2	Bryophyte Diversity: Mosses & Relatives	16	4
2/4	Bryophyte Diversity: Mosses & Relatives	16	5
2/9	Seedless Vascular Plants: Ferns & Relatives	17	6
2/11	Seedless Vascular Plants: Ferns & Relatives	17	7
2/16	Review for Exam 1 (Study Guide)		
2/18	Exam # 1		
2/23	Gymnosperms: Including Conifers	18	8
2/25	Introduction to Angiosperms: Flowering Plants	19	9
3/2	Introduction to Angiosperms: Flowering Plants; Evolution of Angiosperms	20	10
3/4	Regulating Growth and Development: Plant Hormones	27	11
3/9 & 3/11	No Class <Spring Recess 3/7-3/15>		
3/16	Regulating Growth and Development: Plant Hormones; External Factors and Plant Growth	28	12
3/18	Structure & Development of Early Plant Body	22	13
3/23	Structure & Development of Early Plant Body	22	14
3/25 (W-DATE)	Cells and Tissues of the Plant Body	23	15
3/30	Cells and Tissues of the Plant & Fungal Body	23	16
4/1	Root Structure & Development	24	17
4/6	Exam # 2		
4/8	Root Structure & Development; Fungal Mycelium & Mycorrhizae-Root Interface	24	18
4/13	Shoot Structure and Development	25	19
4/15	Shoot Structure and Development; Secondary Growth in Stems	26	20
4/20	Plants & People: Culturally Significant Plants	21	21
4/22	Plants & People: Culturally Significant Plants	21	22
4/27	Dynamics of Plant and Fungal Communities and Ecosystems	31	23
4/29	Dynamics of Plant and Fungal Communities and Ecosystems; Global Ecology	32	24
5/5	Exam # 3 2:00-3:40 pm		

LABORATORY SCHEDULE

Week	Week of (date)	Subject	Exercise in Lab Book
1	Jan. 12 (15)	Lab Safety; Microscope Review Some aspects of classification	1 (p.2-10) p. 63-66
2	Jan. 19 (22)	Evolution and Systematics of Plants Evolution and Systematics of Fungi	Handouts Handouts
3	Jan. 26 (29)	Fungi Part 1 Fungi Part 2	8 (p.77-84) 9 (p.86-96)
4	Feb. 2 (5)	Mosses and Liverworts Fungal Experiments	10 (p.98-108) Handouts
5	Feb. 9 (12)	Primitive Vascular Plants Division Pterophyta: Ferns	11 (p.110-118) 12 (p.120-128)
6	Feb. 16 (19)	Division Coniferophyta: Conifers Gymnosperm Classification	13 (p.130-138) Handouts
7	Feb. 23 (26)	Division Anthophyta: Flowers Co-Evolution of Angiosperms & Animals (Movie: First Flower, PBS NOVA)	14 (p.140-152) Handouts www.pbs.org/wgbh/nova/flower
8	March 2 (5)	Asexual and Sexual Propagation: Hormones in action Lab Practical: Identification Exam 3/5	Handouts
9	March 9 (12)	No lab <Spring Recess>	
10	March 16 (19)	Propagation 2: Sexual and Asexual Division Anthophyta: Fruits and Seeds	Handouts 15 (p.154-162)
11	March 23 (26)	Seed adaptations and dispersal features Cell Division and Plant Tissues	Handouts 2 (p.12-23)
12	April 1 (2)	No lab <Midterm/Easter Break>	
13	April 6 (9)	Roots Stems: Herbaceous Plants	5 (p.44-52) 3 (p.26-33)
14	April 13 (16)	Stems: Woody Plants Leaves Lab Reports Due 4/16	4 (p.36-41) 6 (p.54-62)
15	April 20 (23)	Plants & People Fieldtrip: Pharmacy Greenhouse & Native American Garden	Handouts
16	April 26 (29)	Ecology of Plant and Fungal Communities-fieldtrip	Handouts

Lecture: SCI120 MWF 11 – 11:50 am

Lab of section 211: SCI 207 M 3:00 pm – 5:50 pm

Lab of section 212: SCI 207 T 12 pm – 2:50 pm

Instructor: Dr. Changqi C. Zhu

Office hours: T 9:00 am – 11:00 am F 9:00 am – 11:00 am or by appointment Office: ASC 2015

Contact: Phone: 231-591-3196 email: zhuc@ferris.edu

Required Materials:

Textbook: Developmental Biology, 9th edition by Gilbert

Laboratory Materials: will be provided by the instructor

Required test materials: Packet of SCANTRON cards (form 882-E), 2 #2 pencils,

Course objectives:

Lecture:

Demonstrate how the developmental biology field progressed over time in history, the main knowledge of the major developmental mechanisms guiding the development of vertebrate and invertebrate animals, and the medical implications of developmental biology research.

LAB:

Utilize the scientific method to address questions in Developmental Biology

Gain experience in production and use of micro-dissection tools and use of light microscopy

Demonstrate the knowledge of the basic stages of gametogenesis, fertilization and early development in model invertebrate and vertebrate organisms

Become familiar with how to interpret serial sections and whole mounts of embryos to determine positions of structures throughout the embryo

Exams: Exams will be given during the normal lecture period on the dates as listed on the class schedule, which will include materials covered in lecture and assigned readings in the textbook. Failure to take an exam at the scheduled time (see class schedule) will result in a grade of 0 for the exam. If you have a valid excuse, inform your instructor ahead of time (except for hospitalization etc.), and provide written documentation within a week of the missed exam (proof of funeral, hospitalization, etc), you may take a makeup exam. If there is a conflict between school-sponsored activity and the exam, those who participate in the activity (with documentation) can take the exam during my office hours after the activity is done. All the exams can be reviewed in my office during my office hours after they are graded and your grades are posted. Your grades will be posted on Grade Center of FerrisConnect.

***Scantron sheets (Form 882-E) may be needed for some of the exams.

Grading: Final grades will be based on the points earned in lecture (75%) and laboratory (25%). The Lecture grade (500 points) will be comprised of the total of 4 exams (100 points each) and various in-class and/or homework assignments and quizzes (100 points). Four exams include three unit exams and a final comprehensive exam. Each has 100 points. The exam questions include multiple choice, filling-in blanks, and essay questions. Lab grades will be based on the score earned on a final lab exam, lab participation, and lab reports and/or quizzes.

Grading Scale:

A (≥93%)	C (73 - 76.9%)
A- (90 - 92.9%)	C- (70 - 72.9%)
B+ (87 - 89.9%)	D+ (67 - 69.9%)
B (83-86.9%)	D (63 - 66.9%)
B- (80-82.9%)	D- (60 - 62.9%)
C+ (77 - 79.9%)	F (≤ 59.9%)

Academic Integrity: Any form of cheating will not be tolerated, and will result in a 0 for the assignment or exam in question.

Taking Notes and Reading the Textbook: Lecture materials will be presented in class. It is your responsibility to attend class, take notes, and become informed of any announcements made during your absence. It is important to get to know other students in the class! The questions for the exams will be

taken from the materials presented in class and the chapters assigned in the textbook. To ensure your success in this course, you are advised to read the textbook well, familiarize yourself with the course content, and get to know the detailed developmental processes of the key developmental events.

Attendance: Attendance in lecture is essential for your success in this course. Attendance in each lab is required. Labs can not be made up. More than 2 missed laboratories (for any reason) will result in a failing grade in the class.

To do well in this course:

- Attend all lectures and labs, and BE ON TIME
- Exhibit professional behavior
- Take good notes, and organize them
- Read the assigned sections of the text book before class
- Study your notes EVERY WEEK, not just before the exam
- Ask questions when there is something you don't understand
- Enjoy yourself and have a good time

Lecture Schedule: (Subject to change)

Week		Dates	New Topic	Chapter reading
1	M	Jan 13	Developmental Anatomy	1
	W	Jan 15	Developmental Genetics	2
	F	Jan 17		2
2	M	Jan 20	Martin Luther King Day (no class)	
	W	Jan 22	Cell-Cell Communication in Development	3
	F	Jan 24		3
3	M	Jan 27	The Saga of the Germ Line (Gametogenesis)	16
	W	Jan 29		16
	F	Jan 31	Fertilization	4
4	M	Feb 3		4
	W	Feb 5	Early invertebrate development	5
	F	Feb 7		5
5	M	Feb 10	Drosophila development	6
	W	Feb 12		6
	F	Feb 14		6
6	M	Feb 17	Exam 1	
	W	Feb 19		
	F	Feb 21	Early Development of Amphibians and Fish	7
7	M	Feb 24		7
	W	Feb 26	Early Development of Birds and Mammals	8
	F	Feb 28		8
8	M	Mar 3	Central Nervous System and Epidermis Development (Ectoderm Development)	9
	W	Mar 5		9
	F	Mar 7		9
9	M-F	Mar 10 – 14 SPRING BREAK	
10	M	Mar 17	Neural Crest cells	10
	W	Mar 19		10
	F	Mar 21		10
11	M	Mar 24	Paraxial and Intermediate Mesoderm (Muscle, bones, and Kidney Development)	11
	W	Mar 26		11

	F	Mar 28	Mid-term recess (no class)	11
12	M	Mar 31	Exam 2	
	W	Apr 2	Lateral Plate Mesoderm (Heart Development) and Endoderm (Development of Lung, Pharynx, Gut, Thyroid Glands, Liver, Stomach, Gallbladder, and Pancreas)	12
	F	Apr 4		12
13	M	Apr 7		12
	W	Apr 9	Tetrapod limb development	13
	F	Apr 11		13
14	M	Apr 14	Sex Determination	14
	W	Apr 16		14
	F	Apr 18	Mid-semester recess (No class)	
15	M	Apr 21	Metamorphosis	15
	W	Apr 23		15
	F	Apr 25	Medical Aspects of Developmental Biology	17
16	M	Apr 28		17
	W	Apr 30	Review	
	F	May 2	Exam 3	
17	R	May 8 10 am – 11:40 am	Final Exam (Materials from the whole semester)	

LAB Schedule (Subject to Change)

Week	Date	Exercise and Training	Assignment
1	Jan 13, 14	<ul style="list-style-type: none"> • Culture of fruit flies (<i>Drosophila melanogaster</i>) • <i>Drosophila</i> dissection (testis and ovary) • Introduction to Gal4/UAS inducible gene expression system 	Learn the life cycle of fruit flies. Write a lab report about how Gal4/UAS system works
2	Jan 20, 21	No lab (Martin Luther King Day)	
3	Jan 27, 28	<ul style="list-style-type: none"> • Zebrafish lab (lab visit and culture of zebrafish embryos) • Set up fruit fly crosses for ectopic eye induction 	Observe and document Zebrafish embryonic development
4	Feb 3, 4	<ul style="list-style-type: none"> • Immunostaining (fruit fly ovarioles) • Florescence microscope (ActivinGal4-UASnclGFP/Cyo ovaries) 	
5	Feb 10, 11	<ul style="list-style-type: none"> • <i>Planaria</i> regeneration 	
6	Feb 17, 18	Gametogenesis	
7	Feb 24, 25	<ul style="list-style-type: none"> • Sea Urchin Fertilization • <i>Planaria</i> (end) <p>Observation of ectopic eyes in fruit flies</p>	
8	Mar 3, 4	Frog development I	
9	Mar 10, 11	Spring Recess (No lab)	
10	Mar 17, 18	Frog development II	
11	Mar 24, 25	Avian Development (stage 5, 18, and 24 hours of incubation)	
12	Mar 31, April 1	Avian Development (33 hour) cross and sagittal sections	
13	Apr 7, 8	Avian Development (48 hour)	
14	Apr 14, 15	Avian Development (72 hour)	
15	Apr 21, 22	Chick recovery and culture	
16	Apr 28, 29	Lab exam on chicken embryos	

BIOL 373: CELL BIOLOGY
TR 9:30 – 10:45, SCI 137
Spring 2014

Instructor: Dr. Olukemi Fadayomi ASC 2009 Phone: 591-5628 (o); 591-5638 (lab)
 Email: fadayok@ferris.edu

Office Hrs: M 10:00 – 11:30; W 10:00 – 11:00; F 10:00 – 11:30

Course Description:

This upper-level cell biology course examines many of the coordinated mechanisms by which cellular components interact with each other in order for a cell to function properly. Major topics that will be covered include structure, function, and biosynthesis of biological membranes; cytoskeletal systems and cellular movements; cell communication and growth; and cancer.

Prerequisites: Biol. 122 and Chem. 214, 322 or equivalents. This class is taught with the assumption that the student has a basic knowledge of the information covered in Chapters 1-4 and 18 of *The World of the Cell 8th edition*. Students are encouraged to review these chapters before the first exam.

Textbook: *The World of the Cell, 8th Edition* by Wayne M. Becker, Lewis J. Kleinsmith, Jeff Hardin and Gregory Paul Bertoni

Course Objectives: At the completion of this course students will be able to:	Means of assessing students
<ul style="list-style-type: none"> Describe the biological membranes and other eukaryotic cell components and their major functions of the cell. 	Written exams that utilize short answers and fill in the blanks; complete written analysis of case studies .
<ul style="list-style-type: none"> Demonstrate an understanding of the mechanisms by which the various cellular components interact and how the interactions are regulated. 	Written exams that utilize short answers and fill in the blanks; complete written analysis and oral presentations .
<ul style="list-style-type: none"> Apply key concepts of cell biology to analyze contemporary issues. 	Complete written analysis utilizing in class group discussions, oral presentation and written analysis of case studies .
<ul style="list-style-type: none"> Describe and apply knowledge of selected techniques used in cell and molecular biology research. 	Written exams that utilize long answers, multiple choice, matching and fill in the blanks.

FerrisConnect:

Review questions, selected lecture slides, announcements, assignments and grades will be available electronically in FerrisConnect.

Disabilities:

If you have a disability which requires classroom or test accommodations please register with the Office of Educational Counseling and Disability Services (Starr 113 x3057) if you have not already done so. Information on disability accommodations is available at <http://www.ferris.edu/htmls/colleges/university/disability/homepage.htm>. No accommodations will be granted in this course without notification from the office.

Examinations and Assignments:

Weight		Grading Scale			
3 exams	60%	A = 93 -100%	B = 83-86%	C = 73-76%	D = 60-64%
Cumulative final exam	20%	A- = 90-92%	B- = 80-82%	C- = 70 - 72%	D- = 57-59%
Group paper and presentation	15%	B+ = 87-89%	C+ = 77-79%	D+ = 65-69%	F = Below 57%
Class participation †	5%				

- ❖ Examination questions will be taken from the content of the textbook, the lectures and class handout material and will cover memory, comprehension and application of the subject matter. Students are required and expected to take the exams at the scheduled time otherwise; a grade of zero will be awarded for missed exams. A make-up exam may be given in the case of documented illness or extenuating circumstances but only after a written explanation or valid documentation (such as a letter from a physician, evidence of funeral, etc) has been submitted to the instructor. The documentation or explanation must be submitted within 2 weeks of the missed exam, otherwise a grade of zero awarded.
- ❖ All examinations are the properties of the instructor and must be returned after each exam. However, students may review their examinations up to two (2) weeks after the exam was given. After this period, the exams will no longer be available for viewing.

† Students **must** participate in all discussions and presentations to receive full credit.

Attendance:

Although roll will not be taken, prompt attendance to all lectures is required and expected. Students are responsible for missed lecture contents and any assignments given during the lecture.

Disruptive Behaviors:

Behaviors that are disruptive to learning will not be tolerated (see attached handout for further clarification). Electronic devices (cellular phones, walkmans, etc.) **must** be turned off in the lecture hall.

Academic Honesty

Plagiarism, cheating or any other form of academic dishonesty will result in a grade of zero on the exam/assignment. More information is available at <http://www.ferris.edu/colleges/artsands/stuinfo/dishonesty.html>

Group Tutoring:

A dedicated tutor is available to answer questions you have concerning class materials and provide extra assistance with concepts covered in class. I encourage you to use the service weekly and keep up with class readings. Tutoring hours and rooms are as follows: T: 11:00 – 11:50 (SCI 136), M, W: 4:30 – 5:30 (SCI 137).

Date	Prerequisite	Chapter	Topic
January 14		Video and activity*	Introduction to Cell Biology- syllabus, etc
16	p. 25-34	Chapter 7 Video and activity**	Membrane Structure, Function and Chemistry
21	p. 41-54	Chapter 7 Chapter 8	Membrane Structure, Function and Chemistry Transport Across Membranes
23		Chapter 8	Transport Across Membranes
28, 30	P 89-93	Chapter 12	The Endomembrane System and Peroxisomes
February 4		Chapter 22	Protein Targeting and Sorting
6			Class presentations
11			EXAM 1
13, 18	p. 131-150	Chapter 9	Glycolysis, Fermentation and Gluconeogenesis
20, 25	p. 84-86, 91-94	Chapter 10	Aerobic Respiration
27	p. 86-88	Chapter 11	Photosynthesis
March 4			
6			Class presentations
10-14			NO CLASS Spring Recess
18			EXAM 2
20, 25		Chapters 13 and 14	Signal Transduction Mechanisms
27	p. 95-98	Chapters 15	Cytoskeletal Systems
28		Last Day for "W"	
April 1		Chapter 16	Cellular Movement
3, 8		Chapter 17	Cell Adhesions, Cell Junctions, and Extracellular Structures
8, 10	DNA replication, stages of mitosis and cytokinesis †	Chapter 19	The Cell Cycle
15			Class presentations
17- 20			NO CLASS Mid-semester recess
22			EXAM 3
24, 29		Chapter 24	Cancer Cells
May 1			Class presentations
5 (Monday)		10:00 – 11:40 AM	CUMULATIVE FINAL EXAM

*Complete eukaryotic cell activity at:

http://media.pearsoncmg.com/bc/bc_becker_woc_6/medialib/activities/ch04/act07/st01/frame.html

**Videos and Animations *from the chapters* are available at

http://wps.aw.com/bc_becker_woc_8/179/46027/11783113.cw/index.html

† Biol 121textbook or equivalent

This schedule is a tentative one. The instructor reserves the right to alter the sequence as need arises.

GENERAL MICROBIOLOGY AND IMMUNOLOGY

BIOL 386 (5 CR: 4+1)

SPRING 2015

**PREREQUISITES: BIOL 232 AND BIOCHEMISTRY/
CONCURRENT BIOCHEMISTRY
OR INSTRUCTOR PERMISSION**

COURSE SYLLABUS

<u>DATE:</u>	<u>TOPIC:</u>	<u>REFERENCE:</u>
1. TUE 1/13	Introduction and History	Brock ch.: 1,2
2. THU 1/15	Prokaryotic & Eukaryotic Cells	B ch. 3,20
3. TUE 1/20	Bacterial Structure & Function	B. ch: 3
4. THU 1/22	Bacterial Structure & Function	B. ch: 3
5. TUE 1/27	Bacterial Growth/ Sporulation/ Taxonomy	B. ch: 5,
6. THU 1/29	Viral Structure & Replication	B. ch.: 9
7. TUE 2/3	Viral Structure & Replication	B. ch.: 9
8. THU 2/5	Fungal Structure & Taxonomy	B. ch.:20
9. TUE 2/10	EXAM I	
10. THU 2/12	Microbial Metabolism	B. ch. 13, 14
11. TUE 2/17	Microbial Metabolism	B. ch. 13, 14
12. THU 2/19	Microbial Genetics	B. ch.: 10, 11, 12
13. TUE 2/24	Microbial Genetics	B. ch.: 10, 11, 12
14. THU 2/26	Micro Control: Antimicrobial/Disinfectants	B. ch.: 15, 26
15. TUE 3/3	EXAM II	
16. THU 3/5	Mech. of Microbial Pathogenesis	S. ch. 8.9.10,31
TUE 3/10	SPRING BREAK	
THU 3/12	SPRING BREAK	
17. TUE 3/17	Respiratory Tract/ Oral cavity	S. ch. 13,19,21,23,57,58,59
18. THU 3/19	CNS/Skin and Mucosal Membrane Infect.	S..ch.: 36,39,58,48, 61
19. TUE 3/24	GI Tract Infections/ Intoxications	S. ch. 16,17,22,32,37,42,73
20. THU 3/26	Wound Infections	S. ch.: 11,15,20,35
21. TUE 3/31	STD	S. ch.:14,24,27,66
22. THU 4/2	Spring Recess	

22.	TUE 4/7	Immune System Innate Immunity, Phagocytosis	Kuby ch.: 1,2, 3,4,5,6,18,
23.	THU 4/9	EXAM III	
24.	THU 4/14	Humoral Immunity Complement/ Acute Inflammation	K. ch.: 4-6,7,11,13
25.	TUE 4/16	Cellular Immunity	K. ch.: 8,9,10,12,13,14,20,21
27.	TUE 4/21	Chronic Inflammation	K Appendix: A1,A27
28.	THU 4/23	EXAM IV	
29.	TUE 4/28	Hypersensitivity / Autoimmunity	K. ch. :15
30.	THU 4/30	Hypersensitivity / Immune Based Disease	K. ch.: 16,17
	TUE 5/5	FINAL EXAM (4 - 5:40 PM)	



SUGGESTED

- TEXTS:** 1) **Brock: Biology of Microorganisms**, 13TH Edition, 2011 or more recent edition by Madigan et al., Benjamin Cummings. (N.B.: Working glossary at the end of each chapter and G1-G17 at the back of the text.)
 2) **Schaechter's Mechanisms of Microbial Disease**, 4th Edition, 2007 or a more recent edition, by Engleberg et.al, Lippincott Williams and Wilkins)
 3) **Kuby Immunology**, 6th EDITION, 2007 or a more recent edition, by Kindt, Goldsby, Osborne (Glossary/Chapter Question & Answers

EXAMS: There will be 4 scheduled exams plus a comprehensive final. Each of these exams are worth 100 points and **will be individually curved**, if necessary, to 75%. **In addition laboratory will be worth 100 points for a total of 600 points** for the course. Exam format may include multiple choice, matching, essay, and problem solving case studies. **Make up exams**, for valid and documented absences, are essay in format and are graded without a curve.

SCALE: 100-93 = A, 92-90 = A-, 89-87 = B+, 86-83 = B, 82-80 = B-, 79-77= C+, 76-73 = C, 72-70 = C-, 69-67 = D+, 66-63 = D, 62-60 = D, 59- = F

ATTENDANCE: You are **EXPECTED** to attend every lecture and to explain any absence.

INSTRUCTOR: M. Ryan, Ph.D., ASC2115, Voice mail: 231-591-5892. FAX: 231-591-2540, Email: ryanm@ferris.edu
 Office hours: MTWR 3-4 PM and by appointment. If I am not available, please leave a message via voice mail or e-mail.

LEARNING OBJECTIVES:

- 1) To learn how professionals in microbiology use the scientific method to gain new knowledge and to modify/eliminate existing paradigms.
- 2) To learn collaborative skills by working in groups for some assignments.
- 3) To learn how to apply certain course material to develop problem solving and critical thinking skills in microbiology.
- 4) To learn the language/terminology of microbiology.
- 5) To learn the fundamental principles of microbial structure and function, microbial metabolism, microbial growth and reproduction, microbial genetics, and the use of antimicrobial drugs.
- 6) To learn the principles, mechanisms, and theories of microbial pathogenicity in humans.
- 7) To learn the structure, function, and control of the immune system and the mechanisms of hypersensitivity.

LECTURE LEARNING OUTCOMES :

<u>GOAL</u>	<u>CLASSROOM ACTIVITY</u>	<u>MEASUREABLE OUTCOME/ASSESSMENT</u>
1. The student will learn the scientific method as it applies to medical microbiology – BIOL 386	Instruction in the Koch's Postulates which have been used historically and contemporarily to establish the microbial etiology of diseases	Student will demonstrate knowledge of the Koch's Postulates. Assessed by examination questions.
2. The student will learn problem solving/critical thinking skills as they apply to medical microbiology – BIOL 386	Instruction in both lecture and laboratory in the analysis of clinical case studies, bacterial generation time problems, and dilution problems	Student will demonstrate knowledge solving case studies, generation time and dilution problems. Assessed by lecture and laboratory examination questions.
3. The student will learn the structures and functions of bacteria, viruses and fungi studied in BIOL 386	Instruction from lectures, study guide and textbook assignments on microbial structure and function	Student will demonstrate knowledge of microbial structure and function. Assessed by lecture and laboratory examination questions.
4. The student will learn how to analyze scientific data generated during BIOL 386 laboratories	Instruction in the graphing and charting of scientific data generated in laboratory sessions	Student will demonstrate knowledge constructing graphs and/or charts. Assessed by completion of lab assignments requiring graphs/charts and examination questions.
5. The student will learn how to use scientific instruments such as the compound light microscope	Instruction in the preparing and visualization of stained microorganisms using all levels of magnification of the compound light microscope, including oil immersion,	.Student will demonstrate knowledge of microscopy. Assessed by laboratory examinations.

GENERAL EDUCATION OUTCOMES: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline;
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science .

Biology 407, FORENSIC DNA ANALYSIS, Spring 2015

Credits: 4, prerequisite: BIOL 207 and BIOL 375

Section: 211, Lecture: M and W 10:00 – 10:50 AM in Starr. 136, lab: F 12:00 – 2:50 PM in Sci. 337.

Instructor: Dr. Roger Mitchell. **Office hours:** ASC (Commons) 2007: Wednesday 11:00 AM – 11:50 AM and 1:00 - 2:50 PM, and Friday 10:00 - 10:50 AM. Make an appointment, or drop by to see if I am available at some other time. Knock if the door is closed! You may call my office: 591-5879, but email is preferred. email: mitchelr@ferris.edu

Materials you are required to have:

text: 'Fundamentals of Forensic DNA Typing', Butler

NOTE: This is not the same as 'Forensic DNA Typing,' 2nd ed., Butler

lab notebook with self-copying pages

3-ring binder for lab handouts

#2 pencils for the lecture exams

safety gear for lab, including a lab coat and eye protection

additional materials for lab, and lecture as announced

Course outcomes: A student succeeding in this course should be able to:

- 1) demonstrate by examination a theoretical background to the properties of DNA and genetics that are relevant to forensic DNA identification.
- 2) demonstrate by examination an understanding of the essentials of DNA-based forensic identification at a professional level, including:
 - Historically significant procedures.
 - Current procedures:
 - Autosomal STR profiles.
 - Y chromosome STR profiles.
 - Mitochondrial DNA profiles.
 - Emerging and possible future procedures.
- 3) demonstrate by examination an understanding of the relationship between forensic science and bioterrorism.
- 4) demonstrate by examination an understanding of how the scientific method and evolutionary theory relate to these specific topics.
- 5) perform, in a laboratory setting, a variety of techniques representing the methods of forensic DNA analysis.

Course Description: In depth analysis of forensic biology, molecular biology, statistics, forensic DNA typing and the advantages and limitations of DNA analysis. The laboratory will cover the concepts and techniques of DNA tests currently used in forensic laboratories to solve questions of paternity, maternity, identity of humans, and animal and plant remains resulting from disasters and/or criminal activities.

Policies and Course Requirements:

Exams and the total percentage. 25% lab grade, 75% for lecture grade, including the final exam. The exam grade will mainly include lecture exams, while both lab and lecture grades may include quizzes, reports, and computer assignments. The lab grade will also include a notebook and attendance component.

Exams can only be made up at my discretion and with a legitimate excuse, with a 5% deduction per day, starting with the day of the test. Students who schedule makeup exams in advance will normally take the same test as the rest of the class, or something similar. Exams that are not taken before the test is turned back, or are missed without an acceptable excuse, may receive a "0." Some make-ups may be essay tests or use the student's grade on the corresponding part of the final. I reserve the right to make additional assignments as a condition of giving makeup exams. There is no "extra credit."

Grades. The final total percentages will be curved against a normal grade distribution or modified normal grade distribution at the end of the course.

Dropping with the "W" grade must be done on or before **March 26**.

Incompletes will be given only at my discretion and will require proof of exceptional need. Consistent with university policy, the student must have passed 75% of the class prior to being forced to stop attending due to circumstances beyond their control. The "I" grade must be cleared or it will become an "F."

Attendance will be taken in lab only. If you miss a lab, you may get a "0" for that day's score. Labs cannot be made up for any reason. Missing more than two labs for any reason will result in failing the class. Most labs will be graded on both attendance and quiz scores. Tardiness will reduce your attendance score, and may result in a "0" on your quiz. Assigned seating will be used in both lab and lecture.

Cheating will result in course failure. Additional action may be taken by the university.

Disruption of class. I will take whatever action is necessary to maintain a lecture atmosphere conducive to learning. I reserve the right to force involuntary withdrawal or make additional assignments in response to tardiness or disruptive behavior.

Studying is the responsibility of each student, and strategies differ. The following is a minimal approach:

1. Read the text material for both lab and lecture before attending.
2. Attend every lecture and take careful notes.
3. Within a day of each lecture and lab, review your notes to make sure you understand everything.
4. If you have trouble understanding anything, get help at once. I am always happy to help students, and the university also has a tutoring service.
5. Review the material again before each exam. You should plan to have done all of the things listed above before you study for the exam.
6. If you still have difficulties, you may need to take notes from your book before lecture, and/or rewrite your lecture notes to improve your understanding. Answering the questions at the end of each chapter may also help.

The keys to doing well are to do all of the reading, go to every lecture, and not fall behind on studying.

Exam material will come from both the text and lecture, and may not be covered in both. Questions will test both your retention of the material presented, as well as your understanding of underlying concepts.

Your most important resource will be yourself. You will choose your own grade, by choosing how hard you work in the course, and how effectively you study. The actual grades assigned by the instructor is just a reflection of your performance.

LECTURE SCHEDULE. Highly tentative!

	TOPIC	Chapter
Jan 12	lily DNA: A biologist's introduction	handout
14	DNA review	1
19	NO CLASS: King day	
21	overview and history	2
26	old methods, RFLP/VNTR	3
28	EXAM 1	
Feb 2		
4	samples	4
9	DNA extraction	5
11		
16	DNA quantification	6
18		
23	PCR	7
25		
March 2	EXAM 2	
4	STR markers	8
9	NO CLASS: spring break	
11	NO CLASS: spring break	
16	STR detection	9
18		
23	STR interpretation	10
25	statistics	11
30	challenges	14
April 1	Y-STR	16
6	EXAM 3	
8		
13	mtDNA sequencing	16 (cont.)
15	non-human DNA	15 (part)
20	emerging and future techniques	18
22	bioterrorism: agents	handout
27	bioterrorism: the forensic response	handout
29		

TENTATIVE LAB SCHEDULE. you should read your lab exercises before attending lab. This schedule is highly tentative!

DATE	TOPIC
Jan. 16	Pipettes, gels
23	DNA isolation 1
30	DNA isolation 2
Feb. 6	PCR/VNTR 1
13	PCR/VNTR 2, Photoshop
20	restriction mapping
27	PCR/mtDNA 1
March 6	PCR/mtDNA 2
13	NO LAB: spring break
20	STR 1
27	STR 2
April 3	NO LAB: mysterious holiday
10	STR 3
17	Sequencing 1
24	Sequencing 2
May 1	Sequencing 3

**Course Syllabus – Endocrinology (BIO 421)
Fall 2014**

Instructor: Dr. Joseph Lipar
Office: ASC 2004
Phone: 591-2660
E-mail: liparj1@ferris.edu
Lecture: Starr 136
MWF: 9:00 – 9:50
Office Hours: Monday: 10:00 – 12:00 (ASC 2004)
Tuesday: 1:00 – 3:00 (ASC 2004)

Textbook: Goodman, H.M. 2009. *Basic Medical Endocrinology*, Fourth Edition, Academic Press.

Additional readings and/or information will be provided/assigned during the semester.

Course Description: An in-depth investigation of vertebrate (particularly human) endocrinology. Topics will include hormone structure, hormone synthesis, the mechanisms of hormone action, endocrine disruptors, and the roles of hormones in calcium metabolism, digestive physiology, reproduction, growth, and the stress and sympathetic responses. The hormones of the major endocrine glands will be investigated. This course includes the reading and understanding of primary scientific literature.

Course Goals: The learning outcomes for the students in this course are as follows:

1. Demonstrate an increased understanding and depth of knowledge regarding the field of endocrinology (hormone structure, mechanisms of hormone action, hormone/receptor interactions, specifics of mammalian hormone systems).
2. Demonstrate the ability to access, understand, and critique scientific literature.
3. Demonstrate (with necessary improvements) written communication skills of good quality.

My objective in teaching this course is to provide you with an in-depth introduction to vertebrate endocrinology. We will talk about hormone structure, hormone synthesis, and mechanisms of hormone action. We will investigate the hormones of the major endocrine glands: the pituitary, the hypothalamus, the pineal gland, the pancreas, the thyroid gland, the adrenal glands, and the gonads. We will look at the roles of hormones in calcium metabolism, digestive physiology, growth, and the stress/sympathetic response. In addition, we will investigate the topic of endocrine disruptors. We may also investigate some invertebrate hormone systems. There will be written assignments, the goals of which are to help you improve your writing skills and your ability to gain access to and understand scientific literature.

Exams and Grades: Your final grade will be determined from four exam scores and from the written assignments. I will not assign letter grades to individual exams or to the assignments; you will be assigned a final letter grade based on the total number of points you receive during the course. The final grades for the course will be curved, if necessary.

There will be 550 total points in the class. The points will be broken down as follows:

Exam #1	100 points
Exam #2	100 points
Exam #3	100 points
Final Exam	150 points
In-Class Quizzes	40 points
Bibliography	10 points
Written Assignments	50 points (25 points each)

Your total points will be converted into a percentage at the end of the semester. My grading scale is as follows:

A	93-100	C	73-76.9
A-	90-92.9	C-	70-72.9
B+	87-89.9	D+	67-69.9
B	83-86.9	D	63-66.9
B-	80-82.9	D-	60-62.9
C+	77-79.9	F	Below 60

Exams may contain multiple choice, short answer, essay, true-false, and/or matching questions. The majority of questions will be short answer and essay. Exam questions will be written from material covered in lecture; anything that is brought up in class is fair game for the exams. I will give several questions on every exam that will require you to integrate or apply knowledge in novel ways. Please see the lecture schedule for the dates of each exam. The first three exams will be held during our regular class time, while the cumulative final exam will be held during finals week at the time indicated on the lecture schedule.

If you miss an exam, **you will receive a score of 0** for that exam. If you have what **I** consider to be a legitimate excuse for missing an exam, and if you inform me of this **before** the exam, you will be allowed to take an essay make-up exam. You may **NOT** miss the final; no make-up for the final exam will be given. Cheating on an exam will result in a grade of F for the course.

If the point total on your exam was summed incorrectly, please see me immediately, and I will fix the problem. Ensure that your exam total is the sum of all the points you received on the exam. If you think that you supplied a correct answer for a question, but did not receive points for that answer, you have seven days after receiving your graded exam to see me about it.

The written assignments will each be worth 25 points. Please see the attached sheet of paper for details on these assignments and the associated bibliography (10 points).

How to Do Well: This course covers a great deal of complex and interrelated material, so it is essential that you keep current. You must understand topics covered early in the course to be able to comprehend information presented later in the course, and you will have to be able to integrate material that you learn throughout the course. In short, make sure that when you study a topic, you understand it well enough to be able to remember it and use it later in the course. Do not fall behind in your reading and studying; you will find it difficult or even impossible to catch up once you fall behind in a course of this type. Make sure you set aside regular times outside of class to work on the course material. Finally, don't wait until the night before an exam to study. This is a sure way to do poorly.

Your attendance and active participation in lecture are strongly recommended. I will not take attendance in lecture, but from personal experience and other documented sources I know that students that attend class regularly do better than those that do not.

You will find the learning experience to be much easier if you come to class prepared. Read the assigned materials before coming to class. Within 24 hours of a lecture, re-write your lecture notes. This will force you to review the material while it is fresh in your mind. This has been demonstrated to be an effective way to remember information. Once a given topic has been covered in lecture, answer the appropriate questions at the end of the chapter that cover that topic. The more times that you are exposed to the material (e.g., reading the text, listening to and thinking about the lecture material, and reviewing/rewriting your notes), the greater the likelihood that you will learn the material. Expect me to ask questions during the lecture to motivate you to prepare for class.

I encourage questions. If you have a question during class, please ask it. If something is unclear to you, it is likely that it is a complex topic and there are almost certainly others with the same question. I would like to think that this course can be an interaction among all of us instead of just me lecturing to you. Breaking up the lecture with questions will be beneficial to everyone involved.

Special Accommodations: If you have a learning disability and require special teaching or testing conditions, **please see me during the first week of class** so that we can make the necessary arrangements.

BIOLOGY 423 - NEUROBIOLOGY

Course Syllabus

Fall Semester 2013

Course Description:

This course covers the relation of structure and function of the nervous system. Topics covered include the structure and properties of excitable cells, synaptic transmission, neurochemistry integration of information in simple systems, centrally programmed behavior, and learning and memory.

Instructor: Dr. M. Beth Zimmer, PhD
Office: 2120 Arts and Science Commons
Phone: (231) 591-5022
Email: MaryZimmer@ferris.edu
Office hours: T: 9:00 - 11:00am
T: 3:00 – 5:00am;
By appointment
Lectures: M, W, F 11:00-
11:50pm STR 136

Course Prerequisites: BIOL 322

Course objectives:

By the end of the course students will be able to:

- 1) differentiate the structure and function of neurons and glia.
- 2) calculate an equilibrium potential, using the Nernst equation, and describe the events of an action potential.
- 3) discuss how neurotransmitters are released at a synapse.
- 4) discuss the anatomical, physiological, neurochemical bases of particular examples of neural behavior and learning and memory.
- 5) critically read and analyze classical scientific literature

Required Textbook:

Neuroscience, Fifth Edition, Purves, Augustine, Fitzpatrick, Hall, LaMantia, White, eds., Sinauer Associates Inc.

Lecture NOTES - FerrisConnect and the Internet:

Any powerpoint notes that I have will be made available AFTER lecture. Many notes will be given on the board or as handouts. Remember that the internet has a wide variety of sources of information. While researching for your poster presentations be sure to use appropriate references.

Evaluation:

The course will be evaluated based on the following:

Assignments (4 @ 25pts) – 100 pts
Poster presentation project (includes written paper) – 100 pts
4 Exams @100 each – 400 pts

Total points = 600 pts

Course Grading

93 – 100 = A	73 – 76.9 = C
90 – 92.9 = A-	70 – 72.9 = C-
87 - 89.9 = B+	67 – 69.9 = D+
83 – 86.9 = B	63 – 66.9 = D
80 – 82.9 = B-	60 – 62.9 = D-
77 – 79.9 = C+	Below 60 = F

Week	Day		Lecture	Chapter and page #'s
1	M W F	Aug 26 Aug 28 Aug 30	Introduction Neuro-Review Neuroanatomy – neurons and glia	Chapter 1 – pg 1-21 <i>Get groups together</i>
2	M W F	Sep 2 Sep 4 Sep 6	Labor Day – No class Neurophysiology 1 – cable properties	Chapter 2 – pg 25 – 32
3	M W F	Sep 9 Sep 11 Sep 13	Neurophysiology 2 – action potential Neurophysiology 3 –Voltage clamp/ Patch clamp/ion channels	Chapter 2, 3 – pg 33 -55 Chapter 3, 4
4	M W F	Sep 16 Sep 18 Sep 20	EXAM 1 Synaptic transmission and chemistry	<i>Decide on project idea</i> Chapter 5 – pg 78 – 107
5	M W F	Sep 23 Sep 25 Sep 27	Neurotransmitters and receptors Molecular signaling	Chapter 6 – pg 109-140 Chapter 7 – pg 141-161
6	M W F	Sep 30 Oct 2 Oct 4	Synaptic plasticity – Long Term Depression, long term potentiation, ...	Chapter 7 – pg 141-161 Chapter 8 – 163-185
7	M W F	Oct 7 Oct 9 Oct 11	Behavior in Aplysia LTP at hippocampus Silent synapses	Chapter 8 + handouts
8	M W F	Oct 14 Oct 16 Oct 18	EXAM 2	
9	M W F	Oct 21 Oct 23 Oct 25		
10	M W F	Oct 28 Oct 30 Nov 1		
11	M W F	Nov 4 Nov 6 Nov 8	EXAM 3	
12	M W F	Nov 11 Nov 13 Nov 15		
13	M W F	Nov 18 Nov 20 Nov 22		
14	M W F	Nov 25 Nov 27 Nov 29	Thanksgiving break Thanksgiving break	
15	M W F	Dec 2 Dec 4 Dec 6	<i>Poster presentations in class</i> <i>Poster presentations in class</i> EXAM 4	

WEEKS 8-14: Student “choice” of topics

I will be surveying the class about your interests regarding neuroscience topics. I will try to design the course curriculum around areas of student interest. I will talk more in class regarding the second half of the semester.

Possible ideas include but are not limited to: Pain, locomotion, central pattern generators, spinal cord injury and regeneration, critical periods

Poster Projects

Groups of 3 to 4 individuals will be assigned to a group.

Groups will work on a particular topic of Neuroscience

Group project ideas must be chosen by Sep 16th.

Posters and papers must be completed and turned in by Tuesday, Nov 26.

Posters will be presented in class during the last week – You will need to have two people at the poster at all times – and you will be required to observe each poster to grade each other’s posters.

POSSIBLE IDEAS FOR POSTER PROJECTS:

Amyotrophic lateral sclerosis
Huntington’s disease
Spinal cord injury – regeneration, stem cell therapy...
Stroke
Multiple sclerosis
Traumatic brain injury
Parkinson’s disease
Neural toxins/poisons
Drugs that affect the nervous system – opioids, anesthetics, etc...
Peripheral nerve neuropathies
Pain
Visual system, hearing system, cochlear implants, etc...
Rett syndrome
Sudden infant death syndrome
Central sleep apnea (not obstructive)

The list is endless - you are not limited at all by this list.... please see me for final approval of idea.

MICROBIOLOGY FOR OPTOMETRY

BIOL 438 (4 CREDITS)

SPRING 2015

PREREQUISITES: BIOL 286 /BIOL 331/332 OR EQUIVANT MICROBIOLOGY / A&P COURSES, A BIOCHEMISTRY COURSE AND OPTOMETRY STUDENT STATUS OR INSTRUCTOR PERMISSION

COURSE SYLLABUS

<u>DATE:</u>	<u>TOPIC:</u>	<u>REFERENCE:</u>
1. MON 1/12	Introduction and PRE-REQ TEST	Brock ch.: 1,2
2. TUE 1/13	Basic concepts: Review and application (R&A)	B. 5,6
3. THU 1/15	Microbial Structure & Function (R&A)	B. ch: 4 ,17,18,19
MON 1/19	MLK DAY NO CLASS	
4. TUE 1/20	Bacterial Growth & Sporulation (R&A)	B ch. 5, 6
5. THU 1/22	Viral Structure & Replication (R&A)	B. ch.: 9
6. MON 1/26	Viral Structure & Replication	B. ch.: 9
7. TUE 1/27	Microbial Metabolism	B. ch. 4,11,15
8. THU 1/29	EXAM I	
9. MON 2/2	Microbial Metabolism	B. ch. 4,13,14
10. TUE 2/3	Microbial Genetics	B. ch.: 6, 7,8,10
11. THU 2/5	Microbial Genetics	B. ch.: 6, 7,8,10
12. MON 2/9	Microbe Control: Antimicrobial/Disinfectants	B. ch.: 26
13. TUE 2/10	Mech. of Microbial Pathogenesis	Schaechter ch. 8-10,31 B.32-36
14. THU 2/12	EXAM II	
15. MON 2/16	Respiratory Tract/CNS Infections	S. ch. 13,19,21,23,57,58,59
16. TUE 2/17	Respiratory Tract/CNS Infections	
17. THU 2/19	Ocular Infections	
18. MON 2/23	Ocular Infections	
19. TUE 2/24	Oral cavity/ GI Tract Infect/ Intoxications	S. ch. 16,17,22,32,37,42,73
20. THU 2/26	Oral cavity/ GI Tract Infect/ Intoxications	
21. MON 3/2	Wound Infections / STD	S.ch.:11,15,20,35/14,24,27,66
22. TUE 3/3	Immune System	Kuby ch.,: 1,2, 3,18,19,/B28-30
23. THU 3/5	EXAM III	
MON 3/9	SPRING BREAK	
TUE 3/10	SPRING BREAK	
THU 3/12	SPRING BREAK	
24. MON 3/16	Immune System	Kuby ch.,: 1,2, 3,18,19,/B28-30
25. TUE 3/17	Immune System	Kuby ch.,: 1,2, 3,18,19,/B28-30
26. THU 3/19	Innate Immunity /Phagocytosis	Ku. ch.:4-6, 11

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27.	MON 3/23	Innate Immunity /Phagocytosis	Ku. ch.:4-6, 11
28.	TUE 3/24	Humoral Immunity	Ku. ch.:4-6, 11
29.	THU 3/26	Complement/ Acute Inflammation	Ku. ch.: 7,13
30.	MON 3/30	Complement/ Acute Inflammation	Ku. ch.: 7,13
31.	TUE 3/31	Cellular Immunity	Ku. ch.: 8,9,10,12,13,14,20,21 32
32.	THU 4/2+/-	Cellular Immunity	Ku. ch.: 8,9,10,12,13,14,20,21
33.	MON 4/6	Chronic Inflammation	Ku Appendix: A1,A27
34.	TUE 4/7	Chronic Inflammation	Ku Appendix: A1,A27
35.	THU 4/9	Hypersensitivity / Autoimmunity	Ku. ch. :15
36.	MON 4/13	Hypersensitivity / Autoimmunity	Ku. ch. :15
37.	TUE 4/14	Hypersensitivity / Autoimmunity	Ku. ch. :15
38.	THU 4/16	Semester Recess	
39.	MON 4/20	Hypersensitivity / Immune Based Disease	Ku. ch.: 16,17
40.	TUE 4/21	Hypersensitivity / Immune Based Disease	Ku. ch.: 16,17
41.	THU 4/23	*Atopic Diseases of the Eye	Koevary ch.: 4
42.	MON 4/27	*Ocular Based Immunopathologies	Ko ch. :5
41.	TUE 4/28	* Systemic Based Ocular Immunopathologies	Ko ch.: 5
43.	THU 4/30	* Ocular Allografts	Ko ch.: 7
43.	THU. 5/9	FINAL EXAM (Wed., 6 May, Noon-1:40 PM)** ** (Subject to <u>Actual</u> MCO Exam Schedule)	

* Topic for in-class “Focus Questions” Assignment

“SUGGESTED” information sources:

- 1) **Brock: Biology of Microorganisms**, 13TH Edition, 2011 or more recent edition by Madigan et al., Benjamin Cummings. (N.B.: Working glossary at the end of each chapter and G1-G17 at the back of the text.)
- 2) **Schaechter’s Mechanisms of Microbial Disease**, 4th Edition, 2007, by Engleberg et.al, Lippincott Williams and Wilkins.(or most recent edition)
- 3) **Kuby Immunology**, 6th EDITION, 2007, by Kindt,Goldsby,Osborne (Glossary/Chapter Question & Answers) (or most recent edition)
- 4) **Ocular Immunology in Health and Disease**. Steven B. Koevary. Butterworth Heinemann Publishers.1999 (N.B.: “Available” but Out of Print!)
- 5) **Clinical Ocular Pharmacology**, Barlett and Jaanus, Butterworths Publishers. (or most recent edition).
- 6) **Johns Hopkins ABX Guide**. <http://www.hopkinsguides.com>

EXAMS: There will be 3 scheduled exams plus a comprehensive final. Each of these exams is worth 100 points for a total of 400 points. Each exam **will be individually curved**, if necessary, to 75%. Exam format may include multiple choice, matching, essay, and problem solving case studies. **Make up exams**, for valid and documented absences, are essay in format and are graded without a curve.

SCALE: 100-93 = A, 92-90 = A-, 89-87 = B+, 86-83 = B, 82-80 = B-, 79-77= C+, 76-73 = C, 72-70 = C-, 69-67 = D+, 66-63 = D, 62-60 = D, 59- = F

ATTENDANCE: You are **EXPECTED** to attend every lecture and to explain any absence.

INSTRUCTOR: M.Ryan, Ph.D.,

Office: ASC 2115, Voice mail: 231-591-5892, FAX: 231-591-2540, E-mail: ryanm@ferris.edu

Office hours: MTWR 3-4 PM and by appointment. Best to schedule an office visit at least 24 hours prior to appointment. If I am not available, please leave a message on voice mail or via e-mail.

LEARNING OBJECTIVES:

- 1) To learn how professionals in microbiology use the scientific method to gain new knowledge and to modify/eliminate existing paradigms.
- 2) To learn collaborative skills by working in groups for some assignments.
- 3) To learn how to apply certain course material to develop problem solving and critical thinking skills in microbiology
- 4) To learn the language/terminology of microbiology.
- 5) To learn the fundamental principles of microbial structure, function, metabolism, growth, reproduction, genetics, and controls and be employ these concepts in clinical problem solving situations
- 6) To learn the principles, mechanisms, and theories of microbial pathogenicity in humans.
- 7) To learn the fundamental principles of the structure, function, and control of the immune system and the mechanisms of hypersensitivity and be able to use these concepts in clinical problem solving situations.

LECTURE LEARNING OUTCOMES :

<u>GOAL</u>	<u>CLASSROOM ACTIVITY</u>	<u>MEASUREABLE OUTCOME/ASSESSMENT</u>
1. The student will learn the scientific method as it applies to medical microbiology and immunology.	Instruction in the Koch's Postulates which have been used historically and contemporarily to establish the microbial etiology of diseases	Student will demonstrate knowledge of the Koch's Postulates. Assessed by lecture examination questions.
2. The student will learn problem solving/critical thinking skills as they apply to medical microbiology and immunology.	Lecture instruction and in/out of class activities include the analysis of clinical case studies as a learning tool.	Student will demonstrate knowledge solving case studies, generation time and dilution problems. Assessed by lecture examination questions.
3. The student will learn the structures and functions of bacteria, viruses and fungi studied in BIOL 438 including those associated with ocular infections.	Instruction via lectures supplemented with power point, handouts and the discussion of specific case studies that reinforcing the clinical value of the understanding of microbial structure and function.	Student will demonstrate knowledge of microbial structure and function. Assessed by examination questions.
4. The student will learn the basic concepts of the human immune response as observed in both in the protective and hypersensitivity responses including those associated with ocular infections and allergic reactions.	Instruction via lectures supplemented with power point, handouts and the discussion of specific case studies that reinforcing the clinical value of the understanding the basic concepts of the human immune response.	Student will demonstrate knowledge of the basic concepts of the human immune response .Assessed by examination questions

Ecology

Biology 442

Spring 2015

Paul H. Klatt
2114 ACS Building
591-2671
PaulKlatt@ferris.edu

Texts: Ecology (6th ed), Krebs, 2009.
Never Cry Wolf, Mowat, 1963.
Lab Manual, Klatt, 2015.
Office hours: Monday and Thursday 3:00-5:00 pm
Class: **Lect** - STR 136, 2:00 pm, MW
Lab - SCI 227, 8 am T, and 12:00 pm T

Grading Scale:

A (94% and up)	C (73-76.9%)	Exam I	100
A- (90-93.9%)	C- (70-72.9%)	Exam II	100
B+ (87-89.9%)	D+ (67-69.9%)	Exam III	100
B (83-86.9%)	D (63-66.9%)	<u>Lab Points</u>	<u>100</u>
B- (80-82.9%)	D- (60-62.9%)	Total	400
C+ (77-79.9%)	F (59.9% and below)		

Course Description: Study of the dynamic relationships between organisms (plant and animal) and their environment. This course is designed for students in baccalaureate programs in science education and applied biology.

General Education Outcomes

This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

- 1) have a working knowledge of the fundamental principles of a natural science discipline.
- 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences.
- 3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas.
- 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course Outcomes: A student succeeding in this course should be able to:

- 1) demonstrate a working knowledge of the fundamental principles of ecology (populations, ecosystem function, classification and life cycles, evolution and adaptation to environments, disease and nutrition, naturalized species, management of natural resources, and plant & animal pathogens).
- 2) scientifically identify the key organisms in their field settings and relate this to the life cycle, geography, climate, ecosystem, growth and niche requirements.

Exams: Lecture Exams cannot be made up. Students who are absent on exam day, and do not have a legitimate excuse, will receive a zero on that exam. **Cheating** will result in failure of the course. Additional action may be taken by the University.

Electronic Devices must be turned off in the lecture hall.



Tentative Schedule:

<u>Date</u>	<u>Lecture</u>	<u>Chapter</u>
Jan. 12	Introduction to Ecology as a Science	01
— 14	Evolution and Ecology	02
— 19	[Martin Luther King Holiday]	
— 21	Behavioral Ecology and Geographic Distributions	03 and 04
— 26	Biotic and Abiotic factors that Limit Distributions	05 and 06
— 28	Distribution and Abundance	07
Feb. 02	Populations Parameters and Demographic Tech.	08
— 04	cont.	
— 09	cont.	
— 11	Population Growth	09
— 16	Exam I - 100 points	
— 18	Competition	10
— 23	cont.	
— 25	Predation	11
Mar. 02	Herbivory and Mutualism	12
— 05	Disease and Parasitism	13
— [09-13	Spring Break Holiday]	
— 16	Regulation of Population Size	14
— 18	cont.	
— 23	Harvesting Populations	15
— 25	Pest Control	16
— 30	Exam II - 100 points	
April 01	Conservation Biology	17
— 06	Biodiversity	19
— 08	Succession	18
— 13	Equilibrium Communities	20
— 15	Nonequilibrium Communities	21
— 20	cont.	
— 22	Primary Production	22
— 27	Secondary Production	23
— 29	Nutrient Cycles	24
May 07	Exam III - 100 points, 2:00 pm - 3:40 pm	

Special Needs: Any student that needs special accommodations for learning or has special needs is invited to discuss these matters with the instructor as soon as possible.

Final Note: Enjoy the course and take pride in your work. The University experience is what you make it. This syllabus is subject to change at any time.

“We then try to justify what we do by trying to make it sound as if it has some useful application. But, really, we do it because it is fun. Nature is entertainment, the greatest show on earth. And that is not trivial because what is life, if it isn't fun? I think that the greatest contribution we could make would be to help make life more interesting.”

-- *Ravens in Winter*, Bernd Heinrich

Lab Information

Lab: Lab will consist of exercises to be turned in and quizzes over some reading material. We will meet over in a Flite Computer Lab to complete the analyses of most exercises.

Tentative Schedule:

<u>Week of</u>	<u>Topic</u>
1) 12 Jan.	Introduction
2) 19 Jan.	Animal Behavior Lab
3) 26 Jan.	Plant Competition I
4) 02 Feb.	Pseudoreplication, Hurlbert Paper
5) 09 Feb.	Plant Competition II
6) 16 Feb.	<i>Never Cry Wolf</i> - pages 0-128.
7) 23 Feb.	Predation Lab
8) 02 March	<i>Never Cry Wolf</i> , pages 129-246.
9) 09 March	[Spring Break]
10) 16 March	Gall Maker
11) 23 March	Mark Recapture I
12) 30 March	Mark Recapture II
13) 06 April	Sampling Birds
14) 13 April	TBA
15) 20 April	Sampling a Field
16) 27 April	Sampling a Forest

Syllabus for Biology 453, plant physiology, Fall 2013

NOTE: Previously, this was BIOL 353.

Credits: 4, Completion of organic chemistry is recommended. Prerequisites:

Earned Grades of C- or better in BIOL 122 and BIOL 350.

Section: 211, Lecture: MWF 2:00 – 2:50 PM in Sci. 137, lab: M 9:00 – 11:50 AM in Sci. 235.

lecture and lab Instructor: Dr. Roger Mitchell. **Office hours:** ASC (Commons) room 2007: Monday and Wednesday 12:00 noon – 1:00 PM, Friday 3:00 – 5:00 PM. Make an appointment, or drop by to see if I am available at some other time. Knock if the door is closed! You may call my office at any time: 591-5879. My email is: mitchelr@ferris.edu

Materials you are required to have:

texts: Plant Physiology, Taiz and Zeiger, 4th ed., and Plant Structure and Function, Starr and Taggart, 7th. (Generally, the botany section of any introductory majors' biology textbook should be able to substitute for Starr and Taggart, including Campbell's biology).

#2 pencils for the lecture exams

3H pencils, color pencils, and eraser for lab drawings

additional materials for lab safety. I will let you know in advance when we think that you should obtain such materials.

computer access to prepare lab reports

Course Outcomes: A student succeeding in this course should be able to:

- 1) demonstrate a reinforced understanding of the scientific method and how it applies to experiments.
- 2) demonstrate a reinforced understanding that biology is a living, evolutionary science.
- 3) demonstrate a reinforced understanding of cellular biology and biochemistry.
- 4) demonstrate a knowledge of the fundamentals of plant physiology, with particular emphasis on water relations, photosynthesis, and the control of plant development (including plant hormones).
- 5) carry out a variety of plant-related laboratories to reinforce these concepts, and to provide experience to those students who may need to prepare plant labs in the future.

Course Description: A study of the basic structure, function, and physiology of vascular plants. Topics include plant anatomy and cell biology, water relations (including water uptake, xylem transport, and transpiration), nutritional requirements, an in-depth look at photosynthesis, a review of other plant biochemistry, and a study of development and environmental responses, focusing on the detection of stimuli and hormonal and other messengers. Designed for students in baccalaureate programs in science education and biology.

Policies and Course Requirements:

Exams and the total percentage: 25% lab grade, 75% for lecture exams, including the final exam. Part of the final will be based on the lectures after the third exam, and the remainder will be comprehensive. The three lecture exams will be worth 50 points each, and the final 75. Some additional lecture points may be added for special projects. Exams can only be made up at my discretion and with a legitimate excuse, with a 5% deduction per day (starting with exams taken

on exam day at a different time). Students who schedule makeup exams in advance will normally take the same test as the rest of the class, or something similar. Late make-ups, if allowed, may either be essay tests or use the student's grade on the corresponding part of the final. I reserve the right to make additional assignments as a condition of giving makeup exams. Labs will be graded in part on attendance (with deductions for tardiness), in part on lab worksheets and quizzes, and in part on lab reports. There is no "extra credit." All of these components will be added to get a final total percentage, which will not be adjusted in any way.

Grades. The final total percentages will be curved against a normal grade distribution or modified normal grade distribution at the end of the course.

Dropping with the "W" grade must be done on or before **October 31**.

Incompletes will be given only at my discretion and will require proof of exceptional need. Consistent with university policy, the student must have passed 75% of the class prior to being forced to stop attending due to circumstances beyond their control. The "I" grade must be cleared or it will become an "F."

Attendance policy: Attendance will be taken in lab. If you miss a lab, you may get a "0" for that day's score. Labs cannot be made up for any reason. Missing more than two labs for any reason will result in failing the class. Excessive tardiness may count as an absence. Attendance may sometimes be taken in lecture, although it will not count directly for grading. Assigned seating will be used to aid in attendance taking in both lab and lecture. Excused absences are on a case-by-case basis at my discretion.

Cheating will result in course failure. Additional action may be taken by the university.

Disruption of class. I will take whatever action is necessary to maintain a lecture atmosphere conducive to learning. I reserve the right to force involuntary withdrawal or make additional assignments in response to tardiness or disruptive behavior.

Studying is the responsibility of each student, and strategies differ. The following is a minimal approach:

1. Read the text material for both lab and lecture before attending.
2. Attend every lecture and take careful notes.
3. Within a day of each lecture and lab, review your notes to make sure you understand everything. Do the problems at the end of each chapter and lab.
4. If you have trouble understanding anything, get help at once. I am always happy to help students, and the university also has a tutoring service.
5. Review the material again before each exam. You should plan to have done all of the things listed above before you study for the exam.
6. If you still have difficulties, you may need to take notes from your book before lecture, and/or rewrite your lecture notes to improve your understanding.

The keys to doing well are to do all of the reading, go to every lecture, and not fall behind on studying.

Exam material will come from both the text and lecture, and may not be covered in both. Questions will test both your retention of the material presented, as well as your understanding of underlying concepts.

Your most important resource will be yourself. You will choose your own grade, by choosing how hard you work in the course, and how effectively you study. The actual grade assigned by the instructor is just a reflection of your performance.

I reserve the right to make needed and appropriate adjustments in the syllabus.

TENTATIVE LECTURE SCHEDULE:

Date	Lecture topic	Chapter Taiz	Chapter Starr
Aug. 26	plant cells, cell walls	1 and 15 (part)	
28			
30			
Sep. 4	chemistry review	1	
6	biofuels		
9			
11	basics of metabolism	2 (on web)	
13			
16	exam 1		
18	plant anatomy review		29
20	water in plant cells	3	30
23			
25			
27	water balance	4	
30			
Oct. 2			
4			
7	mineral nutrition	5	
9			
11	xylem transport	6	
14	exam 2		
16			
18	photosynthesis: light reactions	7	
21			
23			
25			
28	photosynthesis: carbon fixation	8	
30			
Nov. 1			
4			
6			
8	photosynthesis in the plant and environment	9	
11	exam 3		
13			
15	phloem transport	10	
18			
20			
22			
25			
Dec. 2	plant hormones, responses, and defense	selections	32
4			
6			

note: Starr chapters may vary with edition.

TENTATIVE LAB SCHEDULE

week	date	subject
1	Aug 26	mineral nutrition
2	Sept 2	NO LAB
3	Sept 9	cell wall substances
4	Sept 16	organelles
5	Sept 23	anatomy review
6	Sept 30	enzymes 1
7	Oct 7	enzymes 2
8	Oct 14	transpiration
9	Oct 21	water relations/root anatomy
10	Oct 28	soil lab 1
11	Nov 4	soil lab 2/chromatography
12	Nov 11	detecting photosynthesis/ chloroplast isolation
13	Nov 18	seed germination (hormones)/leaf anatomy
14	Nov 25	starch
15	Dec 2	final lab quiz

BIOL 460 - Current Topics in Biology
Course Syllabus
Fall 2014

Course Description: Students will use published literature to interpret and analyze current topics of biological interest. This is a capstone course for both the BA Biology and BS Biology programs as it requires students to draw on their knowledge acquired through previous Biology coursework to complete the major written and oral reports.

Instructor: Dr. Scott M. Herron
Office: ASC 2017
Phone: 591-2087
E-mail: herrons@ferris.edu
Lecture: Science 137
Monday and Wednesday: 12:00 – 12:50 pm

Office Hours: M: 10:00 - 10:45am, 1-1:50 pm
W: 10:00 - 10:45am, 1-1:50 pm
Others by appointment, Not available Thursdays, Labs all day.

Textbook: None required. **Optional book:** Gillen, C.M. 2007. *Reading Primary Literature: A Practical Guide to Evaluating Research Articles in Biology*, Pearson Benjamin Cummings.

Course Goals: The learning outcomes for the students in this course are as follows:
1. Demonstrate the ability to access, analyze, interpret, and discuss scientific literature.
2. Demonstrate oral communication skills of good quality in the context of biological research.
3. Demonstrate (with necessary improvements) written communication skills of good quality in the context of scientific writing.

This course will serve as the capstone course for your major. As such, the objective of this course is to provide a final enhancement of your analytical and communication skills in the biological sciences. To achieve this objective, you will be expected to A) read, analyze, and discuss examples of current scientific literature, B) improve your writing skills by providing detailed written summaries of the scientific papers you read this semester, and C) improve your oral communication skills through presentations of the scientific literature to your classmates.

Grades: There will be a total of 700 points in the course. Your final grade will be determined from written assignments, oral presentations, and class participation. Finally, you will also create a useful, impressive resume (hopefully to be used by you in the future). You will be assigned a final letter grade based on the total number of points you receive during the course.

The points for the class will be broken down as follows:

45 Minute Oral Presentation	150 points (students must meet with me to get feedback and grade)
Daily Write-ups	280 points (14 @ 20 points each)
Written Summaries	80 points (2@ 40 points each; 1 individual and 1 group paper)
Class Participation	100 points (20 points Group Peer Evaluation, 50 points Instructor Evaluation of Group, and 30 points Present and Participating in Discussions)
Resume	50 points
<u>Assignments</u>	40 points (1 & 2 @ 20 each)
Total points	700

Your total points will be converted into a percentage at the end of the semester. The grading scale in percentage is as follows:

A	93-100
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9
D+	67-69.9
D	63-66.9
D-	60-62.9
F	Below 60

Class Participation: Most of our classroom time will be spent *discussing* examples of scientific literature. For the first couple of lectures, I will supply the papers that we will be reading and discussing. The format will be such that I will give you a copy of the paper during class, and you will be responsible for the material in that paper for the next class period. We will then talk about that paper. I will expect each of you to contribute significantly to the conversation. DO NOT just sit back and listen. When I say that you have to earn these points, I mean it. I will keep track of how much each person contributes during each class session.

45 Minute Oral Presentation: After I demonstrate the expectations of the presentations during the first 3 weeks, the rest of the semester will be student lead. Each one of you will be the leader for a 50 minute class period. This means that you have to find an article (**NO Review papers**) for all of us to read, confirm I copy the article and pass it out to everyone **one week in advance**, prepare yourself to present the paper, and then guide our discussion on that paper. You will be expected to be prepared to keep the discussion going for the entire class period. Your grade will be determined by me and by your classmates through evaluation forms. **Note: Upon completion of your individual presentation, you MUST meet with Dr. Herron in his office to receive his feedback on your presentation and to discuss peer evaluation summaries. I will confirm your final scores and explain the breakdown of points.** This is an important part of the course. In order for this course to work, each of you must be

willing to participate, as outlined above. In addition, you must do a good job of leading the discussion about your particular paper. If you do not, the course (and your grade) will fall flat on its face. When choosing a scientific article, choose a topic that you are interested in and/or have some background in so that you can demonstrate to us your expertise. I expect that there will be a wide variety of papers to be presented. Your article must meet with my approval before it gets distributed to your classmates. Therefore, make sure you leave yourself enough time to get a copy to me so that I can read it and approve it (1-2 weeks ideally).

Daily Write-ups: You will be responsible for writing a one-page (double-spaced) summary the scientific articles that are presented to you this semester. Overall, I want you to demonstrate to me that you can read and understand these articles. In addition, writing these summaries will help you to prepare for the discussion that will take place on that article. **The summaries of the articles are due on the day that we discuss that article. No late summaries will be accepted. The write-up will be collected at the end of class, but must be written and printed before class.** For all of your summaries, please use a Times New Roman, 12-point font, double spaced, with one inch margins.

Written Summaries: You will write a two 3-4 page summaries (double spaced). One from the scientific article that you present to the class solo, the other from the article you co-present with a peer student. This assignment will also help you prepare for your presentation by forcing you to fully analyze your paper prior to your oral presentation. I will correct/edit your paper and return it to you ungraded. It will be your responsibility to rewrite the paper according to my comments (and learn more about scientific writing from my comments). You will then resubmit the revised paper for a grade. For all of your summaries, please use a Times New Roman, 12-point font, double spaced, with one inch margins.

Resume: You will be expected to prepare a resume as a requirement for the course. Once you turn in a first draft, I will make corrections and suggestions. After that, you will update and improve your resume and turn it in again. This process will be repeated until I think your resume is more than adequate. You will eventually receive the full 50 points for this assignment as long as you turn in a good final product. Some of you might receive all of the points after one try; for others we will have to work through several drafts.

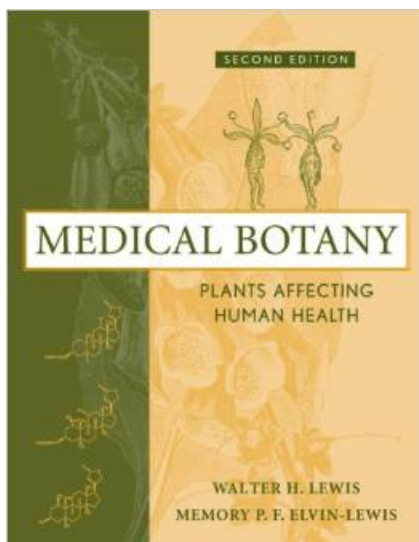
Assignment #1 – Write out the full reference citation for two articles in the format for two different journals (your choice). Turn in hard copy according to date on Class Schedule (next page).

Assignment #2 – Download the PowerPoint files, Presentation of Toucan Paper and Zimmer Presentation Prenatal Nicotine Paper. Go thru each presentation and then explain how the presentations differ in their approach to helping a presenter discuss their paper. Reflect upon and then describe to me the PowerPoint style you are considering using along with your 45 oral presentation and why.

BIOL 460 – Class Schedule (subject to change)

Week	Day		Lecture	Assignments
1	M	Aug 25	Introduction to Course –	Read- Vision and Change Summary
	W	Aug 27	Lecture – How to Find Ideal Journal Articles	http://dx.doi.org/10.1187%2Fcb.10-03-0044
2	M	Sept 1	No Classes	Read -Vision Change in Biology Final Report
	W	Sept 3	Learn to summarize – Vision and Change Case Study	http://visionandchange.org/files/2013/11/aaas-VISchange-web1113.pdf Assignment #1 due in class (print out)
3	M	Sept 8	Lecture – How to Write Scientifically	Read PowerPoints for Assignment 2
	W	Sept 10	How to write a Resume and CV Lecture	Assignment #2 due (print out)
4	M	Sept 15	Presentation by Dr. Herron	Resume Due (print out)
	W	Sept 17	Student 1	Daily write up due
5	M	Sept 22	Student 2	Daily write up due
	W	Sept 24	Student 3	Daily write up due
6	M	Sept 29	Student 4	Daily write up due
	W	Oct 1	Student 5	Daily write up due
7	M	Oct 6	Student 6	Daily write up due
	W	Oct 8	Student 7	Daily write up due
8	M	Oct 13	Student 8	Daily write up due
	W	Oct 15	Student 9	Daily write up due
9	M	Oct 20	Student 10	Daily write up due
	W	Oct 22	Student 11	Daily write up due
10	M	Oct 27	Student 12	Daily write up due
	W	Oct 29	Student 13	Daily write up due
11	M	Nov 3	Student 14	Daily write up due
	W	Nov 5	Student 15 or Group Prep	Daily write up due (if 15 students)
12	M	Nov 10	Group 1 & 2	

	W	Nov 12	Group 3 & 4	
13	M	Nov 17	Group 5 & 6	
	W	Nov 19	Group 7 & 8	
14	M	Nov 24	Make-up date for presentations	Resume Revisions
	W	Nov 26	No Class-Holiday	Due Monday 11/24
15	M	Dec 1	Last Day to turn in rewrites	
	W	Dec 3	No Class	Papers Returned Finals Week at my office



Medical Botany BIOLOGY 490 COURSE SYLLABUS

Instructor: Dr. Scott Herron
Office: 2017 ASC and SCI 233
Telephone: 231-591-2087
Email: herrons@ferris.edu



Dr. Herron enjoying a glass of wine while observing a [blue Aquilegia \(columbine\)](#) in his yard.

Office Hours:

Monday: 2:00-2:50pm ASC 2017
Tuesday: 1:30-2:00 pm SCI 233
Wednesday: 2:00-2:50; 4:15-4:45 pm ASC 2017
Thursday 1:30-2:00 pm SCI 233
All other meetings by appointment only

Class Schedule: **BIOL 490- Section 001** T & R 12:00-1:15 PM
CRN: 11835 Lecture Room: SCI 235

Course Description:

Medical Botany explores the intersection of medicine and botany, utilizing integrative and comparative approaches to critically analyze medical systems, understand how plants produce compounds of medical interest, how medicines work in the human body, and how diagnosticians view health and disease. Medical botany will help prepare students going into medical careers understand the benefits, dangers, and history of this fundamental basis for medicine by exploring past and present treatment options. 3.0 Credit hours. Typically offered Spring Semester. This is a Web-enhanced course. **Prerequisites: BIOL 122 (C-) & CHEM 214 (C-) or CHEM 322 (C-).**

Course Specific Outcomes:

Outcome #1 - Students understand the theoretical basis for modes of action, diagnosis, and treatment for each system (allopathic/pharmaceutical, naturopathic, homeopathic and traditional medicine).

Assessment for Outcome #1 - Written exams, classroom discussions, digital discussion board evaluation, individual paper and cumulative exam.

Outcome #2 - Students can use a medicinal plant guide, handbook of poisonous and injurious plants, or encyclopedia of natural medicine to understand how the classification, botanical, and chemical systems operate.

Assessment for Outcome #2 – Individual student paper on a medical plant case study from guides/handbook.

Outcome #3 – Students can distinguish between the strengths and limitations of each medical system (allopathic/pharmaceutical, naturopathic, homeopathic and traditional medicine).

Assessment for Outcome #3 – Written exams, ethical dilemma discussions, and presentation.

Outcome #4 - Students have explored the ethics and expectations of patients and providers in each medical system.

Assessment for Outcome #4 – Ethical dilemma discussions, individual paper, and cumulative exam.

Outcome #5 - Students can read original research and interpret the results correctly.

Assessment for Outcome #5 – Individual student paper on a medical plant case study from guides/handbook, and small group presentations on a stimulant, depressant or hallucinogenic plant.

Outcome #6 - Students understand how and why plants, fungi, minerals, and animals produce compounds that can be used to medically treat symptoms

Assessment for Outcome #6 – Written exams, classroom discussions, digital discussion board evaluation, and cumulative exam.

Textbooks:

Lecture book (Required)- *Medical Botany* by Walter H. Lewis and Memory P.F. Elvin-Lewis. Wiley, Second Edition, 2003. **ISBN-10:** 0471628824
FLITE: RS164.L475 2003

Resource Materials (Not required)- Materials not digital are in FLITE Reserve (can be checked out for 4 hours).

Encyclopedia of Natural Medicine. Michael Murray and Joseph Pizzorno. 1998. Second Edition. Prima Publishing. ISBN: 0-7615-1157-1. **FLITE: RZ433.M87 2012**

Plant Natural Products: Synthesis, Biological Functions and Practical Applications. H. O. Gutzeit and J. Ludwid-Muller. 2014. Wiley Blackwell. ISBN: 978-3-527-33230-4 **Electronic** <http://library.ferris.edu/cgi-bin/ebrary.cgi?10865382>

Handbook of Poisonous and Injurious Plants. L.S. Nelson, R.D. Shih, and M. J Balick. 2007. Second Edition. Springer. ISBN: 978-0-387-31268-2 **Electronic** <http://library.ferris.edu/cgi-bin/springer.cgi?978-0-387-33817-0>

Plants in our World. B. Simpson. 2013. 4th Edition. Mc-Graw-Hill. ISBN: 978-0073524245

Individual Papers:

Individual research papers will be assigned during the 4th week (Feb. 2-5), with first drafts due the 6th week (Feb. 19). These papers will be peer (student) reviewed by Feb. 24, and your final paper will be due March 3. The topic will be a **poisonous or injurious plant** of your choice. You will have to use the *Resource Materials* listed in textbook section of syllabus and other sources to produce a high quality paper (4-6 double spaced, TNR 12 font). The purpose of this assignment is to demonstrate through your writing that you understand the scientific classification, cultural, physical and chemical systems which underlie this poisonous/injurious plant. **50 points (peer review worth additional 10 points).**

Group Presentations:

You will work in a small group (4 students) to explore a **psychoactive plant, stimulant, depressant, or hallucinogen** as featured in the Textbook. The assignment will be introduced and groups assigned during 10th week (March 23-25). Groups are required to prepare and deliver **one oral digital presentation** on the topic agreed to by the instructor. This **presentation** will be worth **50 points** and will occur during the 15th week (April 27-30). Three groups will present for ~15-20 minutes each on Tuesday and 3 more on Thursday. Supplemental handouts

will be required for groups to hand out to classmates for studying and learning retention. Instructor feedback will be provided to the groups.

Exams: There will be three 50 point exams and one 100 point final. Exam questions may be a combination of multiple-choice, true/false, labeling and/or short essay questions. Exams will be taken from the lectures, textbook and class handouts, along with class activities. **The Comprehensive Final Exam will be given to evaluate course outcomes on Tuesday May 5th at 12:00-1:40 pm.**

Students are required and expected to take the exams and quizzes at scheduled times. Failure to take exams and quizzes at the scheduled time will result in a grade of zero.

Grade Calculation: Grades will be determined by comparing the students' total number of points to the number of points possible in the course. I expect that there will be **approximately** 450 points.

Letter grades will be assigned according to the following scale:

A = 94-100%	B = 83-86.9%	C = 73-76.9%	D = 63-66.9%
A- = 90-93.9%	B- = 80-82.9%	C- = 70-72.9%	D- = 60-62.9%
B+ = 87-89.9%	C+ = 77-79.9%	D+ = 67-69.9%	F = Below 60%

Cheating: Cheating on exams or quizzes will result in a grade of zero on the assignment. The case may also be reported to the Dean for further action.

Attendance Policy: Prompt attendance to all classes is required and expected. If you miss lecture, you are responsible for the lecture contents and any assignments given out during the lecture. If you have a valid reason for an absence, see Dr. Herron with your documentation as soon as you return. **Point deductions (4 per absence) will be in place for unexcused absences** due to the interactive nature of this course and your participation being essential to class success.

Study Suggestions: Come to class regularly and be on time. Show your classmates and me respect in the classroom. **Organize your notes clearly, remembering that you are responsible for your own learning. Read your class handouts, textbook and lecture readings** and fill in missing information. Ask questions regularly, during lecture, lab, or office hours. Study with classmates. Make sure to check Ferris Connect and your Ferris email weekly for new lecture material as well as grades and emails that I may send you.

TENTATIVE CLASS SCHEDULE

Week:	Topic	Assignment
1	History of Medical Botany; Botanical Nomenclature and Glossary of Botanical Terms	Read Botanical Terms and Botanical Nomenclature handouts
2	Medical systems comparison (allopathic, naturopathic, homeopathic and traditional medicine) including exploration of ethics and principles underlying each system (expectations of providers and patients)	Ethical dilemma discussions and postings.
3	Medical Botany and Drug Discovery	Tour of Pharmacy Greenhouse on Thursday Jan. 29
4	Poisonous and Injurious Plants	Exam 1 ; Introduction of research paper into a medical plant
5	Natural Products Chemistry: major classes of medically relevant compounds	Organic Chemistry Review
6	Illnesses, ailments, and theories of their causes across the globe	Paper first draft due
7	Pathways to treatment of ailments and illnesses in the human body	Peer review of paper
8	Diagnosticians and their medical settings (including tours of local facilities)	Paper due March 3
9	Spices, foods, and their medical impacts (hands on activity)	Exam 2
10	Remedial Plants: Cancer	Introduction of group projects
11	Remedial Plants: Musculoskeletal system	Pick plant/instructor approval
12	Remedial Plants: Cardiovascular system	Read Textbook
13	Remedial Plants: Endocrine system	Group sources turned in
14	Remedial Plants: Gastrointestinal tract	Exam 3 ; Group meetings Tuesday
15	Psychoactive plants: Stimulants and depressants; hallucinogens	Small group project presentations
16	Final Comprehensive Exam	Tuesday May 5 th 12:00-1:40 pm

**ANATOMY AND PHYSIOLOGY FOR OPTOMETRY
OPTM 538
COURSE SYLLABUS
SPRING SEMESTER 2015**

Instructor: Dr James Scott
Office: 2013 Arts and Science Commons
Telephone: FSU Office: 231-591-2620
Cell 231-250-7531
Clinic 231-796-3507

E-Mail: Scottj@ferris.edu
Office Hours: Tuesday and Thursday 8-8:50AM MCO331
Wednesday 9:00AM – 11:50AM ASC2013
All other office hours by appointment*
*It is my desire to be available to you at all times and therefore I have offered several ways for you to contact me if necessary. If you need to meet with me I will be happy to work something out with my schedule and yours.

Course Description:

This is the second of a two semester sequence that covers human structure and function and its clinical application. Topics in this course include organ systems including the gastrointestinal, cardiovascular, respiratory, lymphatic, renal and reproductive systems. Interaction and interdependency of various systems will also be explored, as well as clinical issues associated with systemic and ocular dysfunction.

Class Schedule:

Lecture:	MCO 212	All Sections	W	8:00AM - 8:50AM
			TR	9:00AM - 9:50AM
Laboratory	MCO 331	Sec 211	W	1:00PM – 3:50PM
		Sec 212	W	4:00PM – 6:50PM

Required Materials:

Lecture: Vander's Human Physiology, Widmaier, Raff and Strang, 12th edition, 2011, McGraw Hill, ISBN: 9780073378107

Laboratory: Laboratory Manual for Seeley's Anatomy and Physiology, Eric Wise, 9th edition, McGraw Hill, ISBN: 9780073250748

***Other upper level anatomy and physiology lecture books can be used in place of Vander's**
****It will be important for you to purchase the laboratory book as there will be assigned reading from this book in advance and during the laboratory period.**

Course Objectives:

It is my goal that by the end of the second semester in the sequence of Human Anatomy and Physiology (OPTM 537-538) the student would have a comprehensive understanding of the structures that make up the human body; their microscopic and gross anatomy, how each of them function and how each are interrelated and in particular their relationship to the eye and its adnexia. We will achieve these objectives by ensuring that lecture and laboratory subjects are interrelated and reinforce each other, and frequent evaluation by way of lecture quizzes, exams, laboratory quizzes and laboratory practical examinations.

Course Outcomes:

The students will be able to meet the following course outcomes by the end of this course:.

1. Students will be able to identify and name designated anatomical structures (both histological and gross) within the following organ systems: the gastrointestinal, cardiovascular, respiratory, lymphatic, renal and reproductive systems.
2. Students will be able to apply their knowledge of anatomy and physiology to think critically about the application of anatomical and physiologic concepts to case studies: identify the problem, analyze the specific situation and predict the outcome.
3. Students will be able to carry out experimental procedures, evaluate experimental data and interpret their data based on the anatomy and physiology that they have learned.

Ferris Connect:

During the semester you will be required to log on to **FerrisConnect** for many purposes such as to download and copy lecture outline materials, read notes from your instructor, retrieve exam and quiz scores, check current course grades and to take weekly quizzes. Please check the **FerrisConnect** OPTM 538 home page often so that you will not miss any of this important material. If you have any difficulty logging on and retrieving materials please let me know as soon as possible so that I or someone on our computer support staff can help you.

Grading Policies:

There will be 3 scheduled lecture exams each worth 100 points and a final exam which will include one portion, worth 100 points, covering new material since the previous exam and another portion, worth 100 points, that will be comprehensive covering material from the entire semester. I also anticipate giving periodic, unannounced, lecture quizzes covering material from the previous two lectures. Knowing that these quizzes can be given at any time will require you to keep current on your text reading and lecture note review.

Lab quizzes will be given weekly. Quizzes will be given on **FerrisConnect** following the lab session for labs that are more physiology based or at the beginning of the following lab session for those labs that are more related to anatomical studies. **You will be given the information about the time and place for lab quizzes during each lab session.** Each quiz will be worth approximately 20 points.

There will also be a comprehensive lab practical worth 100 points at the end of the semester (see schedule). **This comprehensive lab practical will cover all lab material (both identification and written) from week one up to the last lab period.** Lecture will account for approximately 550 points and laboratory will account for approximately 200 points of your final point total.

GRADING SCALE:

The total points achieved by the student in this course will be converted into a percent total and the final grade will be determined according to the following scale:

93 - 100 = A	73 - 76.9 = C
90 - 92.9 = A-	70 - 72.9 = C-
87 - 89.9 = B+	67 - 69.9 = D+
83 - 86.9 = B	63 - 66.9 = D
80 - 82.9 = B-	60 - 62.9 = D-
77 - 79.9 = C+	Below 60 = F

Attendance

According to MCO policy attendance is required in all classes. There will be no excused absences unless the student obtains an excuse from the Dean or Associate Dean of MCO.

If you miss class you are required to obtain all materials through myself, your classmates or FerrisConnect. If you must change a lab period you can obtain advanced permission to attend the other lab section as long as there is space available. **There will be no make-up labs or lab quizzes.**

Lecture exams and Lab quizzes:

Lecture exams will be based on material presented in **lecture and lab** and will consist of multiple choice, true and false, short answer, and essay.

Lab quizzes will consist of short answer, essay and calculations that cover materials from the previous lab period. **Please log onto FerrisConnect often to look for quiz schedules and updates!**

OPTM 538 Human Anatomy and Physiology

Lecture Schedule

Spring Semester 2015

Week v)	Day	Date	Lecture Topic	Reading (Vander)
1	T	Jan 13	Introduction – Digestive System	Chapter 15
	W	Jan 14	Digestive System Anatomy	Chapter 15
	R	Jan 15	Digestive System Anatomy	Chapter 15
2	T	Jan 20	No Lecture	
	W	Jan 21	Digestive System Physiology	Chapter 15 Tegrity
	R	Jan 22	Digestive System Physiology	Chapter 15 Tegrity
3	T	Jan 27	Digestive System Physiology	Chapter 16
	W	Jan 28	Nutrition and Metabolism	Chapter 16
	R	Jan 29	Nutrition and Metabolism	Chapter 16
4	T	Feb 3	Respiratory System Anatomy	Chapter 13
	W	Feb 4	Ventilation	Chapter 13
	R	Feb 5	Exam 1	
5	T	Feb 10	Lung Function/volumes	Chapter 13
	W	Feb 11	Physical Principles of Gas Exchange	Chapter 13
	R	Feb 12	Oxygen and CO ₂ Transport	Chapter 13
6	T	Feb 17	Control of Ventilation	Chapter 13
	W	Feb 18	Intro to the Cardiovascular System	Chapter 12
	R	Feb 19	Cardiac Anatomy	Chapter 12

Week	Day	Date	Lecture Topic	Reading (Vander)
7	T	Feb 24	Cardiac Physiology	Chapter 12
	W	Feb 25	Cardiac Physiology	Chapter 12
	R	Feb 26	Cardiac Physiology	Chapter 12
8	T	Mar 3	Regulation of the Heart	Chapter 12
	W	Mar 4	Heart and Homeostasis	Chapter 12
	R	Mar 5	Exam 2	
9 Spring Break – No Classes				
10	T	Mar 17	Blood Vessel Anatomy	Chapter 12
	W	Mar 18	Pulmonary / Systemic Circulation	Chapter 12
	R	Mar 19	Dynamics of Blood Circulation	Chapter 12
11	T	Mar 24	Control of Blood Flow / Pressure	Chapter 12
	W	Mar 25	Blood	Chapter 12
	R	Mar 26	Lymphatic System	Chapter 18
12	T	Mar 31	Lymphatic System	Chapter 18
	W	April 1	Lymphatic System	Chapter 18
	R	April 2	Easter Recess	
13	T	Apr 7	Exam 3	
	W	Apr 8	Renal Physiology	Chapter 14
	R	Apr 9	Renal Physiology	Chapter 14
14	T	Apr 14	Renal Physiology	Chapter 14
	W	Apr 15	Renal Physiology	Chapter 14
	R	Apr 16	Water, Electrolytes, Acid-Base	Chapter 14

Week	Day	Date	Lecture Topic	Reading (Vander)
14	T	Apr 21	Water, Electrolytes, Acid-Base	Chapter 14
	W	Apr 22	Male Reproductive Anatomy	Chapter 17
	R	Apr 23	Male Reproductive Physiology	Chapter 17
15	T	Apr 28	Female Reproductive Anatomy	Chapter 17
	W	Apr 29	Female Reproductive Physiology	Chapter 17
	R	Apr 30	Course Conclusion	

Final Examination Date and Time to be announced .

Laboratory Schedule

Week	Dates	Subject	Reading (Eric Wise lab Manual)
1	Jan14	Digestive System Anatomy	Lab 38
2	Jan 21	no lab this week	
3	Jan 28	Structures of the Respiratory System	Lab 35
4	Feb 4	Respiratory Function Breathing and Respiration	Lab 36
5	Feb 11	Structures of The Heart	Lab 27
6	Feb 18	Functions of the Heart, ECG, Blood Pressure	Lab 28
7	Feb 25	Blood	
8	Mar 4	Blood Vessels of the Body	Labs 30 and 31
9	Mar 11	Spring Break	
10	Mar 18	Renal Anatomy	Lab 40
11	Mar 25	Renal Physiology	Lab Handout
12	April 1	Reproductive Anatomy	Lab 42
13	April 8	Lab Practical Review	
14	April 17	Lab Practical Review	
15	April 22	Final Comprehensive Lab Practical	

***The content and schedule of this course may change at the discretion of the instructor. Changes may include lecture and laboratory content and examination/quiz dates. Announcements of these changes will be made during lecture and laboratory periods and on FerrisConnect to keep you informed.**

INBI 303 (Integrated Ecology)
Ecology: Interconnections between Disciplines
4 Credits, Fall Semester Only
Course Syllabus (Tentative)
Fall 2014

Instructor: Dr. Scott Herron
Office: 2017 Arts and Science Commons (ASC)
Telephone: 231-591-2087
Email: herrons@ferris.edu
Office Hours: Monday: 10:00-10:45 am, 1-1:50 pm
Wednesday: 10:00-10:45 am, 1-1:50 pm
All other office hours by appointment only.

Required Materials: **Fundamentals of Ecology** by Eugene P. Odum and Gary W. Barrett, Thompson/Brooks/Cole Publishers; **Ecology Readings** [Handouts provided in class]; **3-Ring binder, water bottle; INBI 303 Lab Handouts** for Dr. Scott Herron [provided in lab].

Class Schedule

Lecture: All sections	M, W, F	9:00 AM-9:50 AM
<u>Lecture Room: SCI 137</u>		
Lab: Section 211	R	12:00 PM-2:50 PM
Section 212	R	3:00 PM-5:50 PM
<u>Lab Room: SCI 235</u>		

Course Description: Explores living organisms found in Michigan and the Great Lakes region through an ecological framework reflecting the Michigan Curriculum Framework. Each concept uses a model organism to illustrate one of the elementary life science standards and how to use these organisms to teach science in the elementary school classroom. Primary concepts include human ecology, ecosystem function, classification and life cycles, evolution & adaptation to environments, human disease & nutrition, populations, naturalized species, and plant & animal pathogens. The labs will entail significant time out-of-doors on & off FSU's campus learning about organisms in their natural environment. INBI 303 is a web-enhanced course. ***Prerequisites: BIOL 103, PHSC 110, & PHSC 115 or instructor approval.***

Course Outcomes:

1. Students will scientifically identify the key organisms in their field settings and relate this to the life cycle, geography, climate, ecosystem, growth and niche requirements.
2. Students will demonstrate a working knowledge of the fundamental principles of ecology (human ecology, ecosystem function, classification and life cycles, evolution & adaptation to environments, human disease & nutrition, populations, naturalized species, management of natural resources, and plant & animal pathogens).
3. Students will inquire, quantify, analyze, and investigate the properties of key organisms & concepts in a controlled lab setting

that meets & teaches the guidelines of the Council of State Science Supervisors. <http://www.csss-science.org/safety>

4. Students will integrate the applied laboratory and field components of the course with the scientific knowledge from lecture to demonstrate their ability to synthesize information and demonstrate scientific proficiency in the form of written laboratory notebook communicating the science effectively, which is instructor evaluated.

Grading Policies:

There will be three (3) scheduled exams. Exam questions will be short answer, essay, true/false and multiple choice. Exams will be taken from the lectures, class handouts, textbook readings, and lab materials.

Students are required and expected to take the exams and quizzes at scheduled times. Failure to take exams at the scheduled time will result in a grade of zero. Exam answers that appear to be copied or shared between students will result in a failure of that exam.

In case of documented illness or extenuating circumstances, you must inform me **before the exam** and schedule a time to complete the exam before I return the graded exams. A written explanation or valid documentation (such as a letter from a physician, evidence of funeral, etc.) must be submitted at the time of the make-up exam.

Unannounced quizzes will be given in lecture during the semester as an indicator of progress and to verify attendance. Each quiz will cover materials from the current and previous lectures.

Unannounced quiz points are bonus points, and absolutely no unannounced quizzes can be taken after I have collected the quizzes in lecture.

Grades:

Grades will be determined by comparing your total number of points to the number of points possible in the course. There will be 300 points possible in lecture (Three 100 point exams) and **approximately** 150 points in laboratory, totaling 450 points.

Letter grades will be assigned according to the following scale:

A = 94-100%	B = 83-86.9%	C = 73-76.9%	D = 63-66.9%
A- = 90-93.9%	B- = 80-82.9%	C- = 70-72.9%	D- = 60-62.9%
B+ = 87-89.9%	C+ = 77-79.9%	D+ = 67-69.9%	F = Below 60%

Cheating:

Cheating will result in a grade of zero on the assignment. The case will be reported to the Dean for further action.

Attendance Policy:

Prompt attendance to all lectures is required and expected. If you miss lecture, you are responsible for the lecture contents and any assignments given out during the lecture. Attendance will be taken **only** at the beginning of the class periods. **Attendance in all lab**

sessions is required as there will be no make up lab period.
Failure to attend more than two lab periods unexcused is grounds for failure resulting in an F on your transcript (Biology Departmental policy).

Field Trips:

There will be one or more field trips that last much of Thursday, requiring your absence from other activities. University Excused Absence forms will be provided so you can make alternative arrangements with your other professors and supervisors during extended hour field trips required for INBI 303.

Study Suggestions:

Come to class every time and arrive early. Get enough sleep to be an active participant in class. Take notes on my lectures and diagrams on the board. Organize your notes clearly, remembering that my handouts and lectures are incomplete without your remaining current with readings. Ask questions regularly, before class, during lecture, lab, or office hours. Study with classmates, but DO NOT take the exams with classmates. Review your notes weekly to see where you need help. Access FerrisConnect regularly to download files, submit tests and assignments, email me or classmates, and to check your grades.

INBI 303 Integrated Ecology: Interconnections between Disciplines

Course Lecture Outline (Tentative):

Introduction to ecology (10 % of class time)

-What is ecology? How do you integrate material from multiple disciplines into a cohesive lesson? Why does chemistry, geology, & geography inform ecology? Michigan Academic State standards (http://www.michigan.gov/mde/0,4615,7-140-28753_64839_65510---,00.html) as a framework for teaching science; Lab Safety using the Council of State Science Supervisors guide for Elementary Students (<http://www.csss-science.org/safety.shtml>); National standards, including Next Generation Science Standards (<http://www.nextgenscience.org/Michigan>); Free Online Next Gen Standards (http://www.nap.edu/openbook.php?record_id=18290)

1. Human Ecology (20 % of class time)

-Human adaptation to environments, cultural acquisition of natural resources, demographics of Michigan's ecotypes and habitats, geographic positioning and navigational technologies, distribution of human populations in Michigan compared to land use and management, Human impact on increasing species extinction rates, and displacement of species habitat for human use (including urban sprawl, recreation, parks); Plant, animal and human responses to climate change

2. Ecosystem Function (20 % of class time)

-Competitive exclusion and localized extinction, resource partitioning, food chains and food webs, photosynthesis as a ecosystem service (O₂ producer & CO₂ reducer), decomposition & recycling of nutrients, microbial ecology, naturalized species, adaptation and evolution to changing environments, management of the aquatic resources (hydrosphere) in Michigan.

3. Plant and Animal Pathogens (15 % of class time)

-Life cycles of plant pathogens (i.e. bronze birch borer, emerald ash borer, gypsy moths, beech bark disease, oak wilt), field identification and classification of pathogens, mechanisms of invasion & infection, pathogen & host population dynamics, adaptation and evolution to pathogens, impact of pathogens on availability of material resources, management of pathogen affected resources

-Ecology of animal pathogens (i.e. bovine tuberculosis, chronic wasting disease, mad cow disease, white-nose bat disease), management of animal pathogens, economic and human implications.

4. Human Disease & Health Habits (15 % of class time)

-Digestion of food, structure of human gastrointestinal tract, chemistry of digestion & food absorption, role of plants and photosynthesis in production of primary food calories

-Nutritional deficiencies and diseases, immunization and disease prevention, selection of healthy foods, nutritional chemistry of common foods, effects of diet, exercise, and sleep on human health, role of ecosystem health and greenspace (managing landscape for human health) to reducing physiological GI system stress, ulcers, GERD, and improving human health.

5. Management of Michigan's Natural Resources (20 % of class time)

-Classification of living versus non-living natural resources, questioning sustainability of removing Michigan water (hydrosphere "mining") and sand by private for-profit companies, growth and development of selected Michigan plants, game animals, and invasive species, phenology of plant and fungal material resources, Hydrofracturing and frac-sand mining for fossil fuel exploitation

LAB INFORMATION: INBI 303 (Integrated Ecology)

Lab Grades: Each of 10 labs will be worth 5 participation points, for a total of 50 points. Student Fact Sheets (10 points), Lab quiz (10 points each); posters (10 points), lab worksheets (20 points) will be account for additional points. Lastly, 50 points from the Lab Notebook with supporting documents will make lab worth approximately 150 points. Approximately 35% of your total grade in this course will be derived from lab, so don't miss out or fail yourself by not participating or attending lab.

Laboratory attendance is mandatory! **More than two unexcused absences from lab will result in failure of the course.** It is expected that you read the Lab Handouts at the beginning of lab period. **Lab quizzes can NOT be made up the following week.** Arriving late, leaving early, or not participating will result in earning 0 out of the 5 participation points. **Lab Safety**
<http://www.csss-science.org/safety.shtml>

Week	Dates	Topic	Assignment
1	Aug. 28	Research Lab Safety, State & National Standards	Lab Safety Sign-in; Fact Sheet Due
2	Sept. 4	Human Ecology 1-Field Lab	Collect Plants and Data
3	Sept. 11	Human Ecology 2-Analyze data in laboratory; Prepare plant vouchers	Quiz 1: Lab Safety Lab Notebook
4	Sept. 18	No Lab-Assignment on Ferris Connect	Human Ecology Lab Report
5	Sept. 25	Ecosystem Function 1-Field Lab	Collect Data
6	Oct. 2	Ecosystem Function 2-Analyze data in laboratory	Ecosystem Function Poster Lab Notebook
7	Oct. 9	Ecosystem Function 3-Field Lab	Collect Data
8	Oct. 16	Animal Pathogens (Field Trip to Wildlife Disease Lab- Lansing)	No Quiz
9	Oct. 23	Plant Pathogens-Field Lab Bog Camp Newaygo	Lab Notebook
10	Oct. 30	Human Disease & Health Habits 1 -In laboratory experiment	Human Disease & Health Worksheet
11	Nov. 6	Field Lab -TBD Fire ecology	Collect Data
12	Nov. 13	Michigan's Natural Resources 1 Field Lab Big Rapids Wastewater Treatment Plant (TBD)	Make Observations and Notes
13	Nov. 20	Michigan's Natural Resources 2 -Field Lab DNR Deer Check Station	Lab Notebook
14	Nov. 27	No Labs-Holiday Recess	
15	Dec. 4	Final Exam Handed Out	Lab Notebooks Returned

SYLLABUS ATTACHMENT
COLLEGE OF ARTS AND SCIENCES – FERRIS STATE UNIVERSITY

FALL 2014

IMPORTANT DATES

Late registration	Wed. – Fri.	Aug. 20 – 22
First day of classes	Monday	Aug. 25
Last day for Drop/Add	Thursday	Aug. 28
Labor Day (no classes)	Monday	Sept. 1
Mid-term grades due	Monday	Oct. 20
Last day for “W” grades	Thursday	Oct. 30
Thanksgiving recess begins (no classes)	Wed (noon)	Nov. 26
Thanksgiving recess ends (classes resume)	Monday	Dec. 1
Last day of classes	Friday	Dec. 5
Examination Week	Mon – Fri	Dec. 8 - 12
Commencement	Saturday	Dec. 13
Final grades due by 1:00 pm	Monday	Dec. 15
Grades available to students on MyFSU	Tuesday (after 8AM)	Dec. 16

Sessions	Dates	Last Day to Withdraw	Sessions	Dates
Full Session	Aug. 25 – Dec. 5	Oct. 30	Full Session	Aug. 25 – Dec. 5

FLITE LIBRARY.....591-2669

Regular hours for FLITE:

Monday – Thursday 7:30 a.m. – MIDNIGHT

Friday 7:30 a.m. – 6:00 p.m.

Saturday NOON – 5:00 p.m.

Sunday 1:00 p.m. – MIDNIGHT

Extended Studies Court will begin late night hours

September 16, 2014

*Sunday-Thursday/MIDNIGHT to 7:30 a.m. *Friday/6 p.m. to MIDNIGHT

*Saturday/5 p.m. to MIDNIGHT)

CLASS ATTENDANCE IS IMPORTANT!

Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness, to encourage students to be present for the full class period. **Check your course syllabus or talk to your instructor about his/her policies.**

HOW TO CONTACT A FACULTY MEMBER

If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, or through the College of Arts and Sciences web page at <http://www.ferris.edu/htmls/colleges/artsands/>. A faculty directory notebook is also located in the dean’s office (ASC 3052).

DROPPING CLASSES OR WITHDRAWING

If you need to drop a class, you must do so **OFFICIALLY**, through your dean’s office, in order to avoid receiving an “F” grade in the course. If you need to totally withdraw from school, you must do so **OFFICIALLY** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. In case of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES

The intent and appropriate use of the “I” grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended alternative to withdraw from a class (W). The “I” is only considered for extenuating circumstances that have led to a student’s missing a portion of the course. Extenuating circumstances are generally defined as those situations over which the student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an “I” will be considered, and they may be required to sign an agreement regarding course completion. An “I” grade automatically changes to an “F” after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of college life. Don't hesitate to explore and use these services at Ferris.

Academic Support Center...ASC 1017 – 591-3543

The Writing Center.....ASC 1017 – 591-2534

The Writing Center, Tutorial Services and Academic Skills Center join together to offer FSU students an array of academic support services, e.g.

- tutoring for many Ferris courses
- individual help and workshops with writing skills and writing assignments for English or other courses
- help in developing better reading and study strategies
- workshops to help you meet the challenges of college life

Scholar Program.....ASC 1025 – 591-5976

SCHOLAR is an academic support program that aids in the student's successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

Disabilities Services.....STR 313 – 591-3057

FSU provides special services and assistance for students with physical handicaps or learning disabilities. In order to take advantage of these services, stop by or call for an appointment with Deborah Cox.

Personal Counseling, Sexual Assault, Substance Abuse

Birkham Health Center - 2nd Floor.....591-5968

Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment.

Safety

Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

College of Arts & Sciences Department Offices

Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Lang/Lit	ASC 3080	591-2520
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Dean's Office	ASC 3052	591-3660

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person's ideas or work as your own, taking someone else's exam for them, violating computer software licenses or program/data ownership, etc. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification.

Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR

The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated.

Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University.

Appendix E: TracDat Program Outcomes

Assessment: Program Assessment



Program - Biotechnology (B.S.)

Mission Statement: The biotechnology program will provide students a quality undergraduate education and a strong foundation in the principles of biology, chemistry, and the biomolecular sciences. A program graduate will have acquired advanced technical laboratory skills and an ability to communicate these skills effectively both orally and in writing. These skills will position the graduate for success in graduate and professional schools or in careers in the biotechnology industry.

Advisory Board/Committee Meetings: Less than once every two years

Next FSU Academic Program Review: 2010-2011

College: CAS

Outcome: Understanding and application of molecular biology and genetics

Students will be able to recognize, recall, and apply knowledge of the basic processes associated with the transfer and expression of genetic material.

Outcome Status: Active

Planned Year(s) of Assessment: Learning

Start Date: 01/01/2009

Assessment Methods

Test - External - Post or Pre/Post - Biotechnology students will take the Biology Field test. Their Molecular Biology and Genetics sub-scores will be compared to the national average. (Active)

Criterion for Success: Our students should perform significantly above the national average for this subscore. Their overall scores should be at or above the national average

Assessment Schedule: Annual

Related Courses

BIOL 121 - General Biology 1 - (I - Introduced)

BIOL 122 - General Biology 2 - (I - Introduced)

BIOL 321 - Human Physiology-Anatomy 1 - (R - Reinforced)

BIOL 322 - Human Physiology-Anatomy 2 - (R - Reinforced)

BIOL 375 - Principles of Genetics - (R - Reinforced)

BIOL 386 - Microbiology and Immunology - (R - Reinforced)

BIOL 470 - Molecular Genetics - (A - Program Assessment, M - Mastery)

BIOL 471 - Recombinant DNA Laboratory - (A - Program Assessment, M - Mastery)

Program - Biotechnology (B.S.)

BIOL 474 - Advanced Cell - Molecular Biol - (R - Reinforced)

BIOL 475 - Bioinformatics - (A - Program Assessment, M - Mastery)

Outcome: Understanding and application of biochemistry and cell energetics

Students will be able to recognize, recall, and apply knowledge of chemical processes associated with bioenergetics and metabolism.

Outcome Status: Active

Start Date: 01/01/2009

Assessment Methods

Test - External - Post or Pre/Post - Biotechnology students will take the Biology Field test. Their Biochemistry and Cell Energetics sub-scores will be compared to the national average. (Active)

Criterion for Success: The student scores will be significantly better than the national average for this sub-score and at least equal to the national average for the overall score.

Related Courses

BIOL 121 - General Biology 1 - (I - Introduced)

BIOL 122 - General Biology 2 - (I - Introduced)

BIOL 472 - Proteins - (R - Reinforced)

BIOL 473 - Proteins Laboratory - (R - Reinforced)

CHEM 121 - General Chemistry 1 - (I - Introduced)

CHEM 122 - General Chemistry 2 - (I - Introduced)

CHEM 332 - Biochemistry Lab 1 - (A - Program Assessment, M - Mastery)

CHEM 333 - Biochemistry Lab 2 - (A - Program Assessment, M - Mastery)

CHEM 364 - Biochemistry - (A - Program Assessment, M - Mastery)

CHEM 474 - Advanced Biochemistry - (A - Program Assessment, M - Mastery)

Outcome: Understanding and application of cellular structure, organization, and function

Students will be able to recognize, recall, and apply knowledge of the composition, formation, and maintenance of cellular structure and function.

Outcome Status: Active

Planned Year(s) of Assessment: Learning

Start Date: 01/01/2009

Program - Biotechnology (B.S.)

Assessment Methods

Test - External - Post or Pre/Post - Biotechnology students will take the Biology Field Exam. Their Cell Biology sub-scores will be compared to the national average using an unpaired t-test. (Active)

Criterion for Success: The student scores will be significantly better than the national average for this sub-score and at least equal to the national average for the overall score.

Assessment Schedule: Annual

Related Courses

BIOL 121 - General Biology 1 - (I - Introduced)

BIOL 122 - General Biology 2 - (I - Introduced)

BIOL 205 - Human Anatomy-Physiology - (R - Reinforced)

BIOL 321 - Human Physiology-Anatomy 1 - (R - Reinforced)

BIOL 322 - Human Physiology-Anatomy 2 - (R - Reinforced)

BIOL 375 - Principles of Genetics - (R - Reinforced)

BIOL 386 - Microbiology and Immunology - (M - Mastery)

BIOL 470 - Molecular Genetics - (R - Reinforced)

BIOL 472 - Proteins - (R - Reinforced)

BIOL 474 - Advanced Cell - Molecular Biol - (A - Program Assessment, M - Mastery)

CHEM 364 - Biochemistry - (R - Reinforced)

CHEM 474 - Advanced Biochemistry - (A - Program Assessment, M - Mastery)

Outcome: Proficiency in a laboratory setting

Students will be proficient in the performance, careful observation, data collection, and analysis of data from advanced laboratory procedures in the areas of chemistry, biochemistry, molecular genetics, cell biology, microbiology, and immunology.

Outcome Status: Active

Planned Year(s) of Assessment: Learning

Start Date: 01/01/2009

Assessment Methods

Test - Internally Developed - Pre/Post or Post - A pre-test will be administered at the beginning and a post-test at the end of the semester to evaluate the ability of students to observe and analyze data from experimental procedures. (Active)

Criterion for Success: An increase in the class average score from the pre-test to post-test.

Related Courses

BIOL 386 - Microbiology and Immunology - (M - Mastery)

Program - Biotechnology (B.S.)

BIOL 388 - Advanced Immunology Lab - (A - Program Assessment, M - Mastery)

BIOL 471 - Recombinant DNA Laboratory - (A - Program Assessment, M - Mastery)

BIOL 472 - Proteins - (A - Program Assessment, R - Reinforced)

BIOL 473 - Proteins Laboratory - (A - Program Assessment, M - Mastery)

BIOL 475 - Bioinformatics - (A - Program Assessment, M - Mastery)

CHEM 231 - Quantitative Analysis - (M - Mastery)

CHEM 321 - Organic Chemistry 1 - (I - Introduced)

CHEM 322 - Organic Chemistry 2 - (I - Introduced)

CHEM 332 - Biochemistry Lab 1 - (A - Program Assessment, M - Mastery)

CHEM 333 - Biochemistry Lab 2 - (A - Program Assessment, M - Mastery)

Outcome: Analysis of scientific literature

Students will have the ability to analyze, evaluate, and present information from peer-reviewed scientific publications in written and verbal form.

Outcome Status: Active

Planned Year(s) of Assessment: Learning

Start Date: 01/01/2009

Related Courses

BIOL 471 - Recombinant DNA Laboratory - (M - Mastery)

BIOL 473 - Proteins Laboratory - (A - Program Assessment, M - Mastery)

CHEM 474 - Advanced Biochemistry - (A - Program Assessment, M - Mastery)

Outcome: Application of knowledge in internships and independent study projects

Students will have the ability to apply learned biotechnology skills and laboratory techniques in extramural internships and independent study projects.

Outcome Status: Active

Planned Year(s) of Assessment: Learning

Start Date: 01/01/2009

Assessment Methods

Internship Evaluation - Evaluations from internship supervisors will be used to evaluate student internship performance. (Active)

Criterion for Success: Positive evaluation from internship supervisor with recommendation of grade "A" for Biology 491

Assessment Schedule: Per semester

Visual Displays (e.g. webpage, film, Concept maps, graphics, etc.) - Evaluation of scientific poster created by each student intern

Program - Biotechnology (B.S.)

at the conclusion of their internship project. (Active)

Criterion for Success: Poster must follow guidelines set forward in syllabus for creation of a common scientific poster in a biotechnology-related field. Poster must be free of typographical and grammatical errors and state objective/hypothesis, outline the procedure(s) performed and explain relevance of all results in a discussion. Posters that successfully meet these criteria will receive an "A" for the internship course (Biology 491).

Assessment Schedule: Every semester

Related Courses

BIOL 473 - Proteins Laboratory - (A - Program Assessment, M - Mastery)

BIOL 491 - Biotechnology Internship - (A - Program Assessment, M - Mastery)

BIOL 497 - Special Studies in BIOL - (A - Program Assessment, M - Mastery)

CHEM 497 - Special Studies in CHEM - (A - Program Assessment, M - Mastery)

Appendix F: Curricula Vitae for Biotechnology Faculty

Hartley, Frank A.
Ferris State University, Department of Biological Sciences
Laboratory Technologist

1. Academic Degrees

B.S. 1977 Ferris State University, Applied Biology

2. Professional Experience

1979-Present Ferris State University – Department of Biological Sciences, Laboratory Technologist

1978-79 Ferris State University – College of Optometry, Clinical Laboratory Supply Manager

1977-78 Ferris State University, Biology Stockroom Clerk

3. Teaching Experience

2010 BIOL 476 – Instructor, Advanced Techniques in Biotechnology

2009-10 MOISD Math Science Technology Center – Semester Workshops in Microbiology

2008-09 BIOL 490 – Instructor, Advanced Techniques in Biotechnology (Prototype Course)

2003-08 Biotechnology Summer Camp Microbiology Instructor

1993-99, BIOL 388 – Laboratory Instructor, Advanced Techniques in Immunology

2005-07

1977-2005 FSU Biology Department Laboratory Instructor: BIOL 109 – Anatomy, BIOL 205 – Anatomy and Physiology, BIOL 108 – Medical Microbiology, BIOL 218 – Microbial Ecology, BIOL 286 – General Microbiology, BIOL 386 – Microbiology and Immunology, BIOL 121 – General Biology

1976-77 Ferris State University, Anatomy/Physiology Laboratory Assistant

4. Military Service

1970-73 United States Navy – USS Kitty Hawk, Machinist's Mate

5. FSU Committees

Current Institutional Animal Care and Use Committee

Current Chemical Safety Committee

2000-2006 Applied Biology Internal Advisory Committee

6. Selected Publications

Hartley, F., Hoeksema, W., and Ryan, M. 2001. "Fundamental Microbiology for the Health Care Sciences." Fourth Edition. Kendall- Hunt Publishing Co. 227 pages.

7. Awards and Achievements

- 2007 Completed the Ferris Employee Leadership Development Program
- 2001 Received STAGE-M (Big Rapids Community Theater Organization) 'Gordy' for "Outstanding Contributions to the growth and enjoyment of theater arts in mid-Michigan"
- 1999 Ferris State University Distinguished Staff Award

8. Community Activities

- 2008-Present Spiritual Life Commission of the Big Rapids United Church of Christ
- 1987-Present Various capacities (actor, director, scenic/lighting designer) in STAGE-M and FSU Theater productions
- 1993-95 Advisor/director Big Rapids High School Drama Club
- 1991-92 Elected Trustee of the Big Rapids Public School's Board of Education

Bradley Jacob Isler

Office

ASC 2113
820 Campus Drive
Big Rapids, MI
(231) 591-2641

Home

12833 220th Avenue
Big Rapids, MI 49307
(231) 796-3504
E-mail: islerb@ferris.edu

Professional Experience

Professor (2013 - present), Associate Professor (2009 - 2013), Assistant Professor (2005 - 2009) of Biology; Biotechnology Program (2005 - present) and Biology Programs (2011 - present) Advising Coordinator, Ferris State University, Big Rapids, Michigan

- Responsible for the instruction of a variety of biology and biotechnology courses
- As coordinator of the biotechnology program, responsible for recruiting, advising, and supervision of curricular activities
- As advising coordinator for biology programs, responsible for assisting general biology advisor with advising and recruitment, supervision of graduation audit and application process
- Current research projects
 - Developing a simple DNA sequencing protocol for high school and undergraduate use
 - A study of the genetic differences between normally sighted and anophthalmic rats

Research Geneticist, U.S. Meat Animal Research Center, Clay Center, Nebraska, 2003 - 2005

- Postdoctoral position
- Area of focus: Quantitative and molecular genetics of sheep
- Primary research project: Investigation of genomic regions associated with carcass and meat quality traits in sheep
- The U.S. Meat Animal Research Center is a unit of the United States Department of Agriculture and the Agricultural Research Service

Education

The Ohio State University, Columbus, Ohio, 1997 - 2003

- Ph.D. in Animal Science/Animal Genetics, March 2003
- M.S. in Animal Science/Animal Genetics, December 1998
- Area of focus: Quantitative and molecular genetics of swine
- Cumulative GPA: 3.70 / 4.00
- Advisor: Dr. Keith Irvin
- Ph.D. dissertation title: An investigation of the associations between several candidate genes and reproductive traits in swine
- M.S. thesis title: Association between the estrogen receptor gene and reproductive components in swine

Iowa State University, Ames, Iowa, 1996 - 1997

- Attended graduate school
- Major: Molecular, Cellular, and Developmental Biology
- Cumulative GPA: 4.00 / 4.00
- Advisor: Dr. Donald Beitz

Ohio Northern University, Ada, Ohio, 1992 - 1996

- B.S. in Biochemistry, with High Distinction
- Biochemistry degree certified by the American Chemical Society
- Cumulative GPA: 3.80 / 4.00

Teaching Experience

***Professor (2013 - present), Associate Professor (2009 - 2013), Assistant Professor (2005 - 2009) of Biology
Ferris State University, Big Rapids, Michigan***

- Biology 101 (Genetics: Human Aspects)
 - Course designed for non-science majors
 - Taught fall semesters 2005-09, 2011-13
- Biology 122 (General Biology 2)
 - Second course in the two semester general biology series
 - Taught spring semesters 2005, 2007, 2009, 2011; summer semesters 2006-09, fall semesters 2010, 2014-present
- Biology 174 (Introduction to Biotechnology)
 - Course designed to introduce students to the biotechnology program at Ferris State and the biotechnology industry as a whole
 - Newly developed fall 2006
 - Taught fall semester 2006 and 2007
- Biology 375 (Principles of Genetics)
 - Junior-level general genetics course for biology and biotechnology students. Serves a prerequisite for many other courses
 - Taught each fall and spring semester from spring semester 2008-present
- Biology 310/390 (Principles of Nutrition)
 - Upper-level, online nutrition course designed for biology students
 - Taught summer semesters 2010-present
- Biology 470 (Molecular Genetics)
 - Four hour lecture course taught at a graduate level for, primarily, upper-level biotechnology students
 - Taught spring semester 2014
- Biology 475/490 (Bioinformatics)
 - Course designed to explore the newly emerging field of bioinformatics, which combines molecular biology and information technology
 - Taught in the spring semester of even-numbered years from 2006-2012 and then every spring semester 2013-present

- Biology 491 (Biotechnology Internship)
 - Internship course for biotechnology students
 - Redesigned in summer 2009
 - Taught as needed

Research Experience

Professor (2013 - present), Associate Professor (2009 - 2013), Assistant Professor (2005 - 2009) of Biology Ferris State University, Big Rapids, Michigan

- Projects
 - Investigating the genetic differences between normally sighted and anophthalmic rats
 - Development of simple DNA sequencing protocols for use in personalized medicine unit for high school and undergraduate students
- Thirteen biotechnology students and two high school students have assisted with these projects since 2005

Research Geneticist, U.S. Meat Animal Research Center, 2003 - 2005

- Investigated the relationship between regions of the sheep genome and economically important traits
- Performed a genome scan for quantitative trait loci that are associated with production and carcass traits in sheep
- Investigated the PRNP locus in sheep, which codes for the prion protein and is related to scrapie, one of the transmissible spongiform encephalopathies

Research Assistant, Department of Animal Sciences, The Ohio State University, 1997 - 2003

- Studied the effect of candidate genes on reproductive tract components in several breeds of swine
 - Study involved the discovery and analysis of novel polymorphisms in a variety of candidate genes: estrogen receptor- α , estrogen receptor- β , paternally expressed 1, paternally expressed 3, H19, prolactin receptor, and retinol binding protein-4
- Studied the genetic and meat quality issues surrounding the Rendement Napole condition in swine

Research Assistant, Molecular, Cellular, and Developmental Biology Program, Iowa State University, 1996 - 1997

- Participated in the molecular, cellular, and developmental biology rotation program
- Studied a variety of topics in molecular and cellular biology, including the role of G-proteins in tumor formation, the porcine PIT-1 gene, and methods to increase the concentration of conjugated linoleic acid in the rumen of dairy animals

University and Community Service

- Biotechnology program coordinator, 2005-present
 - Responsible for coordination of the Bachelor of Science in Biotechnology program, which is focused on the training of students for either a career in biomolecular science R&D or entrance into biomolecular graduate programs
 - Primary individual responsible for direction and evolution of the biotechnology program curriculum
 - Work extensively with external stakeholders and alumni to update the biotechnology program curriculum and maintain the employability of graduates
 - Work with external stakeholders to create internship opportunities for students
 - Primary academic advisor for students in biotechnology program
 - Work closely with professional academic advisors and Honors program for student recruitment
- Biology programs advising coordinator, 2011-present
 - Work closely with department head/chair and professional academic advisors to maintain easy transition of biology students from professional advisors to faculty advisors
 - Solely responsible for reviewing and submitting graduation applications for students in all biology programs
 - Academic advisor for all students in biology minor and cell and molecular biology minor
 - Responsible for the creation and submission of all curriculum proposals related to biology programs
- Summer registration advisor, 2006-present
 - Assist incoming freshmen and transfer students with registration of classes for their first semester at Ferris State
- Advisor for Delta Nu Alpha (biotechnology student organization), 2006-present
 - Nominated for “Outstanding RSO Campus Advisor of the Year” award in 2011 and 2012
- Biotechnology Summer Academy for high school students
 - Camp director, 2007-present; Camp assistant, 2006are
 - Five day residential summer camp for high school students interested in a career in the molecular biosciences
 - Campers participate in hands-on laboratory activities related to DNA barcoding, genomics-based medicine, microbiology, forensic biology and DNA analysis, DNA sequencing, and anatomy and physiology
- Invited presentations
 - Van Andel Institute Graduate Student Career Day, spring 2012
 - GRAPCEP Biomedical Careers Day, 2010-2013
 - 2007 FSU-Grand Rapids Career Pathways Teachers Academy, summer 2007
 - Honors program “Lunch and Learn” series, fall 2007
 - CARE 102 Career and Education Planning course, fall 2007
- Search committee membership
 - Core facility director, 2015
 - Tenure-track geneticist, 2012-13 and 2013-14
 - Associate dean for extended and international operations unit, 2011-12
 - Tenure-track microbiology/molecular biologist, 2010-11

- One year adjunct faculty protein biochemist, summer 2009
- Tenure-track anatomist and physiologist, 2008-09
- General biology advisor, summer 2008
- Tenure-track developmental biologist, 2007-08 and 2008-09
- One year developmental biologist, summer 2007
- Biology department head, September-November 2006
- General committee membership
 - Extended and international operations/academic incubator advisory board, 2012-present
 - Office of academic research advisory board, 2011-2013
 - University institutional animal care and use (IACUC), 2006-present
 - University sabbatical leave committee, fall 2011-present
 - Academic program review committee, 2010-2012
 - Chair, academic program review panel for the biotechnology program, 2009-10
 - College of Arts and Sciences standards and policies, 2006-2009
 - College of Arts and Sciences advising excellence, 2007-present
 - College of Arts and Sciences sabbatical leave committee, fall 2009-present
 - Chair, 2010-present
 - Biology department planning committee, 2007-2011
 - Biology department curriculum committee, 2011-present
 - Biology department awards committee, 2008-present
- Ferris State faculty representative for the Udall Scholarship
- Recruitment activities.
 - Honors symposium, February 2006
 - Phone recruitment drive, 2009-2012
 - Dawg Days, 2011-present
- Judge for the local competition of the International Engineering and Science Fair, 2008-2012

Honors and Awards

- Honors Program Outstanding Faculty award, 2013
 - Awarded every semester to an outstanding professor in the areas of teaching and advising by the Ferris State University Honors Program
- Nominated for “Outstanding RSO Campus Advisor of the Year” award, 2011 and 2012
- L.E. Kunkle Award, 2003
 - Awarded annually to the outstanding animal sciences graduate student at the Ohio State University
- Charles E. Thorne Memorial Scholarship, 2001
 - Awarded to a single outstanding graduate student selected from all agricultural science graduate students at The Ohio State University
- National Swine Improvement Federation Outstanding Graduate Student Award, 1999
 - Awarded annually to the outstanding swine genetics graduate student in the United States

Grants

- Ferris Foundation Merit Grant, 2013-14
 - Enrichment of an academic camp, STEM education, and undergraduate recruitment using advanced personalized medicine laboratory exercises.
 - Used to support the annual summer biotechnology academy
 - \$7500
- Student research assistantship, 2012-13 and 2013-14
 - A study of the association between variation in several candidate genes and anophthalmia in SDF/Fsp-*anop* rats
 - Students: Abigail Dutkiewicz and Chase Judy
 - \$600 each academic year
- Faculty research grant, 2012-13
 - A study of the association between variation in several candidate genes and anophthalmia in SDF/Fsp-*anop* rats
 - \$3850
- Summer research fellowship, summer 2011
 - Wild Rice: Understanding Conservation Biology using Molecular Biology
 - Student: Ewa Slotwinski.
 - Co-mentor with Scott Herron
 - \$600
- College of Arts and Sciences Dean's grant, 2007-2014
 - A study of the genetic differences between normally sighted and SDF/Fsp-*anop* anophthalmic rats.
 - \$4287
- Ohio Pork Producers Council, 2001-2002
 - Examination of the Relationship between Several Candidate Genes and Reproductive Traits in Swine
 - \$4500

Reviewerships

- *Morningside Evaluations, 2015*
- *Journal of Animal Science* Editorial Board, 2009- 2012
- *Human Heredity*, Cummings, Eighth Edition
- *Essential Genetics: A Genomics Perspective*, Hartl, Fifth Edition
- *Human Genetics*, Lewis, Ninth, Tenth, and Eleventh Edition
- *Theriogenology*

Professional Memberships

- American Society of Animal Science, 1997-present
- American Society for the Advancement of Science, 2010-2011
- MichBio, 2009-present

Publications and Presentations

- Judy, C.A., J.M. Letherer, C.R. Salazar, A.M. McGee, A.R. Solitro, and B.J. Isler. A study of the association between anophthalmic conditions and variation in several candidate genes in rats. Poster Presented at the West Michigan Regional Undergraduate Research Conference. November 16, 2013.
- A. R. Dutkiewicz and B.J. Isler. Developing a Simple DNA Sequencing Protocol for High School and Undergraduate Use. Poster Presented at the West Michigan Regional Undergraduate Research Conference. October 27, 2012.
- Isler, B.J., B.A. Freking, R.M. Thallman, M.P. Heaton and K.A. Leymaster. 2006. Evaluation of associations between prion haplotypes and growth, carcass, and meat quality traits in a Dorset x Romanov population. *Journal of Animal Science*. 82: 783-788.
- Isler, B.J., B.A. Freking, K.A. Leymaster, and M.A. Heaton. 2004. Investigation of the association between prion genotype and economically important traits in sheep. *Journal of Animal Science*. 83(Suppl. 2): 44 (Abstract).
- Isler, B.J., B.A. Freking, and K.A. Leymaster. 2004. 2003-2004 U.S. Meat Animal Research Center annual report to NC-109. Paper presented at the 2004 NC-109 annual sheep research meeting in Duluth, Minnesota.
- Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, and M.E. Davis. 2002. Examination of the relationship between the estrogen receptor gene and reproductive traits in swine. *Journal of Animal Science*. 80:2334-2339.
- Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, and M.E. Davis. 2002. Examination of the relationship between the paternally expressed gene 3 and reproductive tract components in swine. *Proceedings of the 7th World Congress of Genetics Applied to Livestock Production*. CD-Rom Communication. N° 08-28.
- Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, and M.E. Davis. 2002. Investigation of the relationship between the estrogen receptor beta gene and reproductive components in swine. *Journal of Animal Science*. 80(Suppl. 1): 378 (Abstract).
- Isler, B.J., K. M. Irvin, M.F. Rothschild, and G.J. Evans. 2001. Examination of the relationship between the prolactin receptor gene and reproductive components in swine. *Research and Reviews: Swine 2001*, OARDC special circular 185. 83-86.
- Isler, B.J., K. M. Irvin, M.F. Rothschild, and G.J. Evans. 2000. Association between the prolactin receptor gene and reproductive components in swine. Poster presented at the 2000 Annual Conference of the National Swine Improvement Federation.
- Isler, B.J., K. M. Irvin, M.F. Rothschild, and G.J. Evans. 2000. Association between the prolactin receptor gene and reproductive components in swine. *Proceedings of the 27th Conference of the International Society of Animal Genetics*. CD-Rom Communication. N° C032. (Abstract).

- Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, M.E. Davis, and D.L. Meeker. 1999. Examination of the relationship between the estrogen receptor gene and reproductive traits in swine. Presentation at the 1999 Annual Conference of the National Swine Improvement Federation.
- Isler, B.J., K. M. Irvin, S. M. Neal, S.J. Moeller, M.E. Davis, and D.L. Meeker. 1999. The effect of estrogen receptor genotype, breed, and parity on litter traits and reproductive tract traits in swine. *Journal of Animal Science*. 77(Suppl. 1): 131 (Abstract).
- Isler, B.J., K. M. Irvin, S. M. Neal, S.J. Moeller, and M.E. Davis. 1999. Association between the estrogen receptor gene and reproductive components in swine. *Journal of Animal Science*. 77(Suppl. 1): 32 (Abstract).
- Isler, B.J., K. M. Irvin, S. M. Neal, S.J. Moeller, M.E. Davis, and D.L. Meeker. 1999. The effect of the estrogen receptor gene on litter traits in swine. *Research and Reviews: Poultry and Swine, OARDC special circular 171*. 50-53.
- Isler, B.J., K. M. Irvin, and S. M. Neal. 1999. Examination of the relationship between the estrogen receptor gene and reproductive tract components in swine. *Research and Reviews: Poultry and Swine, OARDC special circular 171*. 54-59.
- Isler, B.J., K. M. Irvin, and S. M. Neal. 1998. Investigation of the estrogen receptor gene and its association with reproductive tract traits in swine. *Research and Reviews: Poultry and Swine, OARDC special circular 164*. 49-51.
- Isler, B.J., K. M. Irvin, and S. M. Neal. 1998. Investigation of the estrogen receptor gene and its association with reproductive tract traits in swine. *Ohio Swine Day 98 Proceedings: Issues For a Healthy Pork Industry*.
- Irvin, K.M., S. M. Neal, S. J. Moeller, D. L. Meeker, B. J. Isler, R. Emnett, S. Kacirek, and M. Barhorst. 1997-98 Ohio annual report to NC-220. Paper presented at the 1998 NC-220 Annual Meeting in Auburn, Alabama.

CURRICULUM VITA

Kim K. Colvert
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Big Rapids, Michigan 49307
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CURRENT TEACHING RESPONSIBILITIES

Survey, introductory and advanced courses in biochemistry and biochemistry labs, proteins laboratory.

Courses Taught at Ferris:

Quantitative Analysis (CHM 231)	Inorganic Chemistry (CHM 114)
Introductory Biochemistry (CHM 324)	Introductory Chemistry (CHM 100)
Biochemistry (CHM 364)	Proteins Laboratory (BIOL 473)
Instrumental Analysis (CHM 231)	Advanced Topics in Biochemistry (CHEM 474)
Chemical Calculations (ICT 221)	Chemistry and Food (CHEM 104)
Biochemistry Lab I (CHM 332)	Intro to Physical Chemistry (CHEM 451)
Biochemistry Lab II (CHM 333)	
Organic/Biochemistry (CHM 124)	

CURRENT RESEARCH INTERESTS

Binding site interactions and mechanisms of ATP synthases; ATP synthesis assay development, neurotransmitter detection by enzyme-coated microprobes.

POST DOCTORAL RESEARCH

In vitro metabolism and macromolecular binding of suspected carcinogens using HPLC, radioisotope, and protein and DNA isolation techniques. Suicide inactivation of cytochromes P450, affinity chromatography.

GRADUATE RESEARCH

Interaction between proteins in the electron transport chain of photosynthesis using protein purification and analysis techniques, enzyme assays, covalent crosslinking and absorbance spectroscopy.

EDUCATION

PhD August, 1984, University of Arkansas, Fayetteville, Arkansas 72701.
Major: Biochemistry. Dissertation Title: "Interaction of Ferredoxin with Ferredoxin:NADP Reductase in Chloroplast Membranes." Advisor: Dr. Danny J. Davis

B.A. June, 1977, Hendrix College, Conway, Arkansas 72032.
Major: Chemistry.

PROFESSIONAL EXPERIENCE

September, 1988 to present

Asst./Assoc./Full Professor of Chemistry, Physical Sciences Department
Ferris State University. Big Rapids, MI

August, 1986 to August, 1988

Assistant Professor of Chemistry
Chemistry Department
Southwest Missouri State University , Springfield, MO

August, 1984 to August, 1986

Postdoctoral position with Peter P. Fu,
Division of Biochemical Toxicology, National Center for Toxicological
Research, Jefferson, AR. (Exchange Program with Veteran's
Administration, Little Rock, AR)

ACTIVITIES AND AWARDS

Academic Scholar Award, Academic Affairs, 2012
Sabbatical Leave, University of Kansas-Lawrence, August 2009-August 2010
Sabbatical Leave, University of Kansas-Lawrence, August 2001-August 2002
(American Heart Association Grant)
Sabbatical Leave, University of Kansas-Lawrence, August 1994-June 1995
Ferris Faculty Research Grant, June 1993-May 1994
NSF Research Opportunity Award, University of Kansas-Lawrence. June-
August 1990 and June-August 1991
Chair, Western Michigan Section, American Chemical Society. 1991
Faculty Research Grant, Southwest Missouri State University. June 1987-June
1988.

COMMITTEES (current)

Departmental: Tenure Review, Candidate Tenure Committees, Equipment,
Scholarship, Search, Departmental Faculty Development

University: Biotechnology Advisory

Additional Service:

B.A. Biochemistry Program Coordinator
RSO advisor for Biotechnology Student organization
Independent Study Mentor (16 students since 2011)
Math /Science Student Project mentor (2 since 2005)
Science Fair
Dawg Days Volunteer
Alumni Outreach, Homecoming 2014

PUBLICATIONS

Stephanie C. Bishop, Shyam Mehta, Kim K. Colvert, Daxin Zheng, Mark L. Richter, Cindy L. Berrie and Fei Gao. "Insertion of a Rigid Structural Element into the Regulatory Domain of the Chloroplast F1-ATPase Gamma Subunit for Rotational Studies." *(to be published in the proceedings of 15th International Congress on Photosynthesis which was held on 22-27 August 2010, in Beijing, China)*

Kim K. Colvert, Fei Gao, Daxin Zheng, Shyam Mehta, Mark L. Richter, The Mutation E242K in the chloroplast ATP synthase Gamma Subunit Increases the Inhibitory Binding of the Epsilon Subunit Without Changing the Apparent Redox Potential of the Regulatory Dithiol." *(to be published in the proceedings of 15th International Congress on Photosynthesis which was held on 22-27 August 2010, in Beijing, China)*

Quillen, E.E., Haslam, G.C., Samra, H. S., Amani-Taleshi, D., Knight, J.A., Wyatt, D.E., . Bishop, S.C., Colvert, K.K., Richter M.L., Kitos, P.A. "Ectoadenylate kinase and plasma membrane ATP synthase activities of human vascular endothelial cells." *J. Biol. Chem.*, vol. 281, 20728-20737, 2006

Kirch, R.D., Colvert, K.K., Richter, M. L., Graber, P., "Intrinsic Fluorescence of the Chloroplast H⁺-ATPase.", *Archives of Biochemistry and Biophysics*, vol. 316, 1995.

K.K. Colvert, D.A. Mills, and M. L. Richter, "Structural Mapping of Cysteine 63 of the Chloroplast ATP Synthase Beta Subunit", *Biochemistry*, vol.31, pp. 3930-3935, 1992

L.Z. Morand, M.K. Frame, K.K. Colvert, D.A. Johnson, D.W. Krogmann, and D.J. Davis, "Plastocyanin Cytochrome *c* Interaction," *Biochemistry*, vol. 28, pp. 8039-8047, 1989.

K. K. Colvert and D. J. Davis, "Characterization of a covalently crosslinked complex involving ferredoxin and ferredoxin:NADP reductase," *Photosynthesis Research*, vol. 17, pp. 231-245, 1988.

K. K. Colvert, M. W. Chou, and P.P. Fu, "*In Vitro* Binding of Nitro-Polycyclic Aromatic Hydrocarbons and Their Oxidative Metabolites to Macromolecules," presented at the International Symposium on Polynuclear Aromatic Hydrocarbons, National Bureau of Standards, Gaithersburg, Maryland, September, 1987 (published in the proceedings of this meeting).

Kim K. Colvert and Peter P. Fu, "Xanthine Oxidase-Catalyzed DNA Binding of Dihydrodiol Derivatives of Nitro-Polycyclic Aromatic Hydrocarbons," *Biochemical and Biophysical Research Communications*, vol. 141, pp. 245-250, 1986.

Barbara J. Vieira, Kim K. Colvert, and Danny J. Davis, "Chemical Modification and Cross-linking as Probes of Regions on Ferredoxin Involved in its Interaction with Ferredoxin:NADP Reductase," *Biochemica et Biophysica Acta*, vol. 852, pp. 109-122, 1986.

Kim K. Colvert and Danny J. Davis, "Effect of pH, Salt and Coupling State on the Interaction of Ferredoxin with the Chloroplast Membrane," *Archives of Biochemistry and Biophysics*, vol. 225, pp. 936-943, 1983.

PRESENTATIONS

Effects of Putrescine Oxidase Active Site Mutations on Activity. Lukas Woodcock , Dr. Kim Colvert, American Chemical Society National Meeting, Student poster session, March 2015; Ferris State University CAS Student Awards Ceremony and Poster Session, April 2015.

Chemical Rescue of a Mutant Beta-Glycosidase from *Sulfolobus Solfataricus* by Indole and Indole Derivatives. Doug Hulbert, Elizabeth Utke, Matthew Mousseau, Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2015

The Role of His 432 Putrescine Oxidase in Substrate Interaction. Lukas Woodcock , Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2014; Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, Oct. 2014

Kinetic Characterization of Mutant Beta-Glycosidase from *Sulfolobus Solfataricus* *Chemically Rescued by Indole*. Jacob Hare, Matthew Mousseau, Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2014

His Tag Removal and Heme Incorporation of Recombinant CCP1. Lukas Woodcock, Matthew Manninen, Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2013; Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, Oct. 2013

Temperature Effects on Activity and Flavin Content of Recombinant L-6-hydroxynicotine Oxidase and Mutants. Thomas Dingman, Kimberly Johnson, Dr. Kim Colvert Ferris State University CAS Student Awards Ceremony and Poster Session, April 2013;

Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, Oct. 2013

"Kinetic characterization of recombinant nicotine oxidase (6-L-hydroxy nicotine oxidase) from *Arthrobacter oxidans*. Nga Ton nu, Dr. Kim K. Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April, 2012

The kinetics of recombinant 6-L-hydroxy nicotine oxidase are altered in the chimera of 6-L-hydroxy nicotine oxidase and maltose binding protein. David Kallio, Nga Tan nu, Dr. Kim Colvert Ferris State University CAS Student Awards Ceremony and Poster Session, April, 2012

Isolation and Characterization of Recombinant *Saccharomyces cerevisiae* Cytochrome C Peroxidase.

Matthew Manninen, Dr. Kim K. Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April, 2012

Colvert, K. K. (Dec. 2011) "What I Do On My Summer Vacations: Current Research", Ferris Student Affiliate Chapter of the American Chemical Society.

Knight, J., Colvert, K.K., Amani, D., Haslam, G., Samra, H., Kitos, P.A. and Richter, M.L. (2003) "A novel plasma membrane ATP synthesis activity in human umbilical vein endothelial cells" KU undergraduate research symposium

Kim K. Colvert, "Structural Mapping of Cysteine 63 of the Chloroplast ATP Synthase Beta Subunit" Physical Sciences Department, Ferris State University, Big Rapids, Michigan, March, 1993

Gao, F., Colvert, K.K. & Richter, M.L. (1992) *Permanent asymmetry in the chloroplast ATP synthase: evidence against a rotational mechanism*, Midwest Biochemistry Conference, Manhattan Kansas

Mills, D.A., Colvert, K.K., & Richter, M.L. (1990) *Identification and distance mapping of the ATP binding site on the b subunit of the chloroplast ATP synthase*, Midwest Biochemistry Conference, University of Oklahoma

Mills, D.A., Colvert, K.K., & Richter, M.L. (1990) *Structural mapping of the b subunit of the chloroplast ATP synthase*, Gordon Research Conference, Bioenergetics, Vermont

Kim K. Colvert, "Metabolism of Benzo(a)pyrene by Plant Microsomal Enzymes," Midwest Regional Meeting, American Chemical Society, Wichita, Kansas, November, 1987.

K.K. Colvert, N.W. Chou, and P.P. Fu, "*In Vitro* Binding of Nitro-Polycyclic Aromatic Hydrocarbons and Their Oxidative Metabolites to Macromolecules,"

International Symposium on Polynuclear Aromatic Hydrocarbons, National Bureau of Standards, Gaithersburg, Maryland, September, 1987

Kim K. Colvert and Peter P. Fu, "Reductive Metabolism of Nitrated Polycyclic Aromatic Hydrocarbons to DNA Binding Derivatives," 190th National Meeting of the American Chemical Society, Division of Biological Chemistry, Chicago, Illinois, September 1985.

Kim Colvert and Danny J. Davis, "Preparation and Characterization of a Covalently Linked Adduct Between Ferredoxin and Ferredoxin:NADP Reductase," Ann. Plant Biochemistry-Physiology Symposium, University of Missouri-Columbia, Missouri, April, 1984.

Kim Colvert, Keith Hough, and Danny J. Davis, "Covalent Linkage of Interacting Proteins of the Photosynthetic Electron Transport Chain by a Water-Soluble Carbodiimide," Southwest Regional Meeting, American Chemical Society, Tulsa, Oklahoma, December, 1983.

K. Colvert and D. J. Davis, "Effects of pH and Salt on K_m for Ferredoxin in NADP Photoreduction by Chloroplast Membranes," Ann. Plant Biochemistry-Physiology Symposium, University of Missouri-Columbia, Missouri, April, 1982.

D.J. Davis and K. Colvert, "Effects of pH, Salt and Coupling State on the Interaction of Ferredoxin with the Chloroplast Membrane," Midwest Photosynthesis Conference, Argonne National Laboratory, Argonne, Illinois, October, 1982.

K. Colvert and D.J. Davis, "Effects of pH, Salt and Coupling State on the Interaction of Ferredoxin with the Chloroplast Membrane," West Central States Biochemistry Conference, Stillwater, Oklahoma, November, 1982.

Richard Marble

marblerd@yahoo.com

QUALIFICATIONS PROFILE

An experienced Certified Manager of Animal Resources, Registered Laboratory Animal Technologist, and animal care professional with over 11 years progressive background in Laboratory Animal Care and Research across academic and commercial industries and over 6 years AAALAC accredited Animal Facility Management experience. Within my current position I grew and expanded the utilization of the Animal Care Program by roughly 30% within the first year of employment, based on the number of active protocols. Within the first five years in my current position, I have served as an advisor and collaborator to senior administration, faculty, and management in the reorganization of the Capital Grants Office into the Office of Academic Research and Grants resulting in an increase in the amount of research taking place on campus.

CAREER OVERVIEW

MANAGEMENT

- Provide expert supervision and direction to ensure smooth operations of the Laboratory Animal Care Facility
 - Develop, train, and lead team members toward productivity and completion of high quality, time critical projects, as well as prioritization and delegation of tasks ensuring all projects are done on time.
 - Offer animal model selection consulting and related expertise to faculty, staff, and students.
 - Manage a budget of over \$35k and oversee facilities operations, animal husbandry, and maintenance of laboratory equipment.
 - Organized and facilitated Michigan Branch AALAS meetings including overseeing catering, provision of presenters, and reservation of presentation space.(2012 &2014)
- Assist grant writers in writing proposals, recruit top notch students to oversee grant funded animal husbandry, and conduct training for undergraduate students in the husbandry of research animals.
- Organization and facilitation of major equipment purchases and implementation in excess of \$100,000, including cage washer and laminar flow cage dump stations.
- Collaboration and advising of Physical Plant and Contractors in the installation of new HVAC equipment for the animal care facility.

RESEARCH

- Participated in conducting 18+ preclinical large animal toxicological drug trials.
- Assisted researcher staff in identification and of animals which exhibited extreme toxicological effects to laboratory test material and documented results for study binder.
- Gathered data as a technician in NSF and State Funded Agricultural Ecology/Wildlife Population Ecology field studies through MSU-Kellogg Biological Station LTER and University of Georgia- Mead/Westvaco Lumber project respectively.

CONSULTANCY/TEACHING

- Serve as an Ex officio consultant/voting member to the Institutional Animal Care and Use committee.
- Appointed as a member of the University Emergency Management team to advise senior administration on animal laboratory disaster/animal terrorism prevention and recovery.
- Offer consultation services and training for faculty and students involved in research regarding animal care and handling aspects as well as observance of regulatory guidelines.
- Co-Instruct a Biotechnology course that involves instructing students on the history of, advanced techniques in, and regulatory oversight involved in the utilization of animals in research.
- Guest Lecturer on Integrated Pest Management Techniques for Ferris State University's horticulture program.
- Rat colony breeding consultant at R1 institution.
- Consulting on educational materials for AALAS Learning Library and AALAS Educational Committee for the purpose of educating senior Physical Plant staff on interactions with Laboratory Animal Care for major projects and Maintenance

EMPLOYMENT HISTORY

MANAGEMENT EXPERIENCE

Ferris State University ▪ Big Rapids, MI.
Animal Care Facility Coordinator | 2009-Present

RESEARCH EXPERIENCE

Whelping/Breeding/ Sales Departments, Covance Research Products ▪ Kalamazoo, MI
Laboratory Animal Technician Intermediate | 2004-2008

Mead/Westvaco Ecosystem Research Project, University of Georgia ▪ Elkins, WV
Deer Research Field Technician | 2003

Long Term Ecological Research Department, MSU/Kellogg Biological Station ▪ Richland, MI
Agricultural Research Field Technician | 2002

Large Animal Toxicology Department, MPI Research ▪ Mattawan, MI
Research Associate I | 2000

TEACHING/MENTORSHIP EXPERIENCE

Animal Care Facility, Ferris State University ▪ Big Rapids, MI
Management Internship Mentor | May 2014- August 2014.

Biology Department, Ferris State University ▪ Big Rapids, MI
Instructor Advanced Techniques in Biotechnology/Animal Care and Handling | 2009-Present.

Biology Department, Ferris State University ▪ Big Rapids, MI
Guest Lecturer on Integrated Pest Management Techniques for Hort 138 | Fall 2010

Covance Research Products ▪ Kalamazoo, MI
AALAS Certification, ALAT/LAT Instructor | 2005–2008

EDUCATION/TRAINING

Bachelor of Science in Biology: 1999 | Bowling Green State University ▪ Bowling Green, OH
Applicable Coursework:
IPC 102 Speech Communication
ENG 112 Varieties of Writing

CERTIFICATIONS

Certified Manager of Animal Resources| AALAS/ICPM 2015-2017
Registered Laboratory Animal Technologist| AALAS| 2015-2017
Certificate in Supervision| Ferris State University August 2011.
Certificate of Completion in Canine Theriogenology| The Ohio State University August 2006
Certificate of Plan Provider Class/Comprehensive Nutrient Management Planning| MAEP January 2003

AWARDS

MI-AALAS| **Robert A. Watkins Award Winner**| November 2014

In recognition of your significant dedication to the sharing of skills and knowledge with fellow colleagues.

MI-AALAS| **D5 AALAS Travel Scholarship Award Winner**| April 2013

Scholarship Essay award Winner for the 2013 District 5 AALAS meeting. This scholarship provides coverage of Housing and Conference fees along with a travel stipend to cover travel expenses for this meeting. Article describing experiences published in the MI-AALAS Newsletter Lab Tales and Research Remarks | June 2013 Issue

PROFESSIONAL AFFILIATIONS

Laboratory Animal Management Association Member since November 2011.

National AALAS Member since 2005.

MI Branch AALAS Member since 2009.

PRESENTATIONS

65th AALAS Nationals| **Meeting the Social Housing Requirements of Rabbits Outlined in *The Guide***| October 2014

Van Andel Research Institute| **Rat Breeding: How To?**| September 2014

MI-AALAS| **FSU Animal Care Facilities and Capabilities/Social Floor Housing of Rabbits**| August 2012

PUBLICATIONS/TV APPEARANCES/ARTICLE APPEARANCES

Speaking of Research| **5 minutes with an Animal Care Facility Coordinator**| July 28, 2015

Speaking of Research| **It's All About the Animals**| May 29, 2015

Laboratory Animal Science Professional| **Meeting the Social Housing Requirements of Rabbits Outlined in the Guide**| December 2014

MI-AALAS Newsletter Lab Tales and Research Remarks | **Research –A world of Possibilities**| June 2013

Ferris State Torch| **Fish, Students aid in Study**| February 3, 2010 (Credited with Project Assistance)

Ferris State University News| **Ferris Professor Searches for Cause of Melanoma**| October 2010 (Credited with Zebrafish Colony Management)

Ferris State Live| **Melanoma Research** Interview with Dr. James Hoerter and Richard Marble| Show 37/November 16, 2010

CURRICULUM VITAE

ROGER E. MITCHELL II

Department of Biological Sciences
Ferris State University
820 Campus Dr.
Big Rapids MI 49307-2225
Phone: (616)-591-5879
E. Mail: mitchelr@ferris.edu

CAREER GOAL

To teach biology in a college or university setting, with botanical research as a secondary goal.

EDUCATION

B.S., Molecular Biology, 1984, University of Wisconsin (Madison).

- Only 2 classes short of a chemistry major.

Ph.D., Genetics, University of Minnesota (Twin Cities), 1992.

- Thesis advisor, Dr. Irwin Rubenstein. Informal advisor, Dr. David Somers.
- Thesis, "Expression of Zein Associated Protein Genes" in the developing endosperm of *Zea mays* L. (corn).
- Applied a wide range of molecular and tissue culture research techniques to plant systems.
- Classroom emphases: genetics, plant breeding, applied statistics.
- Corn breeding.

POSTDOCTORAL RESEARCH

1993, Louisiana State University, Department of Plant Pathology and Crop Physiology.

- Principal investigator, Dr. Norimoto Murai.
- Gene expression in common bean (*Phaseolus vulgaris* L.).

TEACHING EXPERIENCE

Georgia Southern University in Statesboro, Georgia, Temporary, full-time assistant professor of biology, Winter and Spring quarters, 1994. Courses taught:

- Bio. 151 lecture: Introductory biology for non-majors. Topics: biology as science, survey, ecology, genetics, molecular genetics.
- Bio. 152 lecture: Introductory biology for non-majors. Topics: evolution, biochemistry, plant biology, vertebrate anatomy and physiology.
- Bio. 370 lab: Cell biology lab for mid-level biology majors. Taught: microscopy, cell anatomy, enzymology.

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Ferris State University in Big Rapids, Michigan, Temporary, full-time assistant professor of biology, 1994-95 and 95-96 terms. Tenure-track assistant professor of biology, Fall 1996, associate professor, fall 1999 to present, tenured, Fall 2001, Courses taught:

- Biol. 113, lecture and lab: Botany for horticulture majors. Topics: taxonomy, anatomy, physiology, biochemistry
- Biol. 121, lecture and lab: Introductory biology for biology majors. Topics: genetics, evolution, survey, ecology, plant biology.
- Biol. 122, lecture and lab: Introductory biology for biology majors. Topics: zoology, vertebrate anatomy and physiology, biochemistry, molecular genetics.
- Biol. 207 lab only: Forensic Biology for the criminal justice and the forensic biology programs. In Fall '04, I took over the teaching of the DNA-related labs in this course. Dr. Philip Watson teaches the lecture and the remainder of the labs.
- Biol. 353, lecture and lab: Plant physiology for biology majors. Topics: anatomy, water relations, biochemistry, photosynthesis, cellular respiration, growth and hormones.
- Biol. 407, lecture and lab: Forensic DNA lab for forensic biology majors (a track within the B.S. in Biology). This class was new and began in Winter '05. It teaches the theory and methods used by the modern forensic community to solve crimes using DNA evidence.
- Biol. 460 lecture: Senior seminar for biology majors. Students prepare posters and monographs that review a current topic in biology. Includes computer instruction.
- Biol. 471 lab: Recombinant DNA lab for biotechnology majors. Teaches modern methods including cloning, bacterial transformation, DNA purification, Southern hybridization, sequencing, PCR. Includes computer instruction.

RELATED EXPERIENCE

Teaching:

- Teaching assistant, University of Minnesota.
- Three years teaching research methods to undergraduates in graduate lab.
- Attended peer review of teaching workshop, winter '96.
- Attended the Research Link 2000 workshop for biology research, August '00. at Ferris State University in August 2000.

Computers:

- Proficient in wide range of computer word-processing, statistics, graphics, taxonomy, and presentation applications.
- Studied three computer programming languages.

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- Set up or upgraded several personal computers.
- Sold computers briefly.
- Teach Microsoft Word, Excel, and PowerPoint, as well as Adobe PhotoShop in two of my classes (BIOL. 353 and BIOL. 471), Fall '94 through present.

Communication:

- Competitive forensics and debate in high school.
- High school debate judge while in college.

UNIVERSITY SERVICE

- Committee service: terms are academic years (Fall and the following Winter/Spring semester), present is the '09 - '10 academic year:
 - Course:
 - Introductory lab revision committee ('94 - '95 and '96 - '97 through Fall '02), occasional meetings, replaced by:
 - Introductory lab preparation and coordination committee (Winter '03 through present), weekly meetings. Co-chair, then chair, Fall '04.
 - Introductory biology textbook selection committee (Winter '95 and winter '04).
 - Program:
 - Biotechnology program coordination committees ('94 - '95 through present).
 - Biotechnology program review committee ('97 - '98 through present).
 - Forensic Biology program coordination committee ('03 – '04 through present)
 - Department:
 - Department planning committee ('96 - '97 through '99 - '00 and '02 - '03 through '07 - '08), chair, last three terms.
 - Department curriculum committee ('98 - '99 through '01 - '02), chair, last two terms.
 - Department professional development committee ('96 - '97, '99-'00, and '00 - '01, chair, last term).
 - Four search committees, two for 9-month positions, one for a single tenure-track position, and one for four tenure-track positions (three filled)).
 - Department tenure committee, chair ('03 – '04 through present, chair).
 - Candidate tenure committee, for Dr. Scott Herron ('03 – '04 through '07 - '08), Dr. Bradley Isler ('05 – '06 through present),

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Dr Joseph Lipar ('05 – '06 through present, chair) and (Dr. Changqi Zhu ('09 - '10 through present, chair).

- Interdepartmental:
 - Forensic science track in criminal justice development committee ('96 - '97).
- College:
 - Sabbatical leave committee ('01 - '02 through '06 - '07), chair, five terms ('02 - '03 through '06 - '07).
 - Standards and policies ('03 - '04).
- University:
 - University scientific understanding committee ('00 - '01 through '03 - '04), chair last term.
 - All university sabbatical leave committee ('04 - '05 and '05 – '06), chair, first term.
- Coordinator of introductory biology (BIOL. 121 and 122) labs. This position involves chairing the introductory biology lab committee, editing and writing new material for the lab manual, training new faculty in the labs, coordinating textbook selection, and coordinating and developing assessment for the courses.
- Helped plan, develop and teach first biotechnology workshop for high school students and teachers (Winter '95).
- Prepared poster for, and represented biotechnology program at, Autumn Adventure, a high school recruitment event (Fall '94 through its discontinuation after Fall '01).
- Supervised two biotechnology student interns in the summer of '97, and again in the summer of '98. Shared supervision of a fifth student in the fall of '98. Supervised two more biotechnology student interns in the summer of '99. Shared supervision of an eighth student Summer '02 through Winter '03.
- Supervised undergraduate student independent study, Winter '97, Winter '98, Fall '98, Fall '00, Winter '03, Summer '03, and fall '08 - Spring '09.
- Supervised high school (Math and Science Center) student projects, '00 - '01, '01 - '02, and '02 - '03.
- Supervised student assistants in my main research program on *Rosa* (rose) species breeding,
- Assessment projects.
 - I served on the committee that wrote the short pre/post test used for the BIOL. 121-122 sequence, and I organize its administration in the labs (Fall '07 - present). I am currently writing a new, expanded version. This test assesses student leaning in the intro sequence, which is programmatically critical.

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- I wrote a brief pretest on biologically important chemistry, which I have administered to all of my classes since Fall '07 (some every time the class meets, some selected semesters only). Chemistry competence is highly predictive of student success in biology classes, and I use the results as a basis for advising individual students in BIOL. 353. The chemistry classes required for various biology degrees are also a critical programmatic issue, and I have sought cooperation of other instructors in administering this test in a range of courses.
- I administer the Biology Field Exam to my BIOL. 471 class, representing the seniors in the Biotechnology program. This comprehensive, nationally recognized, standardized exam is also administered to Biology BS students, so it serves as a final assessment of our department's graduating majors.
- I am developing a set of shared questions related to plant biology to administer as a part of regular graded exams in the two classes in which the topic is covered (BIOL. 121, mostly first-semester freshmen and BIOL. 353, juniors and seniors) to assess this topic from a programmatic standpoint.
- I have been selectively breaking down regular graded lecture exam and lab quiz questions to address specific course assessment issues. This most often relates to teaching methodology. For example, compare student performance in BIOL. 353 and 407 on material that is/is not included on sample or is/is not covered by their textbooks.

OTHER ACTIVITIES

- Regularly attend the American Academy of Forensic Sciences yearly meeting ('04, '05, '06) and attended a workshop on the forensic role in terrorism at Duquesne University ('04).
- Carry out lily breeding program and very large rose breeding program (fall '06 through present).
- Carried out lab research project on lily (*Lilium*) species taxonomy, utilizing DNA sequencing, Polymerase Chain Reaction (PCR), and other methods. This work is supported by grants from the North American Lily Society, the Wisconsin Regional Lily Society, and the Ferris State University professional development fund. Summer '06 - Fall '00. I presented a talk about this research at FSU in November '00.
- Carried out lab research project on rose (*Rosa*) species seed germination.
- I am very active on the Rose Hybridizing Society's open internet forum. I read it regularly during most of the year, and make contributions when I feel I have something to contribute. This serves to enhance my own research by exchanging information, to document my own work,

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and in an educational role, since the other participants often are not scientifically trained, and benefit from explanations of that aspect of the subject.

- I have produced materials on my rose breeding program that have been added to my faculty materials on the FSU web site. This helps to communicate and document my work, as well as providing exposure for FSU to the community of rose breeders.
- Carried out a lab research project on Wisconsin Fast Plants (*Brassica rapa*) salt tolerance.
- Carry out a lab research project on plant chromosome characterization.
- Member of several horticultural societies: North American Lily Society (NALS), Species Lily Preservation group (within NALS), Rose Hybridizers Association, American Rose Society.
- Wrote newsletter articles for, and served as assistant editor of, the Wisconsin Regional Lily Society newsletter.
- Served as flower exhibit chairman for Wisconsin Regional Lily Society.
- Served as an accredited judge for the North American Lily Society.
- Write fiction as a hobby.

PUBLICATIONS:

Peer-reviewed journal:

- Mitchell RE (2009) The Inheritance of Juvenile Recurrence in Rosa Species Hybrids. *Floriculture and Ornamental Biotechnology* 3 (Special Issue 1), 46-52

Non-peer-reviewed journals, newsletters, books, etc.:

- "Expression of Zein Associated Protein Genes," Roger E. Mitchell II, Ph.D. thesis, University of Minnesota, St. Paul Minnesota, Jan. 1992.
- "Lily hybridizing: Something for everyone," Roger E. Mitchell II, *Quarterly Bulletin of the North American Lily Society*, vol. 49, #1, March 1, 1995.
- Mitchell, R., "New Genes for Lilies," *Yearbook of the North American Lily Society*, 1997, pp. 67-68. Subject: genetic engineering of flower crops.
- Mitchell, R., "Colder-Climate Trumpets: Trumpet Lily Hybrids," *Yearbook of the North American Lily Society*, 1997, pp. 77-80. Subject: horticulture. I have been told by society members, including the yearbook editor, that this article was very well received.
- Mitchell, R., "Species DNA Research Report," *Quarterly Bulletin of the North American Lily Society*, March 1, 1998, Vol. 52, No. 1, pp. 8-9.
- Mitchell, R., "Lily Hybrids: Understanding Without Intimidation," *Yearbook of the North American Lily Society*, 1998, pp. 54-62. Subject:

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how classical genetics is used by breeders. I have received a lot of favorable feedback about this article, as well.

- Mitchell, R., "What Causes Lily Decline?," Yearbook of the North American Lily Society, 1999, pp. 20-35. Subject: horticulture. This article was the best received in the recent history of the yearbook, according to its editor.
- Mitchell, R., "Rose Hybridizing in the Summer Greenhouse," Rose Hybridizers' Association Newsletter, 2001. The RHA web site is www.rosehybridizers.org
- Mitchell, R., "Rose Hybridizing in the Greenhouse," in "Rose Hybridizing - The Next Step," Rose Hybridizers' Association, John and Mitchie Moe, editors, 2002.
- Mitchell, R., "Rose Hybridizing in Big Rapids, Michigan," Rose Hybridizers' Association Newsletter, 2006.
- Mitchell, R., "Accidental Ground Cover Roses," Rose Hybridizers' Association Newsletter, Spring 2006
- Mitchell, R., "High-Volume Growing and Selection of Rose Seedlings," Rose Hybridizers' Association Newsletter, Spring 2007.
- Mitchell RE (2008) Strategies to maintain species percentage in hybrids. Rose Hybridizers Association Newsletter 39 (1), 15-20
- Mitchell RE (2008) Managing Rose Seedlings. Rose Hybridizers Association Newsletter 39 (3), 7-8
- Mitchell RE (2008) Fertile Seed Parents and a Dilemma Involving Miniature Roses. Rose Hybridizers Association Newsletter 39 (4), 6-7
- Mitchell RE (2009) A miniature Note on Miniatures. Rose Hybridizers Association Newsletter 40 (1), 13
- Mitchell RE (2009) Breeding with *Rosa spinosissima* and its Relatives. Rose Hybridizers Association Newsletter 40 (1), 6-10
- Mitchell RE (2009) Breeding with *Rosa gallica* Relatives, Including 'Alike.' Rose Hybridizers Association Newsletter [published, I need to look up the information]
- Mitchell RE (2009) Classifying the Pimpinellifoliae. Rose Hybridizers Association Newsletter [published, I need to look up the information]

Meeting abstracts:

- "Transient expression of foreign genes in endosperm tissue," Roger E. Mitchell II and Irwin Rubenstein, Maize Genetics Cooperation Newsletter, #64, 1990.
- "Simplified cloning techniques utilizing kanamycin resistant plasmids," Roger E. Mitchell II, John Hunsperger, and Irwin Rubenstein, Maize Cooperation Newsletter, #64, 1990.

PROFESSIONAL MEETINGS ATTENDED:

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- North American Lily Society annual meetings ('96 - '03, '05, '06)
- World Federation of Lily Societies ('04)
- American Rose Society spring meeting ('06)
- Rose Hybridizers' Association meeting ('06)
- American Academy of Forensic Sciences annual meeting ('04 – '07)
- meeting on forensic response to biological terrorism ('04)

Changqi C. Zhu

Department of Biological Sciences
Ferris State University
820 Campus Dr. ASC 2004
Big Rapids, MI 49307

Tel: 231-591-3196
E-mail: Zhuc@ferris.edu

At Ferris State University

Associate Professor since August 2012, Department of Biological Sciences, Ferris State University

Assistant Professor (August, 2009 – August 2012), Department of Biological Sciences, Ferris State University

- **Teaching:** **BIOL 121: General Biology I** lectures and two labs (Every fall of 2009 – 2013, about 96 students per semester)
BIOL 370: Developmental Biology lectures and labs (Every spring of 2010, 2011, 2012, and 2013, about 48 students per semester)
BIOL 460: Current Topics in Biology (Both fall and spring of 2009 to 2013, 15 students per class)
BIOL 474: Advanced Cell and Molecular Biology (About 24 students per class, every other spring since 2013)
- **Research:** Activin signaling-regulated aging process in adult fruit flies
Drosophila follicle cell size and shape regulation
Activin signaling-regulated female fertility in *Drosophila melanogaster*
- **Service:** University Graduate and Professional Council (September 2014 – September 2017)
Dean's Office Special Grants Committee of College of Arts and Sciences (Fall 2015 to Fall 2018)
Member of biology faculty development committee (2011 – 2017)
Member of biology award committee (2010 – 2011, 2014 – 2016)
College of Arts and Sciences Promotion Committee (2012 – 2014)
Member of biology curriculum committee (2010 – 2013)
Pre-medicine student adviser (2010 – present)

Biotechnology student adviser (2013 – present)

Member of Ferris Global Reflection Committee (2012)

- **Training attended:** Fall 2010: Presentation Zen
Spring 2010: New Faculty Transition Program; Critical Thinking
Fall 2009: New Faculty Transition Program;
Grant Writing Training

Education

Ph.D. in Molecular and Developmental Biology, the University of Karlsruhe, Germany,
1998

M.S. in Genetics, Northwestern Agricultural University, China, 1998 – 1991

B.S. in Biology, Shaanxi Normal University, China, 1984 – 1988

Honors and Awards:

- DAAD (German Academic Exchange Service) fellowship, 1994 – 1995
- Outstanding Graduate Student Award, Northwestern Agricultural University, China, 1991

Media Coverage

- CBS Detroit News, Tech Tour Day Eight: Ferris State Biotech Booming At The Edge Of The North Woods, October 23, 2013 8:17 PM
(<http://detroit.cbslocal.com/2013/10/23/tech-tour-day-eight-ferris-state-biotech-booming-at-the-edge-of-the-north-woods/>)
- 2015 Spring issue of Ferris Magazine: Small wonders by Anne Hogenson, Director of Marketing, Ferris State University

Previous Teaching Experience

- *Adjunct Teaching:* Lectures and labs of General Biology course for undergraduate students (two classes, 24 students per class) at **Concordia University**, Saint Paul, MN, September 2008 – May 2009

- *Visit Teaching: Molecular and Cellular Biology course* for undergraduates (30 students, 10 lectures, 2 hours/lecture), **Developmental Biology lectures and labs** for graduates (15 students, 6 lectures and 6 labs), **Shaanxi Normal University**, 2005
- *Teaching Assistant: Genetics course* for undergraduates (one semester, 35 students), **Northwestern Agricultural University**, 1990 – 1991

Research Experience

- *Research Associate: TGF- β signaling in *Drosophila* nervous system development*, Department of Genetics, Cell Biology & Development, University of Minnesota, Minneapolis, MN, October 2002 – August 2009 (Advisor: Prof. Dr. Michael B. O'Connor, Investigator of Howard Hughes Medical Institute)
- *Postdoctoral Research: Homeobox gene *six3* in mouse visual system development*, Department of Genetics, St. Jude Children's Research Hospital, Memphis, Tennessee, December 1999 – August 2002 (Advisor: Dr. Guillermo Oliver, Investigator)
- *Doctoral Research: Homeobox gene *gooseoid* in mouse embryogenesis*, Institute of Genetics, University of Karlsruhe, Germany, 1994 – 1998 (Advisor: Dr. Martin Blum)

Grants

- A student research proposal titled as “Over-expression study of *dActivin- β* gene in the muscle tissues of adult fruit flies” for a Student Research Grant of \$1500 was submitted to the Student Research Grant Committee, College of Arts and Sciences, Ferris State University on November 2, 2015 and got approved on November 13, 2015. Pre-Medicine program student Hannah Lamberg and Pre-Dentistry student Michael Godinez will work on this project.
- Ferris State University Student Summer Fellowship Research Grant: \$1,000 for lab supply; Research project: Functional study of *Drosophila* Activin signaling in aging regulation in fruit flies. 2015
- A National Institute of Health (NIH) R03 research grant proposal titled as “Functional study of *Drosophila* Activin signaling in aging regulation” with a requested funding of

\$139,330 was submitted to NIH on October 16, 2014. This grant proposal was reviewed but not funded.

- Ferris State University Student Research Assistant Award \$600.00 for lab supply, Fall 2013 to Spring 2014.
- A National Institute of Health (NIH) R15 research grant proposal titled as “TGF-beta signaling regulated aging process in fruit fly (*Drosophila melanogaster*)” for a requested funding of \$331,283.76 was submitted to (NIH) on October 25, 2013. This grant proposal was reviewed but not funded.
- Ferris State University Student Summer Fellowship Research Grant: \$1,000 for lab supply; Research project: TGF- β signaling regulated aging process in adult fruit flies. 2013
- Ferris Foundation Exceptional Merit Faculty/Staff Award: \$3,955 for the study of “Molecular and cellular Mechanisms of Activin Signaling Regulated Aging Process in *Drosophila melanogaster*” from April 2012 to April 2013
- Ferris State University Faculty Research Grant: \$6,960 for the study of “Molecular Mechanisms of Cell Size and Shape Determination Regulated by Activin Signaling in *Drosophila melanogaster*” from March 2012 to April 2013
- Ferris Foundation Exceptional Merit Faculty/Staff Award: \$3,750 for the study of “Activin Signaling Regulated Aging Process in Adult Male and Female Fruit Flies” from April 2011 – April 2012
- Ferris State University Faculty Research Grant Award: \$7,500 for the study of “Molecular Mechanisms of Activin Signaling-regulated Female Fertility in *Drosophila melanogaster*” from March 2010 – April 2011
- Faculty Start-up fund: \$5,000, Fall 2009

Students Mentored at Ferris State University

Shaughna Langerak (Ferris Biotechnology Program Undergraduate), fall of 2011 to now: Help new students, clean vials, maintain fruit fly stocks, and set up fruit fly crosses for experiments; Research project: The role of TGF- β signaling in the regulation of the aging process in adult fruit flies

Hannah Lamberg (Ferris Pre-Medicine Program Undergraduate), fall of 2014 to now: Maintain fruit fly stocks, set up fruit fly crosses for experiments, record experimental data and help new students in lab. Research project: The role of TGF- β signaling in the regulation of the aging process in adult fruit flies.

Abbigael Vandusen (Ferris Biotechnology Program Undergraduate), fall of 2014 to now: Sort fruit flies and set up fruit fly crosses for experiments. Research project: The role of TGF- β signaling in the regulation of the aging process in adult fruit flies.

Michael Godinez (Ferris Pre-Dental Program Undergraduate), September 2015 to now: Help set up fruit fly crosses for experiments. Research project: The role of TGF- β signaling in the regulation of the aging process in adult fruit flies.

Caitlin Wright (Ferris Pre-Dental Program Undergraduate), fall of 2012 to spring of 2015. Research project: *Drosophila* follicle cell size and shape regulation.

Emily Arnold (Ferris Pre-Dental Program Undergraduate), fall of 2012 to spring of 2015. Research project: *Drosophila* follicle cell size and shape regulation.

Adam Bringedahl (Ferris Biotechnology Program Undergraduate), fall of 2012 to spring of 2013: The role of dpp signaling in the regulation of the aging process of fruit flies

Jeffrey Ackroyd (Ferris Biotechnology Program Undergraduate), September 2010 to May 2012: Activin signaling regulated aging process in adult fruit flies

Nicole Totten (Ferris Pre-dental program undergraduate student), Spring 2012: The role of Activin signaling in adipose tissue in the regulation of the aging process in adult fruit flies

Justin Cooper (Ferris Biology Pre-medicine Program Undergraduate), Summer 211: The role of muscle cell Activin signaling in the regulation of aging in adult fruit flies

Grace Farrell (Ferris Pre-Optometry Undergraduate), Spring 2010: Fly food preparation and fly culture maintenance

Corey Potter (Ferris Biology Program Undergraduate), Spring 2010: Fly food preparation and fly culture maintenance

Ferris Students' Poster Presentations and Seminar Talks

- **Langerak S.** Functional study of *Drosophila* Activin signaling in aging regulation in fruit flies. WEST MICHIGAN REGIONAL UNDERGRADUATE SCIENCE RESEARCH

CONFERENCE, Van Andel Institute, Grand Rapids, MI. Saturday, November 21, 2015
(Poster presentation)

- **Langerak S.** Functional study of *Drosophila* Activin signaling in aging regulation in fruit flies. Science Building 126, Ferris State University, August 26, 2015 (Oral presentation)
- **Langerak S.** TGF- β signaling mediated aging process in adult fruit flies. IRC 120, Ferris State University, August 21, 2013 (Oral presentation)
- **Bringedahl A, Langerak S, and Zhu CC.** The dosage effect of TGF- β signaling on longevity of fruit flies. Ferris State University College of Arts & Sciences Student Recognition Event, Rankin Center, May 03, 2013 (Poster presentation)
- **Ackroyd J, Totten N, Langerak S, Cooper J, and Zhu CC.** Activin signaling mediated aging process in *Drosophila melanogaster*. Midwest Developmental Biology Meeting at Cincinnati Children's Research Hospital, Cincinnati, Ohio, May 11 – 12, 2012 (Poster presentation)
- **Ackroyd J, Cooper J, and Zhu CC.** Knocking-down Activin signaling in *Drosophila melanogaster* results in prolonged longevity. West Michigan Regional Undergraduate Science Research Conference at Van Andel Research Institute, Grand Rapids, Michigan, November 12, 2011 (Poster presentation)

Professional Affiliation

Member of the Society for Developmental Biology (SDB)

Publications

1. **Langerak S, Lamberg H, Kim MJ, O'Connor, and Zhu CC.** *Drosophila* Activin signaling is required in the whole body as well as muscle tissues for adult fruit flies to achieve their maximum mean life span. In preparation.
2. **Zhu CC, and O'Connor MB.** Activin signaling is required for *Drosophila* follicle cell development and normal female fertility. In preparation.

3. **Zhu CC**, Boone JQ, Jensen PA, Hanna S, Podemski L, Locke J, Doe CQ, and O'Connor MB (2008). *Drosophila* Activin-b and the Activin-like product Dawdle function redundantly to regulate proliferation in the larval brain. *Development* **135**, 513-521
4. **Zhu CC***, Bornemann DJ*, Zhitomirsky D, Miller EL, O'Connor MB, and Simon JA. *Drosophila* histone deacetylase-3 controls imaginal disc size through suppression of apoptosis. *PLoS Genetics*. *4*(2), 1-11, 2008
5. Lagutin OV, **Zhu CC**, Kobayashi D, Topczewski J., Shimamura K, Puellas L, Russell HRC, McKinnon PJ., Solnica-Krezel L, and Oliver G. 2003. Six3 repression of Wnt signaling in the anterior neuroectoderm is essential for vertebrate forebrain development. *Genes & Development* *17*, 368-379
6. **Zhu CC**, Dyer MA, Lagutin O, Uchikawa M, Kondoh H and Oliver G. 2002. Six3-mediated auto-repression and eye development requires its interaction with the Groucho family of corepressors. *Development* *129*, 2835-2849
7. Lagutin O, **Zhu CC**, Furuta Y, Rowitch DH, McMahon A.P. and Oliver G. 2001. Six3 promotes the formation of ectopic optic vesicle-like structures in mouse embryos. *Developmental Dynamics* *221*, 342-349
8. **Zhu CC**, Yamada G and Blum M. 1999. Retinoic acid teratogenicity: the role of goosecoid and BMP-4. *Cellular and Molecular Biology* *45*, 617-629
9. **Zhu CC**, Yamada G, Nakamura S, Terashi T, Schweickert A, and Blum M. 1998. Malformation of trachea, and pelvic region in goosecoid mutant mice. *Developmental Dynamics* *211*, 374-381
10. Alex C, **Zhu CC**, Cato A, and Blum M., 1998. Expression of androgen receptor mRNA in mouse embryogenesis. *Mechanism of Development* *72*, 175-178
11. **Zhu CC**, Yamada G, and Blum M. 1997. Correlation between loss of middle ear bones and altered goosecoid gene expression in the branchial region following retinoic acid treatment of mouse embryos in vivo. *Biochemical and Biophysical Research Communications* *235*, 748-753

Dissertations

- **Ph.D. Thesis (1998):** The homeobox gene *gooseoid*: embryonic expression, loss-of-function phenotype, and regulation by retinoic acid. Institute of Genetics, Department of Biological and Geological Sciences, University of Karlsruhe, Germany
- **Master Degree Thesis (1991):** Induction and screening of *Fusarium graminearum* (*Gibberella zeae*) toxin-resistant wheat callus tissues cultured from young wheat spikes. Northwestern Agricultural University, China
- **Undergraduate Work (1988):** Karyotype analysis of two plant species *Lysimachia barystachys* Bunge and *Lysimachia stenosepala* Hemsl. Shaanxi Normal University, China

Meetings and Presentations

- Poster presentation titled “*Drosophila* Activin Signaling Is Required in the Whole Body as well as Muscle Tissues for Fruit Flies to Achieve Their Normal Maximum Life Span” at the Gordon Research Conference on Aging held from July 19, 2015 to July 24, 2015 at Sunday River in Newry, Maine, USA.
- Poster presentation titled “*Drosophila* Activin signaling is required for normal egg production and female fecundity” at the 13th International Congress of Invertebrate Reproduction and Development at Wayne State University, Detroit, MI, July 14 – 19, 2013.
- Inaugural HAN-MO KOO Memorial Lecture by 1993 Nobel Prize laureate Dr. Phillip A. Sharp from Massachusetts Institute of Technology at Van Andel Institute, Grand Rapids, Michigan, May 23 – 24, 2012.
- Poster presentation titled “Activin Signaling Mediated Aging Process in *Drosophila melanogaster*” at the 50th Annual Midwest Developmental Biology Meeting at Cincinnati Children’s Hospital Medical Center, Ohio, May 11 – 12, 2012.

- 70th Annual Meeting of Society for Developmental Biology, Chicago, IL, July 21 – 25, 2011.
- Origins of Cancer Conference at Van Andel Institute, Grand Rapids, MI, May 19 – 20, 2011. Keynote speaker: Nobel Laureate Dr. James D. Watson.
- Funding Opportunities for Predominantly Undergraduate Institutions organized by the Council on Undergraduate Research (CUR), Washington D.C., February 24 – 26, 2011.
- Poster presentation titled “Activin signaling is required for *Drosophila* follicle cell development and normal female fertility” at West Michigan Regional Undergraduate Science Research Conference, Van Andel Institute, Grand Rapids, MI, October 3, 2010.
- Poster presentation titled “Activin signaling is required for *Drosophila* follicle cell development and normal female fertility” at the Society for Developmental Biology 69th Annual Meeting in Albuquerque, New Mexico, August 5 – 9, 2010.
- Poster presentation titled “The role of Activin signaling in adult *Drosophila* mushroom body neurons” at the 50th annual *Drosophila* conference, Chicago, IL, March 4 – 8, 2009.
- Attended the Conference of Neurobiology of *Drosophila*, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, October 3 – October 7, 2007.
- Platform talk titled “Non-Canonical signaling of BMP ligands through an Activin-type pathway regulates brain lobe development and photoreceptor axon targeting in *Drosophila*” at the 47th annual *Drosophila* conference, Houston, TX, 28 March – 2 April 2006.
- Poster presentation titled “Activin type I receptor Babo regulates *Drosophila* photoreceptor axon targeting and optic lobe development” at the Conference of Neurobiology of *Drosophila*, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, October 5 – October 9, 2005.
- Attended the 46th Annual *Drosophila* Research Conference, San Diego, CA, March 30 – April 3, 2005.
- Attended the 44th Annual *Drosophila* Research Conference, Chicago, IL, March 5 – 9, 2003.

- Poster presentation titled “Mouse Six3 interacts with the Groucho-like Grg protein and functions as a transcriptional repressor” at the 60th Annual Meeting of the Society for Developmental Biology, Seattle, WA, July 18-22, 2001.

Appendix G: Curricula Vitae for Other Biology Faculty

Kimberly Andrus 323 N. Center St. #106 Salt Lake City, UT 84103 (801) 652-3568

Education

<i>Master's of Art in Teaching and Learning</i>	University of Utah	2008
<i>Bachelor's of Science in Biology Minor Chemistry</i>	University of Utah	2007
<i>Associates of Science</i>	Brigham Young University-Idaho	2005

Certification

Secondary Teaching License For the state of Utah 2008

Passed with "Recognition of Excellence" Praxis II Biology content knowledge test
Passed with "Recognition of Excellence" Praxis II Principles of Learning and Teaching 7-12 test

Related Coursework

General Biology with lab	Organic Chemistry with lab	Methods of Teaching
Microbiology with lab	Biochemistry with lab	Integrated Technology

Teaching Experience

Student Teacher	Northwest Middle School	Salt Lake City, UT	2008
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- Taught 7th grade Integrated Science.
- Developed lesson plans, assessment tools and student-centered instruction.
- Worked as a member of a middle school core curriculum team.

AVID Tutor	Granite School District	Salt Lake City, UT	2006-2007
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- Tutored students in all subjects in junior high and high school.
- Supported students' understanding through small group collaboration and the use of Cornell note strategies and Costa's three levels of questioning.

Classroom Aide	West Lake Junior High School	Salt Lake City, UT	2006-2007
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- Provided support in an eighth grade science classroom; helped with assignments and additional instruction.
- Tutored students in math and science after school.
- Assisted in summer school physical activities program.

Skills

Ability to relate and communicate with a variety of students
Capability to foster students' interest in scientific topics
Capacity to think creatively, critically and expressively
Familiarity with writing structured lesson plans
Ability to generate independent thinking within students
Proficiency in laboratory techniques as well as scientific reasoning and thought

**** Degree(s) ******

**AUG 2005 ASSOCIATE OF SCIENCE IN
GENERAL STUDIES**

**** BYU-I Class Records ******

Fall Semester 2003

GS	290B	801	APT LEADERSHIP	1.0	A	
HS	131	004	PER HLTH & WEL	2.0	A	Z
HUM	201H	001	H WESTERN CULT	3.0	B-	A
PHIL	110H	001	H INTRO TO PHIL	3.0	B+	L
REL	121H	201	H BOOK OF MORMON	2.0	A	R
SOC	112H	001	H SOCIAL PROBLEM	3.0	A	S

Carr: 14.0 Earn: 14.0 Pts: 50.3 GPA: 3.593

Winter Semester 2004

CHEM	105	006	GENERAL CHEM	4.0	A-	P
ED	200	012	FOUNDATION ED	2.0	B+	
FA	100	001	PER VIS ART LB	0.0	P	A
FR	102	001	2ND SEM FR	4.0	A	F
REL	122	030	BOOK OF MORMON	2.0	A	R

Carr: 12.0 Earn: 12.0 Pts: 45.6 GPA: 3.800

Fall Semester 2004

BIO	199	001	BIOLOGY ORIENT	1.0	A	
BIO	200	004	INTRO TO BIO I	4.0	B+	B
CHEM	106	001	GENERAL CHEM	4.0	A-	P
IS	140	008	MICRO APPLIC	3.0	A	Z
MATH	221	008	STATISTICS	3.0	A-	M
REL	341	002	CHURCH HISTORY	2.0	B+	R

Carr: 17.0 Earn: 17.0 Pts: 62.3 GPA: 3.665

Winter Semester 2005

BIO	211	004	INTRO BIO II	4.0	B+	
BIO	221	002	GENERAL MICRO	3.0	B+	B
BIO	222	003	GEN MICRO LAB	1.0	B+	B
ENG	316C	006	ADVWRITG/TECHCM	3.0	A-	E
REL	342	002	CHURCH HISTORY	3.0	A	R

Carr: 14.0 Earn: 14.0 Pts: 50.3 GPA: 3.593

CUM Carr: 57.0 Earn: 57.0 Pts: 208.5 GPA: 3.658

**** Advanced Placement ******

**BEAR RIVER HIGH SCHOOL
2002**

07 U.S. HISTORY 3

HIST 120 US TO 1877	3.0	P	I
HIST 121 US SINCE 1877	3.0	P	I

Carr: 0.0 Earn: 6.0 Pts: 0.0 GPA: 0.000

**** Transfer Courses ******

**UTAH STATE UNIVERSITY
LOGAN, UT**

FALL SEMESTER 2001

MATH 1050 COLLEGE ALGEBRA	4.0	A-	M
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SPRING SEMESTER 2003

BIO 1010 BIOL & THE CITIZEN	3.0	A	B
ENGL 1010 INTRO TO WRITING	3.0	A-	E
ENGL 1030 UNDERSTANDING LIT	3.0	A-	L

Carr: 13.0 Earn: 13.0 Pts: 49.0 GPA: 3.769

CUM Carr: 70.0 Earn: 76.0 Pts: 257.5 GPA: 3.679

******* End of Transcript *******

REFERENCES

Mary D. Burbank, M. Ed.
Director of Secondary Education
University of Utah
1705 Campus Center Dr Rm 225
SLC UT 84112
mary.burbank@ed.utah.edu
(801) 581-6074

Niki Hack, Ph.D.
Secondary Education Teacher
Salt Lake City School District
Niki.Hack@slc.k12.ut.us
1730 West 1700 North
Salt Lake City, Utah 84116
(801) 578-8547

Fred Montague, Ph. D.
Professor of Biology
University of Utah
257 South 1400 East Bldg 44 Rm 135
Salt Lake City, UT 84112-0840
montague@bioscience.utah.edu
(801) 581-6244

UNIVERSITY OF UTAH
SALT LAKE CITY, UTAH 84112

April 02, 2008
Page 1 of 2

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Official Transcript

Name: ANDRUS, KIMBERLY
Student ID: 00392982
SSN: XXX-XX-7749
Birthdate: XXXX-07-29

UNIVERSITY OF UTAH DEGREES
Bachelor of Science
Major in Biology
Minor in Chemistry
Confer Date: May 04, 2007
Degree GPA: 3.473

DEGREES AWARDED BY OTHER INSTITUTIONS
BRIGHAM YOUNG UNIVERSITY - IDAHO
REXBURG, ID
Associate in Science
August 15, 2005

BEGINNING OF UNDERGRADUATE SEMESTER CAREER

Course	Description	Units Enrolled	Units Earned	Grade
TRANSPER UNITS				
BRIGHAM YOUNG UNIVERSITY - IDAHO				
REXBURG, ID				
Accepted units				
48.00				
UTAH STATE UNIVERSITY				
LOGAN, UT				
Accepted units				
13.00				
TEST CREDIT				
AP Jun 09, 2005 American History				
Earned Score				
3				
Fall 2005				
BIOL 2020	Princ of Cell Biology	3.00	3.00	A-
CHEM 2310	Organic Chemistry I	4.00	4.00	A-
CHEM 2315	Organic Chemistry Lab I	1.00	1.00	B+
ETHNG 2570	American Indian Exper	3.00	3.00	A-
Diversity & Humanities Explor				
MATH 1060	Trig	2.00	2.00	A
Term GPA: 3.715				
13.000 13.000				

Continued Next Column

Course Description

Course	Description	Units Enrolled	Units Earned	Grade
Spring 2006				
BIOL 2030	Genetics	3.00	3.00	B+
BIOL 3370	Microbial Biology	3.00	3.00	B
BIOL 3900	Teaching Biology	2.00	2.00	B
CHEM 2320	Organic Chemistry II	4.00	4.00	B-
CHEM 2325	Organic Chem Lab II	1.00	1.00	A-
MATH 1210	Calculus I	4.00	4.00	B+
Quant Reas (Math & Stat/Log)				
Term GPA: 3.094				
17.000 17.000				
Summer 2006				
BIOL 3960	Topics In Biology	2.00	2.00	A
Organic Gardening				
MATH 1220	Calculus II	4.00	4.00	A
Service Learning				
PHYS 2010	Quant Reas (Math & Stat/Log)	4.00	4.00	B+
PHYS 2020	General Physics I	4.00	4.00	A-
PHYS 2020	General Physics II	4.00	4.00	A-
Term GPA: 3.714				
14.000 14.000				

Course	Description	Units Enrolled	Units Earned	Grade
Fall 2006				
BIOL 3115	Cmptr Appl Cell Bio Lab	2.00	2.00	B
BIOL 3240	Intro Cell Neurobiology	3.00	3.00	B-
BIOL 3245	Cell Neurobiology Lab	2.00	2.00	B
BIOL 3510	Biological Chemistry I	3.00	3.00	A-
BIOL 5221	Human Evol Genetics	3.00	3.00	A-
Quantitative Intensive				
FA 3600	Writing for New Media	3.00	3.00	A
Upper Division Comm/Wrtg				
Term GPA: 3.394				
16.000 16.000				

Course	Description	Units Enrolled	Units Earned	Grade
Spring 2007				
BIOL 3410	Ecology & Evolution	3.00	3.00	B+
BIOL 3515	Biological Chem Lab	2.00	2.00	B
BIOL 3520	Biological Chemistry II	3.00	3.00	A
BIOL 5210	Cell Structure and Function	3.00	3.00	A+
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University Registrar



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UNIVERSITY OF UTAH
SALT LAKE CITY, UTAH 84112

Official Transcript

Name: ANDRUS, KIMBERLY
Student ID: 00392982
SSN: XXX-XX-7749
Birthdate: XXXX-07-29

Course Description Enrolled Units Earned Grade

Course Description Enrolled Units Earned Grade

 ECON 3100 Labor Economics Spring 2007 (Continued) 3.00 3.00 A
 Quantitative Intensive
 Term GPA: 3.557 14.000 14.000
 Dean's List

 COURSE SUMMARY
 Cumulative GPA: 3.967
 Cumulative GPA Units: 27.000
 Units Enrolled: 27.000
 U of U Units Earned: 27.000
 Total Transfer Units: 0.000
 Total Test Credit: 0.000
 Total Other Credit: 0.000
 Cumulative Units 27.000

 CAREER SUMMARY
 Cumulative GPA: 3.473
 Cumulative GPA Units: 74.000
 Units Enrolled: 74.000
 U of U Units Earned: 74.000
 Total Transfer Units: 61.000
 Total Test Credit: 8.000
 Total Other Credit: 0.000
 Cumulative Units 143.000

END OF GRADUATE SEMESTER CAREER
End of Transcript

END OF UNDERGRADUATE SEMESTER CAREER

 BEGINNING OF GRADUATE SEMESTER CAREER
 Summer 2007
 EGS 6632 Rsrch Multicultural Ed 3.00 3.00 A
 ED PS 6960 Special Topics 3.00 3.00 A
 Adolescent Learning
 SP ED 6011 Inclusive Classrooms 3.00 3.00 A
 T L 6126 Content Area Lit. Instr. 3.00 3.00 A
 T L 6741 Integration Ed Tech 3.00 3.00 A
 Term GPA: 4.000 15.000 15.000

 Fall 2007
 T L 6410 Curriclu/Assess Diversity 3.00 3.00 A
 T L 6411 Instruction & Management 3.00 3.00 A-
 T L 6490 Field Pract: Sec 3.00 3.00 A
 T L 6743 Critical Perspectives 3.00 3.00 A
 Term GPA: 3.925 12.000 12.000
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KEY TO TRANSCRIPT IS PRINTED ON REVERSE

Crystal Marrie Austin

13115 17 Mile Road • LeRoy, Michigan 49655 • (313) 516-3560 • c.marrie.austin@gmail.com
<http://crystalmaustin.wordpress.com/>

Education

Ph.D., Microbiology

University of Georgia, Athens, GA
May 2014

Interdisciplinary Certificate in University Teaching

SoTL Research: *Blended learning in a microbiology classroom.*
University of Georgia, Athens, GA
May 2014

B.S., Biology, cum laude

Ferris State University, Big Rapids, MI
December 2008

Professional Experience

Adjunct Professor, Anatomy and Physiology I; Summer 2014

West Shore Community College, Scottville, MI

Taught Anatomy and Physiology I lecture and laboratory to both traditional and non-traditional students who are pursuing careers within the Health Sciences. Created a collaborative, student-centered learning environment through small group work and used backward design to prepare course content.

Graduate Teaching Assistant, Basic Concepts in Biology Laboratory; Fall 2013

University of Georgia, Athens, GA

Taught a writing intensive, inquiry-based introductory biology course to freshman and sophomore students (non-science majors) with an emphasis on developing critical thinking skills and designing experiments.

Guest Lecturer, Anatomy and Physiology I; Fall 2013

University of Georgia, Athens, GA

Prepared and delivered course material on the skeletal system. Emphasized learning outcomes and incorporated a think-pair-share activity into lectures.

Graduate Teaching Assistant, Introductory Microbiology Laboratory; Spring 2013, Fall 2012

University of Georgia, Athens, GA

Engaged students (science majors; junior/senior level) in microbiological practices and guided them as they designed experiments to identify an unknown bacterium. Designed quiz and exam questions, and created MicroWiki, a wiki used by students for studying and planning experiments.

Graduate Teaching Assistant, Introductory Microbiology Hybrid Course; Spring 2012, Fall 2011

University of Georgia, Athens, GA

Interacted with small groups as they worked together to complete in-class active learning exercises and graded weekly online student reflective blogs as they related to group work and hybrid course design. Assisted professor in developing quiz and exam questions and in designing group activities.

Instructor, Microbiology and Health Care; Summer 2012

University of Georgia, Athens, GA

Taught an introductory microbiology course to Nursing and Allied Health majors. Prepared four lectures per week incorporating in-class case studies and problem-solving. Created three semester exams, a cumulative final exam, and a final laboratory practical exam. Held review sessions and office hours. Regularly met with and advised the laboratory teaching assistants.

Instructor/Graduate Teaching Assistant, Biomedical and Health Sciences Research Methods; Fall 2011 (Instructor), Spring 2011 and Fall 2010 (Teaching Assistant)

University of Georgia, Athens, GA

Collaborated with the Associate Provost, the Director of the Biomedical and Health Sciences Institute, and faculty members from multiple disciplines to design the curriculum and course syllabus. Created assignments, arranged laboratory tours, and invited guest speakers for the class. Advised students as they searched for a research mentor and registered for research courses. Planned and coordinated a symposium each semester where faculty and students met to discuss research opportunities.

Graduate Student Mentor, CURO Undergraduate Researcher; Summer 2011

University of Georgia, Athens, GA

Mentored student one-on-one as she learned about the oxidative stress response and introduced her to molecular biology techniques that she used to construct and characterize a bacterial mutant strain.

K-12 Teaching

Instructor

UGA – Duke Talent Identification Program (TIP): Microbes and You; April 21 – 22, 2012

Designed a two-day microbiology course for 8-11th graders. Students cultured bacteria, practiced bacterial staining techniques, performed PCR and gel electrophoresis, and made squash mounts of the termite gut.

Instructor

UGA – Duke TIP: The Invisible World of Microorganisms; January 21, 2012

Created an introduction to microbiology course for 5th and 6th graders. Students examined different types of microorganisms, including bacteria, fungi, and protists under the light microscope.

Service Learning

Partner Teacher

Project: Fostering Our Community's Understanding of Science (FOCUS); Fall 2011

Collaborated with a 5th grade teacher to plan science activities as they related to the life sciences with an emphasis on bacterial, animal, and plant cells.

Community Engagement

Experience UGA; Spring 2014

Girls Inc., Youth Leadership Program; Summer 2013

Leadership without Limits! Migrant Education Youth Program; Summer 2012, Summer 2011

Georgia Science and Engineering Fair Junior Division Judge; Spring 2012, Spring 2011, Spring 2010

Georgia Science and Engineering Fair Junior Division Reader; Spring 2012, Spring 2010

Summer Program for English Language Learners; Summer 2011

Sin Limites; Summer 2011

Science Night Demonstration at Fowler Drive Elementary School; Spring 2011

Clarke County Young Scientist's Fair Demonstration; Spring 2011

Fowler Drive Elementary School Science Demonstrations; Fall 2011, Fall 2010

Whitehead Elementary School Science Demonstration; Fall 2010

Teaching Coursework

EDHI 9040: Using Technology in the College Classroom (online course design)

PBIO 8010: Seminar in Teaching Biology

GRSC 7800: College Teaching and Student Learning

GRSC 7770: Seminar in University Teaching

WIPP 7001: Pedagogy of Writing in the Science Disciplines

Publications

Austin, C., and R. J. Maier. 2013. Aconitase-mediated posttranscriptional regulation of *Helicobacter pylori* peptidoglycan deacetylase. *Journal of Bacteriology*. 195: 5316-5322.

Austin, C., D. Johnson, R. Orlando, and R. J. Maier. 2014. Putative targets for posttranscriptional regulation by *Helicobacter pylori* aconitase. To be submitted.

Presentations

Dustman, W., and C. Austin. 2013. Blended learning in a microbiology classroom. Abstract publication and poster presentation. Best practices for promoting student engagement and learning. University System of Georgia Teaching and Learning Conference, Athens, Georgia.

Phillips (Austin), C., and R. J. Maier. 2012. Posttranscriptional regulation of peptidoglycan deacetylase by aconitase in *Helicobacter pylori*. Abstract publication and poster presentation. Annual Southeastern Branch American Society for Microbiology Meeting, Athens, Georgia.

Phillips (Austin), C., *et al.* 2009. Wild rice viability and germination testing to compare southern and northern ecotypes of northern wild rice, *Zizania aquatica* var. *angustifolia*, for restoration

potential in Michigan. Oral presentation. Michigan Academy Annual Meeting, Detroit, Michigan.

Herron, S., *et al.* 2009. A hands-on learning approach: wild rice conservation, harvesting, restoration, and processing research at an undergraduate teaching university in Michigan. Poster presentation. USDA-CREES National Water Conference, St. Louis, Missouri.

Awards/Honors

University of Georgia Graduate Teaching Assistantship; Summer 2012 – May 2014

Outstanding Teaching Award; Spring 2013

Thank-a-Teacher Recognition; Spring 2013

Center for Undergraduate Research Opportunities (CURO) Graduate Fellow Assistantship; Fall 2010 – Spring 2012

National Science Foundation (NSF) Graduate Research Fellowship Program Honorable Mention; Fall 2011

University of Georgia Graduate Research Assistantship; Summer 2009 – Summer 2010

College of Arts and Sciences Student Research Grant, Ferris State University; Spring 2009

Professional Development

Center for Teaching and Learning (CTL) Future Faculty Program; Fall 2013 – May 2014

American Society for Microbiology (ASM) Science and Teaching Fellowship Program; Fall 2013

CTL Seminar and Workshop Series: “Teaching Naked” presented by Dr. José Bowen; September 2013

University of Georgia STEM Institute on Teaching and Learning; April 2013

University System of Georgia Teaching and Learning Conference: Best practices for promoting engaged student learning; April 2013

CTL Teaching Portfolio Workshop; Spring 2013

Georgia Intern Fellowship for Teachers (GIFT) Program Facilitator; Summer 2012

Professional Memberships

American Society for Microbiology (ASM); 2009 – Present

Microbiology Graduate Student Association; 2009 – 2014

Curriculum Vitae
Daisy L. Daubert

Address:

Ferris State University
Dept. of Biology
820 Campus Drive, ASC 2004
Big Rapids, MI 49307

Residence
1304 Darwin Ave.
Big Rapids, MI 49307
Ph: (503) 421-4882

Ph: (231)591-2554
E-mail: dauberd@ferris.edu

Education:

B.S.	December 1998	Washington State University Pullman, Washington Major: Animal Science Minor: Neuroscience
Ph.D.	June 2006	Oregon Health & Science University Integrative Biomedical Science Program

Teaching Experience (* Denotes new prep)

Ferris State University

Fall 2013	Human Physiology and Anatomy I (BIOL 321) 4 lecture and lab sections *Basic Human Anatomy-Physiology (BIOL 109) 4 lecture sections
Summer 2013	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2013	Human Physiology and Anatomy II (BIOL 322) 3 lecture and lab sections Pathophysiology (BIOL 300) 1 lecture section
Fall 2012	Human Physiology and Anatomy I (BIOL 321) 4 lecture and 3 lab sections *Endocrinology (BIOL 421) 1 lecture section
Summer 2012	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2012	Human Physiology and Anatomy II (BIOL 322) 3 lecture and lab sections Pathophysiology (BIOL 300) 1 lecture section
Fall 2011	Human Physiology and Anatomy I (BIOL 321) 3 lecture and lab sections

	Pathophysiology (BIOL 300) 1 lecture section
Summer 2011	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2011	Human Physiology and Anatomy II (BIOL 322) 2 lecture and lab sections Pathophysiology (BIOL 300) 1 lecture section Human Anatomy and Physiology (BIOL 205) 1 lab section
Fall 2010	Human Physiology and Anatomy I (BIOL 321) 2 lecture and 3 lab sections *Pathophysiology (BIOL 300) 1 lecture section
Summer 2010	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2010	*Human Physiology and Anatomy II (BIOL 322) 3 lecture and lab sections *Human Anatomy and Physiology (BIOL 205) 1 lab section
Fall 2009	*Human Physiology and Anatomy I (BIOL 321) 2 lecture and 4 lab sections

Research Experience:

- 1) Summer 1993. Technical Assistant: Dept. of Veterinary Microbiology and Pathology, Washington State University, Pullman, WA. Dr. Thomas Besser.
- 2) 1994. Technical Assistant: Field Disease Investigative Unit, Washington State University, Pullman, WA. Dr. Thomas Besser.
- 3) 1995-1996. Animal Technician: Wegner Hall Vivarium, Washington State University, Pullman, WA.
- 4) 1996-1999. Technical Assistant: Dept. of Veterinary and Comparative Anatomy, Pharmacology and Physiology, Washington State University, Pullman, WA. Dr. Robert Speth.
- 5) 1999. Graduate Student: Neuroscience Program, Veterinary Comparative Anatomy, Pharmacology and Physiology, Washington State University, Pullman, WA. Dr. Robert Speth.
- 6) 1999-2006. Graduate Student: Integrative Biomedical Science, Department of Physiology and Pharmacology, Oregon Health & Sciences University, Portland, OR. Dr. Virginia Brooks.
- 7) 2006. Postdoctoral Fellow: Department of Pharmacology, University of Missouri-Kansas City, Kansas City, MO. Dr. Deborah Scheuer.
- 8) 2006-2009. Postdoctoral Associate: Department of Physiology and Functional Genomics, University of Florida, Gainesville, FL. Dr. Deborah Scheuer.
- 9) Summer 2012. Visiting Scientist: Oregon Health & Sciences University, Portland, OR. Dr. Virginia Brooks.
- 10) Summer 2013. Research Volunteer: University of Florida, Gainesville, FL. Dr. Deborah Scheuer

Memberships:

American Physiological Society: 2003-present.

Human Anatomy and Physiology Society: 2011-present

Grants:

American Heart Association pre-doctoral fellowship: \$40,000, July 2003-July 2005.

Awards:

One of the four best writing portfolio submissions for Fall 1998 at Washington State University

N.L. Tartar Trust Research Fellowship: July 2001-July 2002.

Oregon Health & Science University student research forum best student talk award: May 2004.

FASEB Summer Research Conferences; Neural Mechanisms in Cardiovascular Regulation travel award: July 2004.

2005 Caroline tum Suden/Frances A. Hellebrandt Professional Opportunity Award

Committee Service:

Biology Awards Committee: 2010-present

Biology Faculty Development Committee: 2010-present

Chair 2012-present

Biology Planning Committee: 2011-present

Academic Senate: 2012-present

Health Promotion Committee: 2012-2013

Biology Geneticist Faculty Search Committee: 2012-2013

Conferences Attended:

Experimental Biology April 2010

Human Anatomy and Physiology Society May 2011

CUR Beginning a Research Program in the Natural Sciences at a Predominantly Undergraduate Institution November 2011

Professional Development:

Attended Faculty Center for Teaching and Learning workshop on using the smart classroom, Fall 2009

Attended Faculty Center for Teaching and Learning new faculty transition seminar series, Spring 2010

Presented a poster at Experimental Biology, April 2010

Attended Faculty Center for Teaching and Learning Presentation Zen, Summer 2010

Attended Human Anatomy and Physiology Society conference, May 2011

Attended Pearson Publishers seminar on the use of different computer/web programs in biology education, March 2011

Attended Academically Adrift seminar at Central Michigan University, October 2011

Attended Faculty Center for Teaching and Learning the Naked Presenter, Spring 2012

Did research with Virginia Brooks at Oregon Health & Science University, May-June 2012

Did research with Deborah Scheuer at the University of Florida, May-June 2013

Attended McGraw Hill seminar on the use of LearnSmart adaptive learning program and Tegrity, September 2013

Continue to work on research started in at the University of Florida, July 2013-present

Abstracts:

Daubert D.L., Meadows G.G., Wang J.H., Sanchez P.J., and Speth R.C.. 1998. Changes in angiotensin II receptors in dopamine-rich regions of the mouse brain with aging and ethanol consumption. Society for Neuroscience Abstracts, 24:2180.

Daubert D.L., Meadows G.G., Sanchez P., and Speth R.C.. 1999. Chronic ethanol consumption increases adrenal angiotensin II receptor density in female mice in an age and time dependent manner. Society for Neuroscience Abstracts, 25:2200.

Daubert D.L., Giraud G.D., Brooks V.L. 2003. Role of nitric oxide in impaired baroreflex function during pregnancy in conscious rabbits. The FASEB Journal, 17:A23.

Daubert D.L., Brooks V.L. 2004. Role of angiotensin II (AngII) and nitric oxide (NO) in the decreased baroreflex gain of pregnancy. *The FASEB Journal*, 18:A1078.

Daubert D.L., Brooks V.L. 2004. Stress decreases baroreflex gain (BRG) through increased nitric oxide (NO). *The FASEB Journal*, 18:A294.

Daubert D.L., Chung M-Y, Brooks V.L. 2005. Decreased insulin sensitivity: mechanism for decreased baroreflex gain during pregnancy? *The FASEB Journal*, 19:A576.

Daubert D.L., Chung M-Y., Brooks V.L. 2006. Decreased insulin sensitivity: mechanism for decreased baroreflex gain during pregnancy? *The FASEB Journal*, 20:A359.

Daubert D.L., Looney B.M., Su Y. and, Scheuer D.A. 2008. Corticosterone in the dorsal hindbrain does not alter the number of neurons in cardiovascular brain regions activated by stress. *The FASEB Journal*, 22: 1171.5

Looney B.M., **Daubert D.L.**, Su Y., and Scheuer D.A. 2008. Low doses of corticosterone act in the dorsal hindbrain to enhance the arterial pressure response to both acute and repeated stress. *The FASEB Journal*, 22: 1171.4

Su Y., **Daubert D.L.**, Summers C., Speth R., Li H., and Scheuer D.A. 2008. Glucocorticoids enhance expression of angiotensin II type 1 receptors in the dorsal hindbrain. *The FASEB Journal*, 22: 1171.6.

Daubert D.L., Dong Y., Scheuer D.A. 2010. Chronic increases in dorsal hindbrain (DHB) corticosterone (Cort) enhance the blood pressure response to restraint stress without changing peripheral Cort. *The FASEB Journal*, 24: 1019.18

Publications:

Daubert, D.L., Meadows, G.G, Wang, J.H., Sanchez, P.J, Speth, R.C. 1999. Changes in angiotensin II receptors in dopamine-rich regions of the mouse brain with aging and ethanol consumption. *Brain Research*, 816:8-16.

Speth, R.C., **Daubert, D.L.**, Grove, K.L. 1999. Angiotensin II: a reproductive hormone too? *Regulatory Peptides*, 79:25-40.

Braileanu, G.T., Simasko, S.M., Speth, R.C., **Daubert, D.**, Hu, J., Mirando, M.A. 2002. Angiotensin II increases intracellular calcium concentration in pig endometrial stromal cells through type 1 angiotensin receptors, but does not stimulate phospholipase C activity or prostaglandin F2alpha secretion. *Reproduction Fertility and Development*, 14:199-205.

Daubert, D.L., Brooks, V.L. 2007. Nitric oxide impairs baroreflex gain during acute psychological stress. *American Journal of Physiology*, 292(2): R955-61.

Daubert, D.L., Liu, D., Zucker, I.H., Brooks, V.L. 2007. Roles of nitric oxide and angiotensin II in the impaired baroreflex gain of pregnancy. *American Journal of Physiology*, 292(6): R2179-87.

Daubert, D.L., Chung M.Y., Brooks, V.L. 2007. Insulin resistance and impaired baroreflex gain during pregnancy. *American Journal of Physiology*, 292(6): R2188-95.

Daubert D.L., McCowan M., Erdos B., Scheuer D.A. 2012. Nucleus of the solitary tract catecholaminergic neurons modulate the cardiovascular response to psychological stress in rats. *Journal of Physiology*, 590(Pt 19): 4881-95.

Publications in Preparation:

Daubert, D.L. and Scheuer, D.A. Involvement of corticosterone and vasopressin in cardiovascular and neuroendocrine responses to psychological stress in rats. Submitted to the *Journal of Physiology*.

Curriculum Vitae

Christopher DeFraia

Assistant Professor, Ferris State University

Phone: (845) 901-0676

Email: cdefraia@gmail.com

Address: 441 Madison Ave Apt. 3

Grand Rapids, MI 49503

EDUCATION

- 2010 **Ph.D.**, Microbiology and Cell Science (Molecular Biology), University of Florida.
Dissertation: Characterization of NPR1 suppressors and their role in plant immunity. Advisor: Dr. Zhonglin Mou.
- 2005 **B.S.**, Biotechnology, *cum laude*, Rutgers University.
Thesis: Molecular characterization of dissimilatory arsenate respiring prokaryotes using an arsenate respiratory reductase gene (*arrA*) as a biomarker. Advisor: Dr. Lily Young.

UNIVERSITY TEACHING EXPERIENCE

- Spring 2014 **Visiting Assistant Professor of Biology**, Department of Biology, Kenyon College, Gambier, OH.
Instructor, Applied Bioinformatics (BIOL 391)
-Developed a new upper-level bioinformatics computer laboratory course for biological science majors
-Taught analysis of single gene and genomic sequence data
-Oversaw presentation and peer-review of independent research projects
Lecturer, Genetic Analysis (BIOL 255)
-Course is a survey of the principles and applications of genetics
-Taught a lecture class of 15 biology majors and non-majors
-Taught students to read and evaluate primary literature
- Fall 2013 **Visiting Professor**, Department of Biology and Earth Science, Otterbein University, Westerville, OH.
Lecturer: Genetics (BIO 2010)
-Taught 72 biological science majors the principles and applications of genetics
-Developed two new lectures on epigenetics and RNA interference
-Collaborated with Otterbein faculty to enrich the genetics laboratory course
- 2005-2006 **Graduate Student**, Department of Microbiology and Cell Science,

University of Florida, Gainesville, FL.

Teaching Assistant, Bacterial Genome Sequencing Analysis (MCB 4320C)

- Taught computer laboratory section of the course in which students annotated genes from a novel bacterium
- Created computer laboratory activities and assessments
- Oversaw independent student projects and creation of manuscripts

Lead Instructor, Basic Biology of Microorganisms Laboratory (MCB 3020L)

- Taught microbiological techniques and theory to 36 microbiology majors in this intermediate-level, six hour/week class.
- Supervised three undergraduate teaching assistants

RESEARCH EXPERIENCE

- 2013-Present **Postdoctoral Researcher**, Department of Molecular Genetics, Ohio State University, Columbus, OH.
Research topic: Architecture and movement of the nucleus
Advisor: Dr. Iris Meier
- 2010-2013 **Postdoctoral Fellow**, Department of Molecular Genetics, Ohio State University, Columbus, OH.
Research topic: Epigenetic silencing of transposable elements
Advisor: Dr. R. Keith Slotkin
- 2005-2010 **Graduate Research Fellow**, Department of Microbiology and Cell Science, University of Florida, Gainesville, FL.
Research topic: Identification and characterization of genes essential for disease resistance in plants.
Advisor: Dr. Zhonglin Mou
- 2004-2005 **Undergraduate Research Fellow**, Department of Environmental Sciences, Rutgers University, New Brunswick, NJ.
Research topic: Identification and sequencing of an arsenic respiration gene from a novel bacterium.
Advisor: Dr. Lily Young
- 2003 **Undergraduate Researcher**, Biotechnology Center for Agriculture and the Environment, Rutgers University, New Brunswick, NJ.
Research topic: Histidine Biosynthesis in *Arabidopsis thaliana*
Advisor: Dr. Thomas Leustek

UNDERGRADUATE RESEARCH MENTORING

- 2013-Present **Anisa Moussa**, Undergraduate Researcher, Ohio State University
-Research topic: Isolation of nuclearmembrane mutants.
- 2011-2013 **Erica Thomas**, Undergraduate Researcher, Ohio State University

- 2010-2011 **Jennifer Bosse**, Undergraduate Researcher, Ohio State University
 -Research topic: Production of mutant plants with active transposons
 -Will pursue a Ph.D. in molecular biology
- Summer 2008 **Mallory Bembry**, NSF REU Undergraduate Research Fellow,
 University of Florida
 -Research topic: Genetic analysis of an immunocompromised mutant
 -Obtained B.S. in Plant Science Biotechnology from Fort Valley
 State University
- 2007-2010 **George Marek**, Undergraduate Researcher, University of Florida
 -Research topic: Isolation of immunocompromised mutant plants
 using a bacterial sensor
 -Obtained B.S. in Microbiology from the University of Florida
 -Currently a MD-PhD student at the University of Florida

PUBLICATIONS

1. **DeFraia, C,** & Slotkin, R. K. (2014). Analysis of retrotransposon activity in plants. *Methods in Molecular Biology* (Clifton, NJ), **1112**, 195–210.
2. **DeFraia C***, Wang Y*, and Mou Z. (2013). The histone acetyltransferase activity of Elongator subunit 3 is essential for its role in plant immunity. *BMC Plant Biology*. **13**:102. (2013). *Indicates equal contribution.
3. Nuthikattu S, McCue AD, Panda K, Fultz D, **DeFraia C**, Thomas EN, Slotkin RK. The initiation of epigenetic silencing of active transposable elements is triggered by RDR6 and 21-22 nucleotide small interfering RNAs. *Plant Physiol.* May;**162**(1):116-31. (2013).
4. **DeFraia, C** and Mou, Z. The role of the Elongator complex in plants. *Plant Signal Behav* 6 (2). (2011).
5. **DeFraia C**, Zhang X, and Mou Z. Elongator subunit 2 is an accelerator of immune responses in *Arabidopsis thaliana*. *Plant J.* 64 (3):511–523. (2010).
6. Xiong Y, **DeFraia C**, Williams D, Zhang X, and Mou Z. Deficiency in a cytosolic ribose-5-phosphate isomerase causes chloroplast dysfunction, late flowering and premature cell death in *Arabidopsis*. *Physiol Plant* **137**: 249–263. (2009).
7. Xiong Y, **DeFraia C**, Williams D, Zhang X, Mou Z. Characterization of *Arabidopsis* 6-phosphogluconolactonase T-DNA insertion mutants reveals an essential role for the oxidative section of the plastidic pentose phosphate pathway in plant growth and development. *Plant Cell Physiol* **50** (7): 1277–1291. (2009).
8. **DeFraia C**, Schmelz E, and Mou Z. A rapid biosensor-based method for quantification of free and glucose-conjugated salicylic acid. *Plant Methods* **4**, 28. (2008).
9. Zhang X, Xiong Y, **DeFraia C**, Schmelz E, and Mou Z. The *Arabidopsis* MAP Kinase Kinase 7: A crosstalk point between auxin signaling and defense responses? *Plant Signal Behav* **3**, 272-274. (2008).

10. Zhang X, Dai Y, Xiong Y, **DeFraia C**, Li J, Dong X, and Mou Z. Overexpression of Arabidopsis *MAP Kinase Kinase 7* leads to activation of plant basal and systemic acquired resistance. *Plant Journal* **52**, 1066-1079. (2007).
11. Perez-Jimenez J, **DeFraia C**, Young L. Arsenate respiratory reductase gene (*arrA*) for *Desulfosporosinus* sp. strain Y5. *Biochem Biophys Res Commun* Dec **16**:(2):825-9 (2005).

ABSTRACTS

1. **DeFraia C.** and Slotkin RK. "Transgenerational Epigenetic Silencing of Transposable Elements in Arabidopsis Pollen." Ohio State University Comprehensive Cancer Center Symposium. Columbus, OH. (2013).
2. **DeFraia C.** and Slotkin RK. "Epigenetic Silencing of Transposons by sRNAs in Arabidopsis." Ohio State University Comprehensive Cancer Center Symposium. Columbus, OH. (2013).
3. **DeFraia C.**, McCue A., and Slotkin, RK. "Transgenerational activation of transposable elements in Arabidopsis." Cell Symposia: Epigenetics and the Inheritance of Acquired States. Boston, MA. (2011).
4. **DeFraia C.**, Zhang X., Mou., Z. "A genetic screen for suppressors of *npr1*-mediated SA toxicity identifies a novel positive regulator of salicylic acid-mediated immunity." 21st International Conference on Arabidopsis Research. Yokohama, JP. (2010).
5. **DeFraia C.** and Mou Z. "A rapid and biosensor-based method for quantification of free and glucose-conjugated salicylic acid." 19th International Conference on Arabidopsis Research. Montreal, CA. (2008).
6. **DeFraia C.** and Mou Z. "Suppressor mutants of *npr1* restore salicylic acid tolerance and pathogen resistance in Arabidopsis thaliana." Florida Genetics. Gainesville, FL. (2007).

FELLOWSHIPS AND AWARDS

2011-2013	Pelotonia Postdoctoral Fellowship
2010	IFAS/CALS Graduate Student Travel Grant
2009	Davidson Graduate Student Travel Scholarship
2005-2009	University of Florida Alumni Fellowship
2004	Center for Environmental Bioinorganic Chemistry Research Fellowship
2003	Rutgers Undergraduate Research Fellows Award

PROFESSIONAL ACTIVITIES

2014	Invited Speaker, Otterbein University
2013	Manuscript Reviewer, Public Library of Science (PLOS) Genetics
2012	Manuscript Reviewer, The Plant Cell
2006-Present	Member, American Association for the Advancement of Science

COMMUNITY SERVICE

- 2011-2012 **Planning Committee Member**, Tour-de-H2O. Helped plan and execute a charity bike ride to fund clean water projects in African villages.
- 2008 **Panel Member**, Café Scientifique. Discussed transgenic plants and genetically modified organisms in a public forum.
- 2007 **Presenter**, Sunbelt Agricultural Expo. Discussed the state of plant disease resistance research with farmers and the public.

UNIVERSITY SERVICE

- 2012-2013 **Co-Instructor**, Young Scholars Program, 7th grade biology. Taught 7th grade students the scientific method through plant biology experiments
- 2010 **Poster Judge**, University of Florida Undergraduate Research Symposium.
- 2006-2007 **Graduate Representative**, University of Florida Career Fair. Discussed graduate school and career opportunities with undergraduates.
- 2005-2006 **Chair**, Invited Speaker Committee for Microbiology and Cell Science.

LABORATORY SKILLS

Confocal and fluorescence microscopy, real time PCR, microarray analysis, northern blot, fluorescence-activated cell sorting, genetic screening, map-based cloning, construction of transgenic plants, next-generation sequencing, western blot, yeast two-hybrid, recombinant protein expression and purification, bisulfite sequencing, chromatin immunoprecipitation, enzyme activity assays, subcellular fractionation, HPLC.

COMPUTER SKILLS

Blackboard, Moodle, DNA and protein sequence analysis, microarray data analysis, Graphpad Prism, ImageJ, Galaxy/Bowtie (analysis of genomic deep sequencing data).

OLUKEMI FADAYOMI
Department of Biological Sciences

Arts and Sciences Commons 2009
Ferris State University
Big Rapids, MI 49307
Telephone: (231) 591-5628
Fax: (231) 591-5240
Email: fadayok@ferris.edu

EDUCATION

- Ph.D.** North Texas State University, Denton, Texas, Biology (Immunoparasitology) 1986
MS Stephen F. Austin State University, Nacogdoches, Texas Biology (Microbiology) 1982
B.Sc. East Texas Baptist College, Marshall, Texas Biology 1980

PROFESSIONAL HISTORY

Fulbright Scholar, University of Namibia 2003

Biotechnology Program Coordinator, Ferris State University 2000 to 2003

Professor of Biology, Ferris State University 1997 to present

Visiting Fellow, Centers for Disease Control and Prevention, Atlanta, GA 1994 to 1996

Associate Professor of Biology, Ferris State University 1992 to 1997

Assistant Professor of Biology, Ferris State University, 1987 to 1992

Visiting Assistant Professor of Biology, Virginia Commonwealth University, Richmond, VA
1986 to 1987

TEACHING EXPERIENCES

Ferris State University (Courses taught)

General Biology 1 and II (zoology and botany)
Cell and Molecular Biology
Introduction to Biotechnology
Medical Parasitology
Advanced Immunology laboratory
Current Topics in Biology

University of Namibia

General Microbiology
Advanced Microbiology

Virginia Commonwealth University 1986-87 (Courses taught)

General Parasitology
Cell Biology
General Microbiology
General Biology

COLLEGE/UNIVERSITY SERVICES

University:

Academic Program Review	2005- present
Senate Diversity Committee	2000 - 2003
Distinguished Teacher Award Committee	2000 - 2001
Scientific Understanding Committee	1999 - 2001
Faculty Research Grant Committee	1998 - 2000
Academic Senate	1997 - 98
Diversity Counts	1997 - 99
Animal Care and Use Committee	1988 – 89, 1990 - 94
Graduate and Professional Council	1992 - 94
Radiation Safety Committee	1990 - 93

College:

Sabbatical Leave Committee	1996 - 97
Curriculum Committee	1991 - 93
Minority Retention Task Force	1990 - 94
Pre-Optometry Advisory Board	1989 - 94, 1997 - 99

Department:

Present or past chair in

Biotechnology Advisory Board	2000 - 03
Department Tenure Review Committee	1996 - 98
Faculty Development Committee	1996 - 97
Candidate Tenure Committee	1996 - 98
Curriculum Committee	1990 - 93
Faculty Development Committee	1989 - 91
General Biology Committee	1988 - 94

Member

Planning Committee	2001- 03
Arts and Science Remodeling Subcommittee	1989 - 90
Curriculum Committee	1988 - 89
General Biology Committee	1987 – present

PROFESSIONAL HONORS, FELLOWSHIPS, LISTINGS, AWARDS, AND RESEARCH SUPPORT

Merit promotion 2007
Fulbright Scholar Award (Namibia, Africa), 2003
College of Arts and Sciences Deans Initiative Grant, 1999, 2002
Michigan Association of Governing Boards' of State Universities Distinguished Faculty Award, 1997
Development of a Multimedia and Interactive Approach to Teaching Laboratory Biology Courses. Ferris State University Faculty Development Grant, 1997.
Establishment and Maintenance of the Life Cycle of the Human Blood Fluke *Schistosoma mansoni*. Ferris State University. Ferris State University Faculty Research Grant, 1997.
Visiting Scientist Fellowship, National Centers for Infectious Diseases, Centers for Disease Control, Atlanta, GA, 1995 –96

Who's who of American Women, 1991
Selected to participate in a two-week intensive NSF workshop on Introduction of Molecular Biology to Undergraduate Curriculum, 1993
Role of Immune Response in the Protection against *Trichinella spiralis*. Ferris State University Faculty Research, 1989.

REPRESENTATIVE PROFESSIONAL ACTIVITIES

Consultancies

- Wadsworth Publishing Company, 2002
- Williams and Wilkins Publishers, 1991
- Wm. C. Brown Publishers, 1989 - 90
- McGraw-Hill Publishing Company, 1989

Membership

- Association of College and University Biology Educators 1997 - present.
- American Society of Tropical Medicine and Hygiene 1994 – present
- International Alliance of Teacher Scholars, Inc. 2001-2002

Publications

- Adewusi, O.I, R. Mitchell III and D. Stewart 1999. "General Biology Laboratory Manual", Kendall/ Hunt Publishing Company, Dubuque, IA. 203 pages
- Adewusi, O.I, Nix, N.A., Lu, X., Colley, D.G. and Secor, W.E. 1996. "*Schistosoma mansoni*: Relationship of tumor Necrosis Factor- α to Morbidity and Collagen deposition in Chronic Experimental Infection." *Experimental Parasitology* 84: 115-123.
- Adewusi, O.I., Colley, D.G., and Secor, W.E. 1996. "Association Between TNF- α and Morbidity During Experimental Chronic Schistosomiasis," *FASEB*.
- Adewusi, K. and Goven, A.J. 1987. "Enhanced Lysophospholipase Activity in Sensitized Mice Challenged with *Trichinella spiralis*: A Role for Cell-cooperation." *Developmental and Comparative Immunology* 11: 215-225.
- Adewusi, K. And Goven, A.J. 1987. "The Effect of Anti-thymocyte Serum on the Eosinophil and Lysophospholipase Responses in Mice Infected With *Trichinella spiralis*." *Parasitology* 94: 115-122.
- Adewusi, K. and Goven, A.J. 1986. "Enhancement of Lysophospholipase Activity with *Trichinella spiralis* Antigen: Evidence for Cell Cooperation." *Journal of Parasitology* 72: 716-722.
- Adewusi, Kemi 1982. "Fine Structure of the Tegument and Associated Structures in the Tapeworm *Cittotaenia*." *Journal of Texas Society for Electron Microscopy* 13:15.

Presentations

- Advances in Agricultural Biotechnology. March 2003. Neudamm College, Windhoek Namibia

- Adewusi, OI, Freeman Jr.GL, Colley, DG, and Secor, WE. December 1996. "Production of TNF- α by Spleen Cells of Mice with Chronic *Schistosoma mansoni* Infections," American Society of Tropical Medicine and Hygiene, Baltimore, MD.
- Adewusi, OI, Colley DG, and Secor WE. June 1996. "Association between TNF- α and Morbidity during Experimental Chronic Schistosomiasis." America Association of Immunologists Annual Meeting, New Orleans, Louisiana.
- Adewusi, OI, Colley, DG, and Secor, WE. November 1995. "Association of Hypersplenomegaly Syndrome and High TNF- α Levels in the Liver Homogenates of Mice with Chronic Schistosomiasis." American Society of Tropical Medicine and Hygiene, San Antonio, Texas.
- Adewusi, OI. October 1995. "The Role of Tumor Necrosis Factor-alpha in Chronic Schistosomiasis." Fancy Gap Immunological Meeting, Fancy Gap, Virginia.
- Adewusi, OI., 1994. "Women of Other Cultures ", Ferris Professional Women's Conference, Big Rapids, MI
- Adewusi, O.I., 1994. "Women's Issues and the Healing of Racism" Big Rapids, MI.
- Adewusi, Olukemi 1992. "Effects of Ivermectin on the Cyclophillidean Tapeworm, *Railletina salmoni*." Annual Midwestern Conference of Parasitologists, Eau Claire, Wisconsin.
- Adewusi, Olukemi 1991. "The Role of Eosinophilic Lysophospholipase in Immune Response against *Trichinella spiralis*." International Symposium of Tropical Diseases, Haikou, Hainan, People's Republic of China.
- Adewusi, Olukemi 1990. "Animals and Parasites," Annual Meeting of American Association of Laboratory Animal Science, Lansing MI.
- Adewusi, Olukemi 1990. "The Protective Role of Eosinophils in Selected Helminth Infections." Department of Immunology and Microbiology, California State University, San Bernardino, California.
- Adewusi, Olukemi 1989. "The Effect of Anti-thymocyte Serum on the Production of Lysophospholipase in Mice Infected with *Trichinella spiralis*" Ferris State University Science Week.
- Adewusi, K.I. 1986. "Eosinophil Mediated Damage to Parasites via Lysophospholipase Activity." Virginia Commonwealth University: Faculty Research Session.
- Adewusi, K.I. and Goven, A.J. 1986. "Enhanced Synthesis of Phospholipase B in mice infected with *Trichinella spiralis*: Evidence for cell cooperation." American Society for Microbiology, Boston MA.
- Adewusi, K.I. and Goven, A.J. 1986. "Effect of Anti-thymocyte serum on phospholipase B activity in mice infected with *Trichinella spiralis*. Southwestern Association of Parasitologists.
- Adewusi, K.I. and Goven, A.J. 1984. " Phospholipase B: Confirmation of the Eosinophil as the Sole Leukocyte Source in an Inflammatory Reaction." Southwestern Association of Parasitologists.

Attendance

- Annual Meeting of American Society of Tropical Medicine and Hygiene, Denver, CO November 2002
- Lily Conference on College and University Teaching, Ferris State University, September 2002
- AAC&U General Education and The Assessment of Student Learning, Dallas, TX. February 2002
- National Association of Biology Teachers' Convention, Montreal, Canada November 2001
- Lily Conference on College and University Teaching, Ferris State University, September 2001
- Association of Biology Education Conference University of Chicago, June 2001
- Critical Thinking Workshop/Think Tank session with Richard Paul, Ferris State March 2001
- McGraw/Hill General Biology Road show, Chicago, IL March 2001
- Diversity in the New Millennium. Eastern Michigan University, Ypsilanti March 2000
- National Science Foundations' Regional Grants Conference, Lawrence, Kansas October, 1998
- Diversity Conference, Central Michigan University, Mt. Pleasant MI, October 1997.
- CDC, Atlanta, GA November 1997
- AAC&U Diversity Network Workshop, Ann Arbor, MI April 1997
- Minority Equity Conference Western Michigan University, Kalamazoo, MI March 1997.
- Campus Climate Imperatives: Building a Just Responsive Community, Central Michigan University, Mt. Pleasant, MI October 1997
- Project Kaleidoscope, a NSF workshop on revitalizing undergraduate biology curriculum, Morehouse College, Atlanta, GA, November 1996.
- International Symposium on Tropical Diseases, Haikou, China November 1991.
- AAAS Symposium on "Biology of Parasitism", New Orleans, LA February 1990.

Chautauqua courses for college teachers:

- Molecular Epidemiology (May 2001)
- Internet and the World Wide Web (May 1997).
- Virology in the Nineties (1993)
- Recombinant DNA: Technology and Application (May 1991),
- Advances in Immunology (February 1989)

Ferris State University Workshops:

- Connecting with the Learners, Summer 2000
- Comprehensive Guidance Program: Re-Awakening the Soul of Education, February 2000
- Faculty winter institute: Development of web-based instruction using Webct, January 1999
- Health Professions Education Futures Conference, Holiday Inn Conference center, March 1997.
- Antibody Mutagenesis In vitro., Biology Lecture Series November 1997
- Cellular Schizophrenia, Biology Lecture Series , February, 1998

CIVIC AND COMMUNITY ACTIVITIES

- Monday/Tuesday Night Technology (presentation of hands-on biology lab experience to area middle school students) 1999 – present
- K-12 Science Olympiad (judge) 1998

Fadayomi

- Odyssey of the Mind (judge and facilitator) 1998
- EXCEL (Founding member. Parental organization for enhancement of education of academically gifted K-12 students.) 1997 - 2001
- Girls' Scout (troop leader) 1994 - 96
- Big Rapids Forum on the Healing of Racism 1992 - 94
- Michigan Department of Education Workshops. (ACT preparatory workshop for economically disadvantaged high school students in rural areas) 1992.
- Wade McCree Program (Presented biology workshops for minority students from urban Detroit) 1992, 1993.
- Martin Luther King Jr./Caesar Chavez/Rosa Parks College day program (Provided hand-on experience for minority high school students) 1990 - 92.
- Muskegon Area Explorations in Math and Science (presenter). A conference for 7th and 8th Grade girls 1990.

CINDY FITZWILLIAMS-HECK

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Big Rapids, Michigan 49307

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Cell: (231) 349-7495

EDUCATION

PhD (candidate), EDUCATION (Learning, Instruction, and Innovation in Environmental Education)

Walden University, Minneapolis, MN

Current Focus: *Using experiential learning techniques and a social-ecological approach in an environmental adult education curriculum to improve environmental literacy, and natural resource management*

(Golden Key International Honour Society)

MS, BIOLOGY (Emphasis: Aquatic Ecology; Endorsement: Conservation Biology)

Central Michigan University, Mt. Pleasant, MI

Thesis: *The effects of filamentous cyanobacteria on the growth, survivorship, and fecundity of Daphnia pulex*. Emphasis on intricacies of food web dynamics within a lake ecosystem.

(Honors Graduate)

BS, BIOLOGY EDUCATION (General Science Minor)

Ferris State University, Big Rapids, MI

Michigan Secondary Teaching Certificate

(Honors Graduate)

WORK HISTORY

Biology Instructor, Ferris State University (2001-present)

Classes Taught:

1. Nature Study 116 (lecture and lab – since 2005)
 2. Ecology 442 (lecture and lab – 2009, 2002)
 3. Biological Concepts 103 (lecture and lab – 2006, 2005)
 4. Environmental Biology 111 (lecture and lab – 2005, 2003, 2002)
 5. Laboratory Instructor [as needed] for General Biology 121, 122, Ecology 442, Environmental Biology 111, Biological Concepts 103
- Place-based education: 1) Sub-watershed studies before and after two rain gardens planted (partnerships with the Muskegon River Watershed Assembly - MRWA, Big Rapids High School, and Mecosta-Osceola Career Center); 2) 'My Nature Spot: Developing a connection with one place in nature'. A semester-long project using journaling to connect students with the outdoors and the concepts learned in class; emphasis on a watershed perspective.
 - Community service project [each semester]: Litter clean-up along local waterways to help students become more aware of human impact on the environment (a written reflection of the experience assigned); associated with Alliance for the Great Lakes, The Ocean Conservancy research, and the MRWA.
 - Active-learning: Implemented environmental education activities, macro-models, and inquiry-based learning in the classroom and laboratory settings.
 - Technology: Classroom performance system ("clickers") used in lectures to stimulate discussion, assess student learning, and as a formative assessment tool (2009-2013).

Instructor of Education, Ferris State University (Summer 2013)

Classes Taught: EDUC 494; EDUC 694 – Special Topics in Conservation and Experiential Education

- Courses revolved around the Michigan Department of Natural Resources' (DNR) week-long workshop, *Academy of Natural Resources* (ANR).
- Students consisted of certified teachers, pre-service teachers, non-formal educators.
- Focused on innovative application and assessment of workshop material.

Environmental Educator, Independent Contractor (2005-2013)

- Assisted in developing structure of teacher training workshops for the 'Aquatic Academy for Teachers', and presented programs (MRWA Education Committee – 2008, 2009, 2010, 2013)
- Planned and presented at the 'Natural Shorescaping Workshops' within the Muskegon River Watershed (with the MRWA Education Committee) (2011, 2012).
- Led training seminars for volunteers interested in collecting benthic macroinvertebrates for stream quality assessments within the Muskegon River Watershed (an ongoing project affiliated with the MRWA, MiCorps and Michigan Department of Environmental Quality) (2005-present).
- Facilitator for third and fourth grade water festivals (MRWA – 2009, 2010, 2011, 2013)

Faculty Advisor, Outdoor Club of Ferris State University (2004-2005, 2011-present)

- Offered guidance and mentored club members interested in outdoor recreation, environmental education, and volunteerism in the outdoors.

Field Trip Co-Leader, Ferris State University - Geology of Michigan (2004) and Geology of Martinique (2003)

- Assisted in planning trip destinations, educational material covered, and directing students.
- Provided information about the natural history of the areas visited.

Environmental Educator, Naturalist, Asst. Program Coordinator, Hiking Club President, and Assistant Summer Camp Director, Woldumar Nature Center - Lansing, MI (1999-2001)

- Developed, coordinated, and taught a broad range of environmental biology and ecological programs for schools (following their science curriculum for pre-K through 12th grades), families, adults, and senior citizens.
- Led numerous interpretive nature walks year-round that emphasized food web dynamics, succession, other ecological concepts, and taxonomy.
- Founded and coordinated the Hiking Club that promoted environmental education, stewardship, and maintaining overall health and well being by monthly newsletters and weekly local hikes.
- Created, organized, and executed educational backpacking trips for adults that focused on the natural history, and watershed ecology in the area that was visited in MI. Areas visited and studied were Isle Royale National Park, North and South Manitou Islands/Sleeping Bear Dunes National Lakeshore, Nordhouse Dunes Wilderness Area, and the Manistee River/North Country Trail Loop.
- Assisted in development and implementation of a new environmental education summer day camp structure.
- Mentored high school students in Project GREEN, a cooperative school program that focused on water quality testing and interpretation of the Grand River Watershed.
- Assisted in organization and leadership of the Teachers Programming Committee for Environmental Education in the Classroom.

Biology Laboratory Instructor, Central Michigan University (1998-1999)

- Taught introductory college biology laboratories for biology majors, non-majors, and teacher education students.
- Created new laboratory exercises.
- Assisted in the updating of the Introductory Biology Laboratory Manual.

Research Assistant, Central Michigan University (1997-1998) – *Predatory zooplankton as the potential cause for the decline of yellow perch larva in Lake Michigan.*

- Collected, identified, and enumerated zooplankton and larval fish in Lake Michigan and Crystal Lake.
- Responsible for the organization and maintenance of the aquatics laboratory.

Substitute Teacher, Mecosta/Osceola, MI ISD (1996-1997); Lansing Area Schools, MI (1999-2001)

- Long-term subbing position for tenth grade biology at Pine River H.S. (1997).

Student Teacher (High School Physical Science & Biology) (1996) – Pine River High School, Leroy, MI.

- Immediately took initiative in teaching four, ninth-grade physical science classes, and one tenth-grade biology class.
- Effectively incorporated organized cooperative learning groups in the classroom.

PROFESSIONAL COMMITMENTS

- MRWA Executive Board – Vice Chair (2013-2015)
- Michigan Alliance of Environmental and Outdoor Education (MAEOE) Board of Directors (2013)
- DNR-ANR Advisory Committee (2013-present)
- MRWA Education Committee (2002-present)
- MRWA Action Committee (2013-present)
- MRWA Voyage of Discovery Committee (2012-present)
- Mecosta County Northern Lights Environmental Award Committee (2013)
- Ferris Non-tenure Track Faculty Organization Leadership Committee – Contract Review Chair (2009-present)

PROFESSIONAL DEVELOPMENT ACTIVITIES

- Great Lakes Stewardship Initiative's *Place-Based Education Conference* (2012, 2013)
- MAEOE Annual Conference (2000, 2012, 2013)
- *Great Lakes Conference on Teaching and Learning* – CMU (2013)
- *Transforming Education Towards a More Sustainable Future* – Green Teacher (2013)
- Michigan Science Teacher's Association Annual Conference (2013)
- *Assessment in Action: The Use of Electronic Media for Classroom Assessment* (FSU Faculty Center for Teaching and Learning – FCTL, 2012)
- *Game-Based Learning* (FSU – FCTL, 2012)
- *Pearson's Innovations in Teaching Science* (Washtenaw Community College 2012)
- Preparing Students for a Changing Climate: Campus Sustainability Day 2012 – webcast and interactive panel
- Academy of Natural Resources (DNR): *Forests, Field, & Fins Field Camp* (Roscommon, MI 2012)
- National Wildlife Federation's webinar, *Sustainability in the Classroom* (2011)
- Environmental Protection Agency's webinar, *State of the Lakes Ecosystem Conference* (2011)
- Great Lakes Conference 2010 in E. Lansing, MI - *Learning from the Past, Looking Towards the Future* (2010)
- National Wildlife Federation Webinar – *Evaluating Campus Sustainability* (2010)
- Great Lakes Beach Conference 2010 – *Rapid Analytical Methods Wet Lab*
- The Watershed Academy's *Healthy Lakeshores Through Better Shoreline Stewardship* (2010)
- Interactive webinar on *Creating a Native Plant Specification* – JFNew Full-Service Ecological Solutions (2010)
- Science Fair Judge for Mecosta-Osceola Intermediate School District's, Math, Science, Technology Center (2010)
- Benthic Macroinvertebrate Symposium – MiCorps (Bay City, MI 2005)
- Lilly Conference Series on College and University Teaching and Learning (Traverse City, MI 2002, 2003)
- Pre-Cambrian Geology of the Marquette area (MTU – Ted Bornhorst, Field Geology, May 2002)
- Karst Geology of Michigan field trip (Association of Professional Geologists, Gaylord, MI 2002)
- National Association of Interpreters Annual Meetings (1999-2001)

CERTIFICATIONS

- Wilderness Awareness School - Kamana Naturalist Training Program (2011-2012)
- Environmental Protection Agency's Watershed Management Training Certificate (2010)
- Wildlife Management – Queens College, NY (2010)
- Wilderness First Responder (2001)
- Project Learning Tree (2001)
- Project WILD (2000)

PRESENTATIONS

- *Healthy Lake Ecosystems* (Michigan Chapter, North American Lake Management Society - MCNALMS 2012)
- *Understanding the Shoreline* (MCNALMS 2012)
- *Planning a Natural Shoreline Landscape* (MCNALMS 2012)
- *Basics of Natural Shoreline Ecosystems* (Natural Shoreline Workshop – MRWA 2011, 2012)
- *Native Plant Selection and Design* (Natural Shoreline Workshop – MRWA 2011, 2012)
- *Maintaining a Natural Shoreline* (Natural Shoreline Workshop – MRWA 2011, 2012)
- *Volunteer Stream Monitoring Program* (MRWA & MiCorps) Seminars consisted of educating the public on the physical and ecological dynamics of streams, the biology of benthic macroinvertebrates, and proper sampling and identification techniques (2005-present).
- *Lake & River Monitoring* (MRWA's Aquatic Academy for Teachers 2009, 2010)
- *What's in the Water and Why Should We Care? An Introduction to Simple and Fun Ways to Water Monitoring* (MRWA's Aquatic Academy for Teachers 2008)
- *Earth Day Enlightenment Hike: The History and Significance of Earth Day* (FSU Wellness Week 2007, 2008)
- *This is my True Home: Using Experiential & Place-based Education to Enhance Learning* (FSU Recreation Leadership seminar series 2008)
- Poster presentation at CMU of thesis research *The effects of filamentous cyanobacteria on the growth, survivorship, and fecundity of Daphnia pulex* (1999)
- Poster presentation at CMU of research on (co-author) *Daily vertical migrations of Chaoborus sp. in response to presence or absence of potential food sources* (1998)
- Poster presentation at CMU on *Sedimentation characteristics & zooplankton assemblages used to determine lake-level fluctuations in Lake Michigan* (1997)

FUNDING

- *Helping Hands to Reforest the Muskegon River Watershed*. Consumers Energy grant for purchasing trees (2012).
- Co-founder/coordinator for the grassroots venture, *Project Stormwater: A collaborative effort between Ferris State University faculty, staff, and students, and the Muskegon River Watershed Assembly, to reduce stormwater runoff into the Muskegon River*. Funding awarded through Ferris Foundation Grant, and Consumers Energy to construct a rain garden on campus (2011, 2010).
- FSU Academic Service Learning funds used to complete projects on campus to reduce stormwater runoff (2009, 2008), and clean up litter along local waterways (2007).
- Received funding from FSU's Political Engagement Project for students to conduct an ecological assessment of the property at Camp Newaygo, MI, *A comparison between the windward and leeward communities of a ridge - biotic and abiotic similarities and differences* (2009).

AWARDS

- Mecosta County Northern Lights Environmental Award (2013)

PROFESSIONAL MEMBERSHIPS

- National Science Teachers Association
- Michigan Science Teachers Association
- American Institute of Biological Sciences
- North American Association of Environmental Education
- Michigan Alliance of Environmental and Outdoor Educators
- Association of Watershed and Stormwater Professionals
- Ecological Society of America
- Big Rapids Rock, Mineral, and Gem Club
- National Wildlife Federation – Campus Ecology
- Muskegon River Watershed Assembly
- The Michigan Nature Association
- Woldumar Nature Center
- The Nature Conservancy
- The Sierra Club

STEWARDSHIP & CONSERVATION EXPERIENCE

- Lake Sturgeon release in the Black River of Michigan (2013)
- Stream quality monitor of Mitchell Creek & Ives Ave Creek (using macroinvertebrates as indicators) (2007-present)
- Great Backyard Bird Count (2010-present)
- Salmon egg harvesting and fertilization for Salmon-in-the-Classroom program (2012 MAEOE conference)
- Assisted in the design & planting of five native rain gardens for the MRWA (2007-2012)
- Organized & participated in 'Litter Cleanup Day' along the Muskegon River, Big Rapids, MI (2002-present) – Alliance for the Great Lakes, The Ocean Conservancy, and MRWA.
- Geology field assistant for the investigation & interpretation of the Muskegon River Valley glacial geology (FSU -2001-present)
- Evaluated Woldumar Nature Center's (WNC) conservation efforts then proposed & implemented plans for composting, removal of exotic species & promoting native/indigenous plant species (1999-2001).
- Researched and planted native prairie plants and wildflowers at WNC (1999-2001).
- Participated in the removal of the exotic plant, purple loosestrife, along the Grand River in Lansing, MI (2000).
- Trained in and participated with The Nature Conservancy's (TNC) for prescribed prairie burns at WNC (2000).
- Participated in bird banding during 1998-1999 Fall and Spring migration through Mt. Pleasant, MI.
- Assisted in fish shocking and inventory of trout populations in the west Pere Marquette River, MI (1998).
- Volunteered for TNC's removal of exotic plant species in the Sleeping Bear Dunes National Lakeshore (1998).
- Assisted with the riverbank preservation along Chippewa River (1997) near Mt. Pleasant, MI.

REFERENCES

Dr. Joe Lipar - Department Head of Biological Sciences (2011-present), FSU (231) 591-2550
Ms. Terry Stilson – Program Coordinator, MRWA (231) 591-2324
Mr. Kevin Frailey – Education Services Manager, DNR (517) 373-7306
Dr. Karen Strasser – former Department Head of Biological Sciences, FSU (2006-2011), FSU (231) 591-3856
Dr. Gary Rodabaugh - Professor of Biology, FSU (231) 591-2308
Ms. Bridget Booth - WNC, Program/ Environmental Education Director (formerly) (517) 853-9863
Dr. Scott McNaught - Professor of Biology, Graduate Advisor, CMU (517) 774-1335
Mr. Dan Benjamin - Biology Instructor, Teaching Assistant Coordinator, CMU (517) 774-2491

Clifton V. Franklund

Personal Information:

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Web Site: <http://franklund-micro.com>

Twitter: [@Dr_Franklund](https://twitter.com/Dr_Franklund)

Blog: <http://www.wordpress.com/assessmentinaction>

Professional Employment:

Associate Professor Department of Biological Sciences, Ferris State University, Big Rapids, MI
 2009 – present

Assistant Professor Department of Biological Sciences, Ferris State University, Big Rapids, MI
 2006 – 2009

Assistant Professor Department of Biological Sciences, California State University, Long Beach,
 Long Beach, CA 2000 – 2006

Research Associate Department of Microbiology and Immunology, Virginia Commonwealth
 University, Richmond, VA 1999 – 2000

Adjunct Professor Division of Natural Sciences, Piedmont Virginia Community College,
 Charlottesville, VA 1996 – 1999

Post-Doctoral Training:

University of Virginia, School of Medicine, Department of Microbiology. Charlottesville, Virginia 22908.
 February 1997 to 1999. Was a research associate in the laboratory of Dr. Joanna Goldberg, Associate
 Professor of Microbiology.

University of Virginia, School of Medicine, Department of Microbiology. Charlottesville, Virginia 22908.
 January 1991 to January 1997. Was a research associate in the laboratory of Dr. Robert J. Kadner,
 Professor of Microbiology.

Education:

Medical College of Virginia/Virginia Commonwealth University, Health Sciences Division. Richmond,
 Virginia 23298. August 1986 to December 1990. Ph.D. Department of Microbiology and Immunology.
 Advisor: Dr. Phillip Hylemon, Professor of Microbiology.

North Dakota State University, Fargo, North Dakota 58105. August 1984 to July 1986. M.S. Department
 of Bacteriology. Advisor: Dr. Thomas Glass, Associate Professor of Bacteriology.

Concordia College, Moorhead, MN 56560. August 1980 to May 1984. B.A. Major: Biology. Minor:
 Philosophy.

Professional Affiliations:

American Society for Microbiology, Michigan Regional Branch of the American Society for Microbiology, Sigma Xi Honor Society, and the Anaerobe Society of the Americas

Professional Roles:

Academic Affairs assessment coordinator
Ferris State University Quality Matters Trainer
Ferris State University Online Instruction Trainer
Ferris State University Blackboard Learn 9.1 Mentor (assigned 33 faculty members)
Assessment coordinator for the department of Biological Sciences
Co-program coordinator for the B.S. in Biological Science

Awards:

Top 25 STEM Professor in Michigan (2013)
Ferris State University Distinguished Teacher of the Year (2012)
Softchalk Higher Education Online Challenge Winner (2011)
Exemplary On-Line Course, Web Enhanced (2007)

Certificates:

Certificate of Online Adjunct Teaching, University of Maryland (2013)
Assessment Specialist Graduate Certificate, James Madison University (Begun 2013)

Courses Taught at Ferris State University:

BIOL108: *Medical Microbiology*. (2006 - present)

This three-unit course is taught every semester and is part of the core curriculum for allied health sciences majors at Ferris State University. The class focuses upon the diversity of microbial life forms, the basis of a protective immune defense, and a brief survey of important microbial pathogens. The laboratory covers essential microbiological techniques and includes a group-based directed research project on a topic of the students' choosing.

BIOL286: *General Microbiology*. (2006 - present)

This three-unit course is taught every semester and is part of the curriculum for the clinical laboratory sciences program at Ferris State University. The lectures serve as a brief introduction to the microbial world including microbial structure, function, metabolism, classification, genetics, control of microbial growth and immunity. The laboratory provides practical experience with fundamental concepts, techniques and instrumentation and includes fieldtrips to the Big Rapids wastewater treatment plant. I am also attempting to coordinate visits to the Yoplait plant in Reed City, the Big Rapids hospital diagnostic lab, and the Big Rapids water treatment plant.

BIOL387: *Microbiology and Immunology*. (2008 and 2009)

This three-unit course is taught every semester and is part of the curriculum for the clinical laboratory sciences program at Ferris State University. The lectures serve as a brief introduction to the microbial world including microbial structure, function, metabolism, classification, genetics, control of microbial growth and immunity.

BIOL472: *Proteins*. (2013)

This three-unit course is taught every other year and is part of the curriculum for the Biotechnology program at Ferris State University. The class covers protein structure, function, purification, and characterization with an emphasis on lab applications, problem solving, and trouble-shooting.

Courses Taught at Other Institutions:

MICR320: *Bacterial Pathogenesis*. CSULB (2000 – 2006)

This five-unit course is taught every semester and is part of the core curriculum for Microbiology majors at CSULB. Lectures were focused upon molecular mechanisms of host-parasite interactions in a broad range of human pathogens.

MICR471: *Bacterial Physiology*. CSULB (2000 – 2006)

This is a three-unit course that is taught once per year during the spring semester. Using a comparative approach, the growth, metabolism, nutrition, and ecology of bacteria and archaeobacteria are discussed. Recent publications are used to compare and contrast the diverse strategies employed by prokaryotes to adapt to their environment.

BIOL696: *Research Methods*. CSULB (2002 – 2006)

This three-unit, course is offered during the fall semester for graduate students in the process of completing their thesis. Topics covered include experimental design, data presentation, computer graphics, and technical writing. The class culminates with formal oral, written, and poster presentation of their research.

BIOL220H: *Introduction to Bioinformatics*. CSULB (2004)

This two-unit, team-taught course is offered during the fall semester to honors students in the department. Topics covered include the nature of biological information, database design and queries, sequence comparisons, phylogenetic analyses, and predictions of structure and function based upon sequence data. One half of the course time is dedicated to using current computer algorithms for actual sequence analyses.

MICR200: *General Microbiology for Health Professionals*. CSULB (2005)

This is a general microbiology course for those planning careers in nursing, health care and education, and foods and nutrition. This course offers a broad overview of the structure, function, and diversity of microorganisms with an emphasis on their roles in human health. I served as a laboratory instructor.

NAS185: *Microbiology*. Piedmont Virginia Community College (1997 – 1999)

This four-unit course provided an introduction to microorganisms, their metabolism, and involvement in human disease. Emphasis was placed upon prokaryotic metabolism and genetics as well as the molecular and cellular aspects of the human immune system.

BIO101/102: *Introductory Biology Laboratory*. Piedmont Virginia Community College (1996 –1999)

Laboratory sessions included exercises spanning Botany, Animal Physiology, Biochemistry, Genetics, and Molecular Biology. As laboratory instructor, I prepared, presented, and graded all lab materials, quizzes, and practical exams.

Research Funding:

Faculty Research Grant – Lipopolysaccharide sialation in *Fusobacterium nucleatum*

Faculty Research Committee, Ferris State University 2007

Role: P.I.

3 S06 GM 063119-02S2 (Kingsford, Laura) 2003 - 2005

Support for Continuing Research Excellence (SCORE)

Role: P.I.

2 R25 GM 0089-04 (Bauer, Roger) 2003 – 2004

Bridges to the Future: Baccalaureate Bridge Program

Role: Faculty participant.

Committee Appointments at Ferris State University:

Department:

- Department Planning Committee (2011-present) – currently serving as chair
- Department Awards Committee (2012-present)
- Geneticist Faculty Search Committee (2012-2013)
- Microbiologist Faculty Search Committee (2010-2011)
- Developmental Biologist Faculty Search Committee (2007-2008)
- Department Curriculum Committee (2007-2009)
- Department Assessment Committee (*ad hoc*) (2009-present) – currently serving as chair

College:

- College of Arts and Sciences Dean Search Committee (2011-2012)
- College of Arts and Sciences Planning Committee (2011-present)
- College of Arts and Sciences Assessment Committee (2012-present, current chair)
- College of Arts and Sciences Assessment Committee (2007-2013)

University:

- Vice-President of Student Affairs Search Committee (2013, co-chair)
- National Competitive Scholarships Committee (2006-2007)
- Human Subjects Review Committee (2006-2013)
- General Education Scientific Understanding Committee (2008-2010)
- University Assessment Committee (2012-present, current chair)

Directed Student Research at Ferris State University:

<u>Student Name</u>	<u>Program</u>	<u>Tenure</u>	<u>Current Position</u>
1. Peter Wissink	Pre-medicine	2013	Calvin College
2. Jennifer Franklund	Biology	2012	Southern Illinois Univ.
3. Tracy Elliott	Pre-Dentistry	2011	Student at FSU
4. Ewa Slotwinski	Biotechnology	0211	Student at FSU
5. Alicia Weeks	MSTS	2011	High school
6. Jason Workman	Biotechnology	2010	Student at FSU
7. Allison Wyatt	Biotechnology	2010	Student at FSU
8. Jeremy Way	Pre-Medicine	2009	Student at FSU
9. Akshay Chellappa	Biotechnology	2009	Student at FSU
10. Erika Dittmar	Pre-Medicine	2008	USDA Forest Service
11. Ashley Pointdexter	MSTC	2008	High school
12. Bridgette Buse	MSTC	2008	High school
13. David Bosak	College of Optometry	2008	DO program
14. Brad Christopherson	College of Optometry	2008	DO program

I directed an additional 30 students while a faculty member at California State University, Long Beach

Selected Professional Development Training Attended:

New Faculty Orientation Week
Using RSS Feeds for Teaching or Research
Ways to Conduct & Manage Class Discussions
CAS Outcomes-Assessment
Motivating Students
McGraw-Hill Microbiology Symposium, Atlanta, GA
Managing a College Classroom--Control, Community and Discipline
SLI 2007, Creating a Learning-Centered University
Conducting Effective Class Discussion
Faculty Writing Institute
Online Instructor Certification
2008 NC State Undergraduate Assessment Symposium
Making a Difference in Student Learning: Assessment as a Core Strategy, HLC (2009)
New Faculty Orientation Week, Planning session (2011 and 2012)
Inquiries into Teaching and Learning (2010 and 2011)
Lilly North Conference, Traverse City, MI. 2007, 2008, 2009, 2010
IUPUI Assessment Institutes (2012 and 2013)
North Central Association – HLC (2012 and 2013)
HLC-NCA Assessment Academy (2013)
Improving the Validity and Reliability of Your Tests or Quizzes (2010)
Planning an Assessment of Student Learning (2011)
Inquiries into Teaching and Learning dinner (2011)
Welcome Back! Faculty Professional Development Day (2012 and 2013)
Evidence-Based Teaching: A Journal Club on Research in Teaching and Learning (2011 and (2012)
Best Practices Workshop (2012)
Quality Matters Training (2012)
Blackboard Learn 9.1 Training (both modules 1 and 2) (2012)

Abstracts:

1. Creating Institutional Processes that Enhance Faculty Engagement in Learning Assessment. HLC-NCA Assessment Workshop. 2013.
2. **Franklund, C.V.** Facilitating Collaborative Learning with Google Apps. Lilly Conference on College and University Teaching. 2010.
3. Woodman, H., **C.V. Franklund**, and C. Conley-Sowels. Rubrics + Readability = Retention -- The 3 Rs: Making the Connection. Lilly Conference on College and University Teaching. 2010.
4. Woodman, H., **C.V. Franklund**, and C. Conley-Sowels. Rubrics Rock! Using Rubrics to Assess Authentic Student Learning. Texas A&M Assessment Conference. 2010.
5. Woodman, H., **C.V. Franklund**, and C. Conley-Sowels. Rubrics Rock! Rubistar and Beyond: Rubrics to Use Monday Morning. Lilly Conference on College and University Teaching. 2009.
6. **Franklund, C.V.** Using Computer-Assisted Formative Feedback to Enhance Learning in an Introductory-Level Microbiology Course. Lilly Conference on College and University Teaching. 2008.
7. Nolan, D., H. Abdelhadi, and **C.V. Franklund**. Cloning and Characterization of the *recA* Gene from *Fusobacterium nucleatum* 10953. National Meeting of the American Society for Microbiology. 2003
8. Raps, A., and **C.V. Franklund**. Cloning and Analysis of a Lipopolysaccharide Core Gene from *Fusobacterium nucleatum*. National Meeting of the American Society for Microbiology. 2002.

9. Raps, A., and **C.V. Franklund**. Cloning and Analysis of a Lipopolysaccharide Core Gene from *Fusobacterium nucleatum*. Southern California Branch Meeting of the American Society for Microbiology. 2001.
10. Krebs, T., **C.V. Franklund**, and J.B. Goldberg. Function Analysis of Enzymes in Lipopolysaccharide Biosynthesis. Annu. Meet. of the Virginia Branch of the Amer. Soc. for Microbiol. 1999. (Honorable Mention).
11. Dean, C.D., **C.V. Franklund**, J.D. Retief, M.J. Coyne, Jr., K. Hatano, D.J. Evans, G.B. Pier, and J.B. Goldberg. Sequence Analysis of the O Antigen Locus from the Serogroup O11 *Pseudomonas aeruginosa* Strain PA103. Abstr. Annu. Meet. Am. Soc. Microbiol. 1998.
12. **Franklund, C.V.** and J.B. Goldberg. Cloning and Characterization of *gltX* from *Pseudomonas aeruginosa*. Abstr. Annu. Meet. Am. Soc. Microbiol. 1998.
13. **Franklund, C.V.** and R.J. Kadner. Regulation of *btuB* in *Escherichia coli*. Abstr. Annu. Meet. Am. Soc. Microbiol. 1996.
14. Baron, S. F., **C. V. Franklund**, and P. B. Hylemon. Cloning, Sequencing, and Expression of the Gene coding for 7 α -hydroxysteroid dehydrogenase from *Eubacterium* sp. VPI 12708. Southeastern Microbial Physiology and Genetics Conference 1994.
15. Baron, S. F., **C. V. Franklund**, and P. B. Hylemon. Characterization of the Bile Acid-Inducible NADH:Flavin Oxidoreductase Gene from *Eubacterium* sp. VPI 12708. Annu. Meet. of the Virginia Branch of the Am. Soc. for Microbiol. 1993.
16. Baron, S. F., **C. V. Franklund**, and P. B. Hylemon. Characterization of the Bile Acid-Inducible NADH:Flavin Oxidoreductase Gene from *Eubacterium* sp. VPI 12708. Abstr. Annu. Meet. Am. Soc. Microbiol. 1993.
17. **Franklund, C.V.**, and P.B. Hylemon. Purification and Characterization of a 7 α - Hydroxysteroid Dehydrogenase from *Eubacterium* sp. Strain VPI 12708. Annu. Meet. of the Virginia Branch of the Am. Soc. for Microbiol. 1989. (Outstanding Speaker Award)
18. **Franklund, C.V.**, and P.B. Hylemon. Evidence for a Multiprotein Complex Containing the Cholate-Inducible NADH:Flavin Oxidoreductase from *Eubacterium* sp. Strain VPI 12708. Abstr. Ann. Meet. Am. Soc. Microbiol. 1988.
19. **Franklund, C.V.**, and P.B. Hylemon. Evidence for a Multiprotein Complex Containing the Cholate-Inducible NADH:Flavin Oxidoreductase from *Eubacterium* sp. Strain VPI 12708. Annu. Meet. of the Virginia Branch of the Amer. Soc. for Microbiol. 1988.
20. **Franklund, C.V.**, and T.L. Glass. Glucose Uptake by the Cellulolytic Rumen Anaerobe *Bacteroides succinogenes* S85. Annu. Meet. of the North Dakota Branch Am. Soc. Microbiol. 1986.
21. **Franklund, C.V.**, and T.L. Glass. Glucose Uptake by the Cellulolytic Rumen Anaerobe *Bacteroides succinogenes* S85. Abst. Ann. Meet. Am. Soc. Microbiol. 1986.

Peer Reviewed Publications:

1. Pandak, W.M., P. Bohdan, **C. Franklund**, D.H. Mallonee, G. Eggertsen, I. Björkhem, Z.R. Vlahcevic, and P.B. Hylemon. Expression of Sterol 12 α -Hydroxylase Alters Bile Acid Pool Composition in Primary Rat Hepatocytes and *In Vivo*. *Gastroenterology* **120**:1801-9 (2001).
2. Dean, C.D., **C.V. Franklund**, J.D. Retief, M.J. Coyne, Jr., K. Hatano, D.J. Evans, G.B. Pier, and J.B. Goldberg. Characterization of the O Antigen Locus from the Serogroup O11 *Pseudomonas aeruginosa* Strain PA103: Identification of the O Antigen Polymerase Gene. *J. Bacteriol.* **181**: 4275–4284 (1999).
3. **Franklund, C.V.**, and J.B. Goldberg. Cloning and Characterization of *gltX* from *Pseudomonas aeruginosa* PAK. *J. Bacteriol.* **181**:3582-3586 (1999)

4. **Franklund, C.V.** and R.J. Kadner. Multiple Transcribed Elements Control Expression of the *Escherichia coli* *btuB* Gene. *J. Bacteriol.* **179**:4039-4042 (1997)
5. Aitchison, Paul M., Spencer B. Gay, **C.V. Franklund**, and J.J. Jackson. A Web-based End of Rotation Quiz. *Acad. Radiol.* **4**: 860-61 (1997).
6. **Franklund, C.V.**, S.F. Baron, and P.B. Hylemon. Characterization of the *baiH* Gene Encoding a Bile Acid-Inducible NADH:Flavin Oxidoreductase from *Eubacterium* sp. Strain VPI 12708. *J. Bacteriol.* **175**:3002-3012 (1993).
7. Baron, S.F., **C.V. Franklund**, and P.B. Hylemon. Cloning, Sequencing, and Expression of the Gene Coding for Bile Acid 7-Hydroxysteroid Dehydrogenase from *Eubacterium* sp. Strain VPI 12708. *J. Bacteriol.* **173**:4558-4569 (1991).
8. Hylemon, P.B., P.D. Melone, **C.V. Franklund**, E. Lund, and I. Björkhem. Mechanism of Intestinal 7-dehydroxylation of Cholic Acid: Evidence that Allo-Deoxycholic Acid is an Inducible Side-Product. *J. Lipid Res.* **32**: 89-96 (1991).
9. **Franklund, C.V.**, P. de Prada, and P.B. Hylemon. Purification and Characterization of a Microbial, NADP-Dependent Bile Acid 7-Hydroxysteroid Dehydrogenase. *J. Biol. Chem.* **265**: 9842-9849 (1990).
10. White, W.B., **C.V. Franklund**, J.P. Coleman, and P.B. Hylemon. Evidence for a Multigene Family Involved in Bile Acid 7-Dehydroxylation in *Eubacterium* sp. Strain VPI 12708. *J. Bacteriol.* **170**: 4555-4561 (1988).
11. **Franklund, C.V.**, and T.L. Glass. Glucose Uptake by the Cellulolytic Rumenal Anaerobe *Bacteroides succinogenes*. *J. Bacteriol.* **169**: 500-506 (1987).

Non-Peer Reviewed Publications:

1. Lathrop, J.T., **C.V. Franklund** and R.J. Kadner. Communication Between Membranes in TonB-Dependent Transport Across the Bacterial Outer Membrane. In W.N. Kohings, H.R. Kaback and J.S. Lolkema (eds). *Handbook of Biol. Phys.* Vol. 2. Elsevier Press (1996).
2. **Franklund, C.V.** *Microbiology.* Chancellors Learning Systems, Fishers, IN. (2004).

DAVID M. GRIFFITH

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ASC 2004
Ferris State University
Big Rapids, MI 49307
(231) 591-5855
davidgriffith@ferris.edu

521 Linden St
Big Rapids, MI
49307

EDUCATION

Ph.D. in Biology, University of Illinois at Chicago, 1990
Concentration: Evolution and Environment
Dissertation: Ecology and evolution of predatory behavior in the carabid cave beetle *Neaphaenops tellkampfi*

B.S. in Biology, Hillsdale College, Hillsdale, Michigan, 1983

PROFESSIONAL EXPERIENCE

Visiting Assistant Professor of Biology, Ferris State University, Big Rapids, MI.	2003-present
Substitute Teacher and stay at home dad, Pike County (606) 433-9300 and Pikeville Independent Boards of Education (606) 432-8161.	1997-2003
Adjunct Professor of Biology, Prestonsburg Community College, Prestonsburg, Kentucky	1996-1997
Assistant Professor of Biology, Pikeville College, Pikeville, Kentucky	1993-1996
University Lecturer in Biology, Governors State University, University Park, Illinois	1990-1993

COURSES TAUGHT

Ferris State University: Biol 121: General Biology (majors), Biol 205: Human Anatomy & Physiology. Biol 344: Entomology; Biol 442: Ecology

Pikeville College: Human Anatomy, Ecology, Genetics, Principles of Biology I and II for majors, Introduction to Biology (non-majors), Invertebrate Zoology, Special Topics (Cave Ecology), and Comparative Anatomy.

Governors State University: General Biology, Human Physiology (a two semester sequence for Nursing majors), General Zoology, Human Genetics (non-majors), and Ecology.

Prestonsburg Community College: Human Anatomy and Physiology

PUBLICATIONS

Griffith, D. and T. Poulson, 1993. Mechanisms and consequences of intraspecific competition in a carabid cave beetle. *Ecology* **74**: 1373-1383

Griffith, D. and J. Brown. 1992. A null model of patch assessment with an application to a carabid cave beetle. *Oikos* **64**: 523-526.

Griffith, D. 1991. The effects of substrate moisture on survival of adult cave beetles (*Neaphaenops tellkampfi*) and cave cricket eggs (*Hadenoeus subterraneus*) in a sandy deep cave site. *Bulletin of the National Speleological Society* **53**: 98-103.

Griffith, D. 1990. Laboratory studies of predatory behavior in two subspecies of the carabid cave beetle *Neaphaenops tellkampfi*. *International Journal of Speleology* **19**: 29-38.

GRANTS

National Speleological Society Grant: Ecology of a terrestrial cave community; January-December 1986. \$140.00

Karst Research Grant, Cave Research Foundation: The dynamics of a terrestrial cave predator-prey system: abiotic and biotic interactions; January-December 1987. \$1,000.00

University of Illinois at Chicago Travel Grant, August 1987. \$200.00

PRESENTATION OF PAPERS

“Ecology of a Terrestrial Cave Community.” Presented at the Sigma Xi Graduate Student Forum, UIC, March, 1986.

“The Dynamics of a Terrestrial Cave Predator-prey System: Biotic and Abiotic interactions.” Presented to the UIC Committee on Evolutionary Studies, April, 1986.

“Coevolution in a Cave Predator-Prey system.” Presented at the National Speleological Society Annual Convention, Marquette, Michigan, June, 1987.

“Measuring Patch Assessment by a Carabid Cave Beetle: A Model and a Test.” Presented at the 76th Annual Ecological Society of America meeting, San Antonio, Texas, August, 1991.

PUBLISHED ABSTRACTS

Griffith, D. 1988. Evolutionary and ecological interactions between the cave beetle *Neaphaenops tellkampfi* (Coleoptera: Carabidae) and the cave “cricket” *Hadenoeus subterraneus* (Orthoptera: Rhaphidophoridae) in Mammoth Cave National Park. Abstracts of the fourteenth annual scientific research meeting, Great Smoky Mountains National Park, May 12-13, 1988.

PUBLICATIONS IN NON-REFEREED JOURNALS

Griffith, D. 2004. Mark-recapture studies of cave beetles: a review and new methods. Cave Research Foundation Annual Report.

Griffith, D. 1985. Investigation of a predator-prey system found in Great Onyx Cave, Kentucky. Cave Research Foundation Annual Report.

Poulson, T., D. Griffith, and K. Schmidt. 1991. Energetic advantage of interspecific competition in *Neaphaenops t. tellkampfi*. Cave Research Foundation Annual Report.

COMMITTEE WORK

Governors State University: Division of Science Safety Committee (we developed a new set of rules and guidelines for safety in the science laboratories)

Pikeville College: Special Events Committee

PERSONAL DATA

Married to Jeannette; Children: Joseph and Matthew. Member of Tri-Beta Biology Honor Society, Captain of Hillsdale Soccer Club, Life Scout, Youth Soccer Coach for the Pikeville Area YMCA, 1993-2003.
JV Soccer Coach and Assistant Varsity Soccer Coach, Reed City High School, 2006
Hobbies: Chinese Philosophy and Language (Mandarin); Soccer, Nature Photography

PROFESSIONAL ASSOCIATIONS

Michigan Entomological Society
National Speleological Society
Human Anatomy & Physiology Society

REFERENCES

Dr. Robert Friar
Professor of Biology
Ferris State University
ASC 2019
Big Rapids, MI 49307
231-591-2542

Dr. James Hoerter
Professor of Biology
Ferris State University
ASC 3087
Big Rapids, MI 49307
231-591-2563

Mr. John Johnson
Adjunct Instructor
Biology Department
Ferris State University
Big Rapids, MI 49307
231-591-5849

Scott M. Herron

Associate Professor of Biology, Ferris State University
820 Campus Dr. ASC 2017, Big Rapids, Michigan 49307-2225
Phone 231-591-2087; fax 231-591-2540, herrons@ferris.edu

Education:

- 2002 **Southern Illinois University**, Carbondale, IL - **Ph.D., Plant Biology**
Honor: Phi Kappa Phi, GPA 4.0
Specialization: Ethnobotany, Plant Taxonomy, and Cultural Anthropology
Dissertation: Ethnobotany of the Anishinaabek Northern Great Lakes Indians
Advisor: Dr. Donald Ugent
- 1998 **Grand Valley State University**, Allendale, MI - **B.S., Biology & Botany.**
Honor: Cum Laude, GPA: 3.80

Botanical Work Experience

- 1997 Frederik Meijer Botanical Garden; *Horticulture Intern.* Grand Rapids, Michigan.
1996-97 The GVSU Arboretum; *Arborist Intern.* Office of the Vice President for Finance and Administration, Grand Valley State University.
1996 Motman's Greenhouse; *Horticultural Assistant.* Grand Rapids, Michigan.

Teaching Appointments:

- 2008-10 **Visiting Associate Professor;** University of Michigan Biological Station, Pellston, Michigan. College of Literature, Science and the Arts, University of Michigan
2008- **Tenured Associate Professor;** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2007- **Associate Professor;** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2004-07 **Assistant Professor;** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2004-08 **Visiting Assistant Professor;** University of Michigan Biological Station, Pellston, Michigan. College of Literature, Science and the Arts, University of Michigan
2003 **Lecturer of Ethnobotany;** University of Michigan Biological Station, Pellston, Michigan. Department of Ecology and Evolutionary Biology, University of Michigan
2002-04 **Adjunct Assistant Professor;** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2001-02 **Part-time Biology Instructor;** Life Science Department. John A. Logan College, Carterville, Illinois.
2001 **Co-coordinator;** Economic Botany Seminar Series with Dr. Don Ugent. Department of Plant Biology. Southern Illinois University, Carbondale, Illinois.
1997-98 **Supplemental Instructor, Peer Mentor;** Minority Science Education Center. Office of Minority Affairs. Grand Valley State University, Allendale, Michigan.

Courses Taught:

- 2009-10:
Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section (Grand Rapids)
Basic Botany (Biology 113): 3 credits- 1 lecture and 1 lab section
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits- 1 lecture and 1 lab section, 1 seminar section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2008-09:
Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section
Basic Botany (Biology 113): 3 credits- 1 lecture and 1 lab sections

- Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
 Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits-
 1 lecture and 1 lab section, 1 seminar section
 Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2007-08:
 Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section
 Basic Botany (Biology 113): 3 credits- 1 lecture and 1 lab sections
 Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
 Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits-
 1 lecture and 1 lab section, 1 seminar section
 Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2006-07:
 Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section
 Basic Botany (Biology 113): 3 credits- 1 lecture and 2 lab sections
 Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
 Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits-
 1 lecture and 1 lab section, 1 seminar section
 Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2005-06:
 Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
 Basic Botany (Biology 113): 3 credits- 1 lecture 2 lab sections
 Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
 Plant Propagation (Horticulture 152): 2 credits-1 lecture and 1 lab section
 Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2004-05:
 Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
 Basic Botany (Biology 113): 3 credits- 1 lecture 2 lab sections
 Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
 Plant Propagation (Horticulture 152): 2 credits-1 lecture and 1 lab section
 Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2003-04:
 Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
 Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
 Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 2 lab sections
 Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)
- 2002-03:
 Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
 Majors Biology (Biology 121): 4 credits- 1 lab section
 Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 2 lab sections
 Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
 Ethnobotany (EEB 455): 5 credits- Lecturer/TA (UMBS Spring Term)
- 2001-02:
 Non-Majors Biology (Biology 100): 3 credit hours- 1 section lecture and lab
 Human Anatomy and Physiology (Biology 106): 4 credit hours- 1 section lecture and lab
 Non-Majors Biology (Biology 100): 3 credit hours- 2 lecture and 2 lab sections

Grants

- 2010 Student Research Grant with Lauren Mitten and Joshua Byers. FSU College of Arts and Sciences- \$1000 (Pending)
- 2010 Lower Michigan Wild Rice Camp (workshop) September 2010. Ferris Foundation Exceptional Merit Grant, \$5860
- 2010 Travel and Presentations to Ecological Society of America's Annual Meeting, Pittsburgh, Pennsylvania, August 1-6, 2010. Timme Travel Grant, \$850
- 2009 Lower Michigan Wild Rice Camp (workshop) September 10-13. Great Lakes Regional Water Program. Co-PI with Patrick Robinson, University of Wisconsin-Extension, Green Bay, and Great Lakes Regional Water Program, \$6000

- 2009 Faculty and Staff Diversity Mini-Grant (lead investigator), Raising Expectations with Handicapped Accessible Raised Bed Gardens, \$4000
- 2009 Biology Department Travel Grant-Michigan Academy Annual Meeting, Presentation by Dr. Herron's research team of undergraduates: Crystal Phillips, Chris LaVelle, Michael Reynolds, and Lauren Mitten, \$300
- 2008 Student Research Grant-Crystal Phillips, Chris LaVelle, Michael Reynolds, FSU College of Arts and Sciences- \$2000
- 2007 Great Lakes Regional Water Program; Wild Rice Camp (White Earth, MN) Travel Grant, University of Wisconsin Extension, \$750
- 2007 Political Engagement Project Resource Grant (Integrated Ecology course), FSU- \$242
- 2006 Political Engagement Project Resource Grant (Integrated Ecology course), FSU- \$250
- 2006 Special Opportunity Grant for Wild Rice Coalition & Conference, Great Lakes Aquatic Habitat Network & Fund, Tipp of the Mitt Watershed Council, Petoskey, Michigan- \$400
- 2005-06 Environmental Leadership Program Activity Fund award recipient-\$6000
- 2006 Professional Development Grant, FSU Academic Senate; Wild Rice Restoration and Preservation: Professional Development in Ecology-\$1213
- 2006 Student Research Grant-Elizabeth Mansfield, FSU College of Arts and Sciences- \$500
- 2005 Student Research Grant-Melissa Holman, FSU College of Arts and Sciences- \$500
- 2002 Travel Grant from Dean of Arts and Science to present a paper at Great Lakes United Indigenous Peoples Hub Workshop on Indigenous Organizational Development sponsored by the Great Lakes Aquatic Habitat Network and Fund, Sugar Island Cultural Camp, Sault Ste. Marie, MI.-\$500
- 2000 James E. Ozment Achievement Award in Natural History. Southern Illinois University Foundation and the College of Science.-\$600
- 1998 Michigan Botanical Club Annual Spring Foray Award. White Pine Chapter Foundation. - \$1000
- 1997 Salski Award Grant. Department of Biology, Grand Valley State University.-\$500

Research Fellowships & Professional Awards:

- 2010 Cambridge Who's Who VIP Member, Executive Professionals
<http://www.cambridgewhoswho.com/Members/MI/Scott-Herron-983839.html>
- 2008-10 Carnegie/AASCU Scholar of Political Engagement
- 2006- Golden Key International Honor Society Honorary Member
- 2005- Environmental Leadership Program, senior fellow
- 2004-05 Environmental Leadership Program, national fellow
- 2005-06 Featured Teacher in 2005-06 Edition of Marquis Who's Who in Science and Engineering
- 2001-02 Dissertation Research Assistantship (DRA) Fellowship. *Graduate School*, Southern Illinois University-Carbondale.
- 1998-01 Illinois Minority Graduate Incentive Program (IMGIP) Fellowship. *State of Illinois*, Southern Illinois University-Carbondale.
- 1998 Thomas M. Seykora Award for Outstanding Volunteer Contribution. *Grand Valley State University*
- 1996-97 Outstanding Biology Student Awards. *Grand Valley State University*.

Professional Development Activities:

- 2009 Ethnobiology & Wild Rice Presentation. Protectors of the Earth Youth Camp. Seventh Generation Cultural Center. Saginaw Chippewa Indian Tribe of Mt. Pleasant. July 29th.
- 2008 Political Engagement Project Meeting (national report to PEP and NY Times) at New York Times Headquarters, Manhattan, NY, January 25, 2008. Ferris report to PEP, NYT given with co-authors: Anthony Baker and Connie Meinholdt
- 2006-10 *Native Wild Rice Coalition, Co-Chair*; Regional coalition of governmental agencies, universities, tribal community colleges, graduate student researchers, tribal community members, non-profits, tribal governments and community groups funded through grants and administrated through the University of Wisconsin Extension through the Great Lakes Regional Water Program. Co-Chair, Patrick Robinson, UWEX-Green Bay.

- 2007 Traditional Wild Rice Camp, August 30-September 2. White Earth, Minnesota. Hosted by the Sah-kay-tay Indigenous Preservation Society.
- 2007 *Native Wild Rice Coalition*, Strategic Planning Meeting, March 6; College of Menominee Nation, Keshena, Wisconsin.
- 2006 Pere Marquette Sea Lamprey Symposium on October 14, 2006 at West Shore Community College.
- 2006 56th Annual Meeting of the Eastern Region of the International Plant Propagators Society on October 4-7, 2006 at the Amway Grand Plaza Hotel in Grand Rapids, Michigan.
- 2006 *Wild Rice Conference brochure and website*; Design and development with Patrick Robinson and Rebecca Power-University of Wisconsin Extension; summer 2006. <http://www.uwex.edu/ces/regionalwaterquality/wildrice/index.htm>
- 2006 *Northern Michigan University Special Topics Course Proposal, Manoomin Niikaanisag: Wild rice and all its relations*; 3/13/06; approved as NAS 298 for 3 credits through the NMU Center for Native American Studies; Instructor Donald Chosa; 9 students enrolled and completed the class held at Wild Rice Conference.
- 2005 Professional Development Plan revised for the Environmental Leadership Program.
- 2004 Professional Development Plan developed and peer reviewed for the Environmental Leadership Program.
- 2003-06 Protectors of the Earth Youth Camp executive committee: Chair of Equipment and Supplies committee (2003-2005); Member of Evaluation Team (2003-2006); Chaperone and Camp Counselor (2003-2004)

Published Papers

- 2010 Herron, S.M.; Human History (Chapter 1) in *The Changing Environment of Northern Michigan: A Century of Science and Nature at the University of Michigan Biological Station*; editors: Knute Naddelhoff, Alan Hoag & Brian Hazlett. University of Michigan Press.
- 2009 Robinson, P., Herron, S., Power, R, and D. Zak; *A regional multicultural approach to sustaining wild rice. Journal of Extension*, Vol. 47 (6):1-5. http://www.joe.org/joe/2009december/pdf/JOE_v47_6iw6.pdf
- 2003 Herron, S.M.; Catnip, *Nepeta cataria*, a morphological comparison of mutant and wild type specimens to gain an ethnobotanical perspective. *Economic Botany*, Vol. 57(1): 135-142.
- 2003 Herron, S.M.; American Indian use of the natural resources in the Muskegon River watershed (Pre-contact). *River View: News from the Muskegon River Watershed Assembly*. Vol. 1(8): 3.
- 2000 Herron, S.M.; Ethnobotanical Crisis as the US Government Attempts to Utilize Biowarfare to Unwisely Combat the War on Drugs. *Ethnobotanical Leaflets*, Spring-Summer 2000, www.siu.edu/~ebl/scott.htm.
- 1999 Herron, S.M.; The Natural History of Mahogany. *Ethnobotanical Leaflets*, Spring 2000, www.siu.edu/~ebl/leaflets/mahogany.htm.
- 1998 Herron, S.M.; Medicinal Plants Usage of the Anishinaabek Great Lakes Indians. Ningiziwaush Press, Detroit, Michigan.
- 1996 Herron, S.M. and M. L. Hulls; *Within the Depths of Peyote*. A video produced, edited, filmed, and narrated by Scott Herron and Michelle Hulls. SHMH Productions, Allendale, Michigan.

Published Abstracts

- 2010 Dr. Scott Herron, Josh Byers, Brenna Chencinski, Andrea Lodholtz, Lauren Mitten, Nicole Patrosso, Michael Reynolds, and Sarah Thompson. *The Importance of Wild Rice Camps for the Continued Research and Harvesting of Wild Rice in Lower Michigan*. Michigan Academician: Papers of the Michigan Academy of Science, Arts and Letters. Volume XXXX (4). http://webcache.googleusercontent.com/search?q=cache:usNE3pJXT_cJ:themichiganacademy.org/Content/Documents/Document.ashx%3FDocId%3D115280

- 2009 Phillips, C. and S. Herron. COS 97-10: *Wild Rice population resiliency in response to fungal smut pathogen*. 94th Ecological Society of America Annual Meeting. <http://esameetings.allenpress.com/2009/Paper16743.html>
- 2009 Mitten, L. and S. Herron. COS 94-3: *Viability and germination studies to elucidate the dynamics of wild rice restoration from northwestern to southeastern populations in the Great Lakes region*. 94th Ecological Society of America Annual Meeting. <http://esameetings.allenpress.com/2009/Paper18425.html>
- 2009 Mitten, D. and S. Herron. COS 5-4 *The politics of green: Civically engaging undergraduate students*. 94th Ecological Society of America Annual Meeting. <http://esameetings.allenpress.com/2009/Paper18442.html>
- 2009 Herron, S. M., P. Robinson, and R. LaBine. COS 115-2 *Incorporating traditional ecological knowledge into wild rice research, education and management efforts in the Great Lakes region*. 94th Ecological Society of America Annual Meeting. <http://esameetings.allenpress.com/2009/Paper17575.html>
- 2009 Crystal Phillips, Michael Reynolds, Chris LaVelle, Lauren Mitten, and Scott M. Herron. *Wild Rice Viability and Germination Testing to Compare Southern and Northern Ecotypes of Northern Wild Rice, Zizania aquatica Var. angustifolia, for Restoration Potential in Michigan*. Michigan Academician: Papers of the Michigan Academy of Science, Arts and Letters. Volume XXXIX (4):263-264. <http://www.thefreelibrary.com/Botany+and+plant+ecology.-a0219833051>
- 2008 Herron, S. M. *The use of ecological Detrended Correspondence Analysis (DCA) in evaluating the dissemination of ethnobotanical knowledge within the Anishinaabek Great Lakes Indian culture*; Michigan Academician, Volume XXXVII(4). *A Published Abstract from presentation at Michigan Academy of Science, Arts, and Letters Annual Meeting; Botany and Plant Ecology Section, at Oakland University on March 3, 2006*
- 2008 Herron, S., P. Robinson, E. Hoagland, W. Paulson, P. David, D. M. Zak, and R. Power. PS 87-151: *Native Wild Rice Coalition's cultural and ecological restoration*. 93rd Ecological Society of America Annual Meeting. <http://eco.confex.com/eco/2008/techprogram/P14632.HTM>
- 2008 Herron, Scott. *Coalition Building as a Model to Address Regional Environmental Issues in Restoration Ecology: A Case Study to Sustain Wild Rice*. Michigan Academician: Papers of the Michigan Academy of Science, Arts and Letters. Volume XXXVIII (4):16. http://goliath.ecnext.com/coms2/gi_0199-10351687/Botany-plant-ecology.html

University Service Load:

- 2009-11 Biology Curriculum Committee
- 2008-09 American Democracy Project (ADP)-Political Engagement Project (PEP) Council
- 2008-11 College of Arts and Sciences Diversity Committee
- 2007-10 Senate Diversity Committee, Chair (2007-2009)
- 2007-08 Equity Conference Planning Committee, hosted by FSU March 30-April 2, 2008.
- 2004-10 Biology Education Coordinator and Advisor
- 2007-09 Diversity Planning Committee, University-wide committee chaired by Dr. David Pilgrim.
- 2006-07 University Chief Diversity Officer hiring committee (hired David Pilgrim).
- 2005-10 College of Arts and Sciences' Education Program Coordinators (Secondary Education) committee
- 2005-06 Diversity Incidents Team, FSU campus wide committee advocating justice, equality, and equity within the campus community 2005-2006
- 2005 Program Review Panel Member (Elementary Education BS of Science Degree)
- 2005 Program Review Panel Member (Ornamental Horticulture Technology AAS Degree)
- 2004-05 College of Arts and Sciences' Integrated Science Teaching Minor (Elementary Education) committee
- 2004 Biology Department's Lab Prep Supervisor hiring committee (hired Andrea Bruziac)
- 2004-05 Biology Department's Vertebrate Biologist hiring committee (hired Dr. Joseph Lipar)
- 2004-05 Biology Department's Cell and Molecular Biology hiring committee (hired Dr. Brad Isler)
- 2004-05 Biology Department's General Biology hiring committee (hired Dr. Paul Klatt)
- 2004-07 Biology Department Planning Committee

- 2003, 06 Biology Department Microscope Committee
- 2003-06 Student Affairs/Academic Affairs Divisions Hispanic (Minority) Recruitment Initiative
- 2002-04 Office of Minority Student Affairs - American Indian consultant and advisor,
- 2002-06 Rankin Center Art Gallery – American Indian art acquisition project
- 2002-05 American Indian and ethnic minority recruiter; Admissions and Records under Assistant Director Cathryn Claerhout and Vice President Dan Burcham.

Current Professional and Academic Association Memberships:

- 2005-10 Ecological Society of America; *Traditional Ecological Knowledge section member; Plant Population Ecology Section member; Education Section member; Environmental Justice section member; Microbial Ecology Section member*
- 2004-10 Michigan Academy of Science, Arts, and Letters; *Botany and Plant Ecology Section Vice-Chair (2005-07); Co-Chair (2007-09).*
- 2000-10 Society of Ethnobiology.
- 1998-10 Society for Economic Botany; member- *Student Advisory Committee member (1999-2002)*
- 2003-05 American Association of Plant Taxonomists
- 2001-03 Phi Kappa Phi Honor Society
- 2001-03 Society of Ecological Anthropology
- 1998-02 WDBX 91.1 FM-Carbondale, IL – “Native Voices”- American Indian Radio Show; *Co-host and co-producer.*
- 1998-00 American Indian Association; *Vice President.* Southern Illinois University.
- 1994-98 Native American Student Association; *President, Senior Advisory Council Member, Director of Subcommittees.* Grand Valley State University.
- 1995-98 Minority Student Organization Council; *Board Member.* Grand Valley State University.

Professional Presentations:

- 2010 *Translating Wetland Field Experiences into Classrooms at Get Wet and Wild: Aquatic Academy for Teachers.* Muskegon River Watershed Assembly, Camp Newaygo <http://www.mrwa.org/repository/pdf/brochure-2010.pdf> (workshop leader).
- 2010 Dr. Scott Herron, Josh Byers, Brenna Chencinski, Andrea Lodholtz, Lauren Mitten, Nicole Patrosso, Michael Reynolds, and Sarah Thompson 2010. *The Importance of Wild Rice Camps for the Continued Research and Harvesting of Wild Rice in Lower Michigan.* Michigan Academy of Science, Arts and Letters: Botany and Plant Ecology Section, Calvin College (oral).
- 2009 Phillips, C. and S. Herron. COS 97-10: *Wild Rice population resiliency in response to fungal smut pathogen.* 94th Ecological Society of America Annual Meeting. (oral).
- 2009 Mitten, L. and S. Herron. COS 94-3: *Viability and germination studies to elucidate the dynamics of wild rice restoration from northwestern to southeastern populations in the Great Lakes region.* 94th Ecological Society of America Annual Meeting. (oral).
- 2009 Mitten, D. and S. Herron. *COS 5-4 The politics of green: Civically engaging undergraduate students.* 94th Ecological Society of America Annual Meeting. (oral).
- 2009 Herron, S. M., P. Robinson, and R. LaBine. *COS 115-2 Incorporating traditional ecological knowledge into wild rice research, education and management efforts in the Great Lakes region.* 94th Ecological Society of America Annual Meeting. (oral).
- 2009 A hands-on learning approach-wild rice conservation, harvesting, restoration, processing, and environmental analyses research at an undergraduate teaching university in Michigan. Scott Herron, Andrea Lodholtz, Crystal Phillips, Michael Reynolds, Chris LaVelle, and Patrick Robinson. National Water Conference, St. Louis, MO (poster).
- 2009 Multistate Knowledge of Wild Rice Cultural and Ecological Knowledge. Scott Herron, and Patrick Robinson. National Water Conference, St. Louis, MO (oral).
- 2009 Wild Rice Restoration and Preservation: Michigan’s Aquatic Gardens. Michigan Wildflower Conference, Kellog Center, East Lansing. (invited oral plenary).
- 2009 Wild rice viability and germination testing to compare southern and northern ecotypes of northern wild rice, *Zizania aquatica* var. *angustifolia*, for restoration potential in

- Michigan. Scott Herron, Crystal Phillips, Michael Reynolds, Chris LaVelle, and Lauren Mitten. Michigan Academy of Science, Arts, and Letters, Wayne State University (oral)
- 2008 *Native Wild Rice Coalition's cultural and ecological restoration*. Scott Herron (presenter), Patrick Robinson, Earl Hoagland, William Paulson, Peter David, Deborah Zak, and Rebecca Power. Ecological Society of America Annual Conference, Milwaukee, Wisconsin, August 2008. (poster).
- 2008 Wild Rice Roundtable Discussion. Ecological Society of America Annual Conference, Milwaukee, Wisconsin, August 2008.
- 2008 *The role of traditional drums in the bridging of traditional ecological knowledge from the past to the future*. Scott Herron, Society for Ethnobiology Annual Conference, Fayetteville, AR, April 17, 2008. (oral).
- 2008 *Wild rice ecosystems: The place to be for bird watching and food harvesting!* Scott Herron, Michigan Botanical Club-White Pine Chapter, Grand Valley State University, March 22, 2008. (oral).
- 2007 *Sustaining wild rice through multicultural partnerships*. Patrick Robinson, Rebecca Power, and Scott Herron, Outreach Scholarship Conference, University of Wisconsin-Madison, October 8, 2007. (oral).
- 2007 *Wild Rice Coalition building in the Great Lakes*. Scott Herron and Patrick Robinson, Society of Ethnobiology 30th Annual Conference, University of California-Berkeley, CA, March 28-31, 2007. (oral).
- 2007 *Coalition building as a model to address regional environmental issues in restoration ecology: A case study to sustain wild rice*. Scott Herron and Patrick Robinson, Michigan Academy of Science, Arts, and Letters, *Botany and Plant Ecology Section*, at Ferris State University on March 9, 2007. (oral).
- 2007 *What is Ethnobotany? Career prospects and educational pathways (workshop)*; Protectors of the Earth Youth Camp; Bay Mills Community College on July 31, 2007.
- 2006 *The Journey Ahead: Building a Regional Network to Sustain Wild Rice/Manoomin (keynote address)*; Wild Rice Restoration and Preservation Conference; Lac Vieux Desert Resort and Conference Center in Watersmeet, Michigan, August 7-10, 2006.
- 2006 *Native Harvested Plants: Ethnobotany of the Lake Superior Anishinaabek (workshop)*; Protectors of the Earth Youth Camp; Bay Mills Community College on August 1, 2006.
- 2006 *Wild Rice Restoration and Coalition Building on Hamlin Lake & the Ludington Area*; Hamlin Township Hall in Ludington on June 22, 2006.
- 2006 *Wild Rice's status in Michigan & Houghton Lake: What is happening in the restoration and coalition movements*; Houghton Lake Improvement Board meeting on April 25, 2006
- 2006 *Wild Rice Restoration and Coalition Building on the Muskegon River Watershed*; Grand Valley State University Annis Water Institute in Muskegon on April 10, 2006.
- 2006 *The use of ecological Detrended Correspondence Analysis (DCA) in evaluating the dissemination of ethnobotanical knowledge within the Anishinaabek Great Lakes Indian culture*; Michigan Academy of Science, Arts, and Letters Annual Meeting; *Botany and Plant Ecology Section*, at Oakland University on March 3, 2006. (oral).
- 2005 *The role of forensic insects in deposition of pollen at a death scene*. Rebecca J Kirby, Anita L. Guedea, Phillip L. Watson, Roger E. Mitchell and Scott M. Herron. American Academy of Forensic Sciences meeting in New Orleans in February 2005.
- 2005 *Wild Rice Coalition Building*; Ziibiwing Museum of the Saginaw Chippewa Indian Tribe in Mt. Pleasant, MI on December 1, 2005 (oral).
- 2004 *Ethnobotany of the Lake Superior Anishinaabek (workshop)*; Protectors of the Earth Youth Camp; Sugar Island Culture Camp on Sugar Island, near Sault Ste. Marie, August 1-6, 2004.
- 2004 *Wild Rice Restoration & Population Ecology on the Muskegon River Watershed*; Scott Herron and Gale Nobes, Michigan Academy of Science, Arts, and Letters Annual Meeting; *Botany and Plant Ecology Section* at Grand Valley State University on March 5-6, 2004. (oral).
- 2003 *Outdoor Life & Survival Skills of the Great Lakes Indians (workshop with Bucko Teeple)*; Protectors of the Earth Youth Camp; Clear Lake Camp near Shingleton, Michigan, August 8-16, 2003.

JOHN W. JOHNSON

17042 Sierra Drive
Big Rapids, MI 49307
(231) 527-1268
johnjohnson@ferris.edu

EDUCATION	Central Michigan University <i>Master of Arts in Physical Education and Sport</i> Major: Exercise Science	Mt. Pleasant, Michigan May 2000
	Carthage College <i>Bachelor of Arts</i> Major: Biology	Kenosha, Wisconsin August 1996
	Alpena Community College <i>Associate of Science</i> Graduated Magna Cum Laude	Alpena, Michigan May 1994

EXPERIENCE	Ferris State University <i>Lab Instructor for BIOL 205</i> <ul style="list-style-type: none">• Teach Anatomy/Physiology students pursuing degrees in Nuclear Medicine, Pre-pharmacy, Forensic science, and other allied health professions to apply what they have learned in lecture to experimentation• Instruct students on proper use of lab equipment• Assist students in developing skills necessary to approach and solve problems in a scientific manner	Big Rapids, Michigan 08/07 to present
	Advanced Cardiac Specialists <i>Director of Cardiac Rehabilitation (8/01 to 7/06)</i> <ul style="list-style-type: none">• Managed five rehab sites• Served as source of information on exercise, anatomy, physiology, cardiac medications, procedures, and nutrition to patients and staff• Lectured at community outreach programs• Acted as liaison between patient and doctor to aid in patient care• Provided medical surveillance of rehab patients, including BP, HR, SaO₂, and ECG analysis• Performed VO₂ Max stress testing with MedGraphics metabolic cart• Administered EECF treatments with Vasomedical equipment	Gilbert, Arizona 02/99 to 07/06
	Chandler/Gilbert Community College <i>ACSM Exercise Specialist Workshop Instructor</i> <ul style="list-style-type: none">• Taught several subjects including ECG Interpretation, Medications, Training Special Populations, New Concepts in Cardiovascular Interventions, and Human Behavior• Aided in explaining metabolic calculations	Chandler, Arizona Summer '00 & '01

Q The Sports Club **Tempe, Arizona**
Personal Trainer 02/99 - 03/99

- Educated clients in proper technique and physiological adaptations to exercise
- Developed exercise programs for clients
- Instructed clients on health risks and nutrition

Central Michigan University **Mt. Pleasant, Michigan**
ECG Assessment Lab Assistant 07/98 – 05/98

- Assisted in ECG interpretation and answered physiological questions
- Instructed students on proper lead placement technique

Central Michigan University **Mt. Pleasant, Michigan**
Human Performance Lab Assistant 09/97 – 12/97

- Assisted students in use of laboratory technical equipment (underwater weighing, spirometry, Quinton stress testing, ECG machines)
- Instructed students on blood pressure techniques
- Body fat composition, strength testing, flexibility testing

Lincoln Haven Health Care Centre **Lincoln, Michigan**
Nurse Assistant 11/96 – 08/97

- Measured vital signs and provided daily care of residents with Multiple Sclerosis, stroke victims, and cognitively impaired

INTERNSHIP **Arizona Heart Institute-East / Cardiac Conditioning** **Mesa, Arizona**
Graduate Intern 09/98 – 12/98

- Monitored telemetry unit and hemodynamic responses to exercise
- Calculated exercise prescriptions and assisted in progression of workloads
- Provided source of information for patients and assisted in instruction of undergraduate intern
- Assisted in the administration of stress tests and interpretation of results
- Experience in venipuncture and glucometer
- Performed nutritional summaries and provided patients with dietary information
- Observed CABG, angiogram, and echocardiograms

COMPUTER SKILLS

- Windows XP, some Access
- Nutribase Pro, Dine Healthy
- Internet

ACTIVITIES

- Second-degree black belt in Shorei-Ryu Karate (07/03)
- Volunteered in Physical Therapy department (170 hours) at Alpena General Hospital (1996)
- Studied language and culture at Kitakyushu University in Japan (Summer 1995)
- Co-captain of Carthage College Swim Team (1995-1996)
- US Army Mechanic/Recovery Specialist stationed in Germany (09/88 – 09/91)

HONORS

- CCIW All Academic (12/95)
- Dean's List (01/92 – 12/94)
- Carthage College Presidential Scholarship (09/94)
- Carthage College Robert Todd Scholarship (09/94)
- Army Commendation Medal (07/91)

REFERENCES

Dr. Tariq Khalil
6641 E Baywood Ave # A2
Mesa, AZ
(480) 396-2022 (clinic)
(480) 283-7943 (cell)

Dr. Ambika Bhaskaran
201 W. Guadalupe Rd.
Gilbert, AZ 85233
(480) 545-1847

Mary Haggberg, (RN, BSN)
2087 Leisure World
Mesa, AZ 85206
(H) 480-218-4066
marebrg@cox.net
(W) 480-472-6650

PAUL H. KLATT

CURRENT POSITION

Ferris State University. Associate Professor of Biology. 2008-present.

EDUCATION

North Dakota State University. Ph.D. Zoology. 2002. Major Professor: Dr. Nuechterlein.

Eastern Kentucky University. MS. Biological Sciences. 1992. Major Professor: Dr. Ritchison.

University of Illinois at Urbana-Champaign. BS. Psychology. 1988.

TEACHING EXPERIENCE

Ferris State University

- 2008-present, Associate Professor of Biology
- 2005-2008, Assistant Professor of Biology

<u>Course</u>	<u>Description</u>	<u>Enrollment</u>
Biology 121	General Biology I (2005-2008)	100
Biology 122	General Biology II (2006-2009)	100
Biology 347	Environ. Conservation (2006-2008)	40
Biology 348	Animal Behavior (2007-2009)	40
Biology 492	Biology Internship (2007-2009)	4

University of North Dakota

- 2002-2005, Visiting Assistant Professor of Biology

<u>Course</u>	<u>Description</u>	<u>Enrollment</u>
Biology 338	Animal Behavior (2002-2004)	40
Biology 332	General Ecology (2002, 2003)	100
Biology 370	Vertebrate Zoology (2003-2005)	40
Biology 432	Fish and Wildlife Disease (2004)	30

North Dakota State University

- 1997-2002, Graduate Teaching Assistant, General Biology, General Zoology, and Human Anatomy and Physiology.

- instruction of labs, writing and grading exercises and quizzes

<u>Course</u>	<u>Description</u>	<u>Enrollment</u>
Zoology 360	Animal Behavior (2000)	70
Zoology 170	General Zoology (1997)	250

- taught full courses as a graduate student

University of Alberta

- 1993-1996, Graduate Teaching Assistant, Introductory Biology, General Zoology, Natural History of the Vertebrates, Mammalogy, and Ornithology.

- instruction of labs, writing and grading quizzes and lab practical exams

Eastern Kentucky University

- 1988-1991, Graduate Teaching Assistant and 1991-1992, Part-Time Faculty, Introductory Biology.

- instruction of labs, writing and grading exercises and quizzes

RESEARCH EXPERIENCE

FSU Student Research

Bobby Hathaway Jr. Continue counting, banding, and observing the birds of Pierce Cedar Creek. 2007.

Kari Kammer. Counting, banding, and observing the birds of Pierce Cedar Creek. 2006.

Research Associate with Bridget J.M. Stutchbury, Ph.D., York University. Incubation feeding and extra-pair paternity in Scarlet Tanagers. 2003-2005.

Doctorate Research - Territorial Behavior of Red-necked Grebes. 1993-2002.

Research Associate with Gary Ritchison, Ph.D., Eastern Kentucky University and David Westneat, Ph.D., University of Kentucky. Mate guarding and extra-pair paternity in Northern Cardinals. 1992-1993.

Master's Research - The effect of mate removal on the vocal behavior of male and female Eastern Screech-Owls. 1988-1992.

Undergraduate Research Assistant to Nancy Burley, Ph.D. and Lowell Getz, Ph.D., Dept. of Ecology, Ethology, and Evolution, University of Illinois at Urbana-Champaign. 1986-1988.

FSU SERVICE

- College of Arts and Sciences, Promotion Committee (2008-present).
- Developmental Biologist Search Committee (2007-present).
- Anatomy and Physiology Search Committee (2008-present).
- Academic Senate (2006-present).
 - Ad Hoc Emeriti sub committee (2006-present).
- Registered Student Organization Advisor to Ferris Recyclers (2006-present).
- Registered Student Organization Advisor to Table Tennis Club (2008-present).
- Ferris Foundation Grants and Gifts Committee (2006-present).
- Faculty Research Committee (2008-present).
- Faculty Development Committee Chair, Biological Sciences (2006-present).
- Biology, Environmental Biology Concentration Head (2006-present).
- Biology Department Head Search Committee (2005-2006).

ORGANIZATIONS AND HONORS

Pierce Cedar Creek Institute for Environmental Education

- Advisory Board and Research Review Committee (2006-present).

Association of Field Ornithology (2006).

Waterbird Society (2005).

American Ornithologist's Union (2003).

NDSU Wildlife Graduate Student of the Year (2000).

Dr. Harvey K. Nelson Award - excellence in aquatic biology, NDSU Zoology (1999).

NDSU Zoology Graduate Student Representative to the Faculty (1999-2000).

Raptor Research Foundation (1993).

Cooper Ornithological Society - student membership award (1991).

Phi Sigma National Biological Honor Society (1990).

Animal Behavior Society (1988).

GRANTS

Pierce Cedar Creek Institute, Hastings, MI. Continue counting, banding, and observing the birds of Pierce Cedar Creek. 2007. \$6,000.

Pierce Cedar Creek Institute, Hastings, MI. Counting, banding, and observing the birds of Pierce Cedar Creek. 2006. \$6,000.

Animal Behavior Society. The dispersion of Red-necked Grebes breeding in territories and colonies. 1997. \$300.

Canadian Circumpolar Institute, Edmonton, AB. Territory-size regulation in Red-necked Grebes. 1994. \$1,500.

PRESENTED PAPERS

2004 Annual meeting of the Cooper Ornithological Society - Female Scarlet Tanagers called when their mates were temporarily removed during incubation. Paul H. Klatt, University of North Dakota and Bridget J.M. Stutchbury, York University.

2003 Annual meeting of the American Ornithologists Union - Incubation feeding by male Scarlet Tanagers: a removal experiment (poster presentation). Paul H. Klatt, University of North Dakota and Bridget J.M. Stutchbury, York University.

2001 Annual meeting of The Animal Behavior Society - From colonial to solitary: territorial behavior and nesting dispersion in Red-necked grebes. Paul H. Klatt, North Dakota State University. W.C. Allee Student Award Session.

1996 Annual meeting of the Association of Field Ornithologists - Genetic evidence that Eastern Screech-Owls do not engage in extra-pair copulations (poster presentation). Sunni Lawless and Gary Ritchison, Eastern Kentucky University, Paul H. Klatt, University of Alberta, and David F. Westneat, University of Kentucky.

1993 Annual meeting of The Raptor Research Foundation - Effect of mate removal on the vocal behavior and movement patterns of Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1992 Annual meeting of The American Ornithologists Union - Duetting behavior of male and female Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1992 Annual meeting of The Animal Behavior Society - Effect of mate removal on the singing behavior of male and female Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1991 Fall Meeting of The Kentucky Ornithological Society - Effect of mate removal on the singing behavior of male and female Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1990 Meeting for The Kentucky Academy of Sciences - Activity levels and the natal dispersal of Eastern Screech-Owls. Gary Ritchison and Paul H. Klatt, Eastern Kentucky University, and James R. Belthoff, Clemson University.

1990 Midwest Regional Animal Behavior Conference - Activity levels and the dispersal of juvenile Eastern Screech-Owls. Gary Ritchison and Paul H. Klatt, Eastern Kentucky University, and James R. Belthoff, Clemson University.

PUBLICATIONS

- 1) **Klatt, Paul H.**, Bridget J.M. Stutchbury, and Melissa Evans. 2008. Incubation feeding by male Scarlet Tanagers: a mate removal experiment. *Journal of Field Ornithology* 79(1):1-10.
- 2) **Klatt, Paul H.** and Cynthia A. Paszkowski. 2005. Intruder pressure explains more of the variation in territory size than fish abundance for Red-necked Grebes (*Podiceps grisegena*) breeding on small boreal lakes. *Ornis Fennica* 82:129-136.
- 3) Paszkowski, Cynthia A., Beverly A. Gingras, Kayedon Wilcox, **Paul H. Klatt**, and William M. Tonn. 2004. Stable isotope analysis of trophic relations of the Red-necked Grebe on lakes in the western boreal forest. *Condor* 106:638-651.
- 4) **Klatt, Paul H.**, Gary L. Nuechterlein, and Deborah Buitron. 2004. Frequency and distribution of behaviour of Red-necked Grebes breeding in a colony and in classic territories. *Behaviour* 141:263-277.
- 5) **Klatt, Paul H.** 2003. Territorial behavior and nesting dispersion in Red-necked Grebes. *Waterbirds* 26(1):94-99.
- 6) Lawless, Sunni, Gary Ritchison, **Paul H. Klatt**, and David F. Westneat. 1997. The mating strategies of Eastern Screech-Owls: a genetic analysis. *Condor* 99:213-217.
- 7) Ritchison, Gary, **Paul H. Klatt**, and David F. Westneat. 1994. Mate guarding and extra-pair paternity in Northern Cardinals. *Condor* 96:1055-1063.
- 8) **Klatt, Paul H.** and Gary Ritchison. 1994. The effect of mate removal on the vocal behavior and movement patterns of male and female Eastern Screech-Owls. *Condor* 96:485-493.
- 9) **Klatt, Paul H.** and Gary Ritchison. 1993. Duetting behavior of Eastern Screech-Owls. *Wilson Bull.* 105:483-489.

REFERENCES

Karen Strasser, Ph.D., Biology Department Head, Associate Professor of Biology, Ferris State University, Big Rapids, Michigan 49307. 231-591-2543.

Phillip Watson, Ph.D., Candidate Tenure Committee Chair, Professor of Biology, Ferris State University, Big Rapids, Michigan 49307. 231-591-2558.

Michelle Skedgell, Executive Director, Pierce Cedar Creek Institute, Hastings, Michigan 49058. 269-721-4770.

Bridget J.M. Stutchbury, Ph.D., Research Associate, Professor of Biology, York University, Toronto, Ontario M3J 1P3. 416-736-2100.

Joseph L. Lipar

Curriculum Vitae

Work Address: Department of Biology, 2004 ASC, Ferris State University, Big Rapids,
MI 49307

Home Address: 14895 205th Avenue, Big Rapids, MI 49307

Telephone: 570-321-4183 (Work) 570-323-9622 (Home)

Fax: 570-321-2540

E-mail: liparj1@ferris.edu

CURRENT POSITION (Ferris State University)

August 2005 – August 2008: Assistant Professor
August 2008 – Present: Associate Professor
January 2006 – August 2011: Director, Card Wildlife Education Center
August 2007 – August 2011: Coordinator, Program in Biology
July 2011 – December 2013: Department Head, Biological Sciences
January 2014 – Present: Department Chair, Biological Sciences

PREVIOUS POSITION

August 2002 – August 2005: Assistant Professor, Lycoming College, Williamsport, PA

EDUCATION

1993 Michigan State University B.S., Zoology (With Highest Honor)
1993 Michigan State University B.S., Biochemistry (With Highest Honor)
2000 Indiana University Ph.D., Biology (Advisor: Dr. Ellen Ketterson)

Dissertation Title: Maternal Investment via Yolk Hormones: Do Female Birds Influence
Nestling Competition through Differential Allocation of Steroid Hormones?

POSTDOCTORAL EXPERIENCE

2000-2002 Postdoctoral Teaching and Research Associate, Washington State University
(Mentor: Dr. Hubert Schwabl)

ACADEMIC FELLOWSHIPS

1994 Indiana University - Graduate School Fellowship
1995-1998 National Science Foundation Predoctoral Fellowship
2000 Indiana University - Institute of Molecular Biology Graduate Fellowship

TEACHING EXPERIENCE

Department of Biology, Indiana University, Bloomington, IN

Fall 1996 Teaching Assistant – Biology For Elementary Education Teachers
Spring 1997 Teaching Assistant – Introductory Biology
Fall 1999 Teaching Assistant – Biology of Birds

School of Biological Sciences, Washington State University, Pullman, WA

Fall 2000 Human Physiology
Fall 2001 Comparative Physiology

Department of Biology, Lycoming College, Williamsport, PA

Fall 2002 Human Physiology
Spring 2003 Human Physiology
 Animal Behavior
Fall 2003 Vertebrate Biology
 Birds! Birds! Birds! – A freshman, non-majors class designed to
 serve as an introduction to the biology of birds. The roles of
 birds in art, literature, poetry, folklore, and popular culture
 were also examined.
Spring 2004 Human Physiology
 Endocrinology
Fall 2004 Human Physiology
 Birds! Birds! Birds!
Spring 2005 Human Physiology
 Animal Behavior
Summer 2005 Ornithology

Department of Biology, Ferris State University, Big Rapids, MI

Fall 2005 General Biology
 Human Anatomy and Physiology (Labs)
Spring 2006 Endocrinology
 Human Anatomy and Physiology (Labs)
Summer 2006 Vertebrate Natural History
 Birds of Michigan
Fall 2006 Nature Study
 Current Topics in Biology

Spring 2007	Endocrinology Current Topics in Biology Human Anatomy and Physiology (Labs)
Summer 2007	Vertebrate Natural History Birds of Michigan
Fall 2007	Endocrinology Current Topics in Biology
Spring 2008	Current Topics in Biology
Summer 2008	Vertebrate Natural History
Fall 2008	Endocrinology Current Topics in Biology
Spring 2009	Current Topics in Biology
Summer 2009	Vertebrate Natural History
Fall 2009	Endocrinology Current Topics in Biology
Spring 2010	Current Topics in Biology
Summer 2010	Vertebrate Natural History
Fall 2010	Endocrinology Current Topics in Biology
Spring 2011	Current Topics in Biology
Summer 2011	Vertebrate Natural History
Fall 2014	Endocrinology
Spring 2015	General Biology (Labs)

TEACHING AWARDS

1999 Indiana University Teaching Excellence Recognition Award

RESEARCH EXPERIENCE

- 1991-1993 Michigan State University, East Lansing, MI
 Research Assistant: Regulation of DNA Replication by *dnaA* Protein.
 Advisor: Dr. Jon Kaguni, Department of Biochemistry
- 1993 Michigan State University, East Lansing, MI
 Research Assistant: Electromagnetic Radiation Environmental Impact Study.
 Advisor: Dr. Donald Beaver, Department of Zoology
- 1994-1995 Indiana University, Bloomington, IN
 Graduate Research Pilot Study: Effects of Testosterone on Winter Social Interactions in the Dark-eyed Junco, *Junco hyemalis*.
 Advisor: Dr. Ellen Ketterson, Department of Biology
- 1995-2000 Indiana University, Bloomington, IN
 Dissertation Research: Investigation of Steroid Hormones in Avian Eggs including A) The Relationship between Variation in Yolk Steroid Concentration

and Variation in the Developmental Parameters of Nestlings and B) The Relationship between Steroid Concentrations in the Laying Female and Steroid Concentrations in its Eggs. Species investigated include the Red-winged Blackbird, *Agelaius phoeniceus*, the European Starling, *Sturnus vulgaris*, and the Dark-eyed Junco, *Junco hyemalis*.

Advisor: Dr. Ellen Ketterson, Department of Biology

2000-2002 Washington State University, Pullman, WA

Post-Doctoral Research: A) Investigation of the Effects of Yolk Testosterone on the Physiological and Functional Development of the Hatching Muscle in the Red-Winged Blackbird. B) Investigation of Individual and Seasonal Variation in Incubation Patterns of Female Red-Winged Blackbirds.

Advisor: Dr. Hubert Schwabl, School of Biological Sciences

2002-2004 Lycoming College, Williamsport, PA

Mentoring of Undergraduate Research Projects: A) The Relationship Between Yolk Steroids and Offspring Sex. B) The Effects of Yolk Testosterone on Hatching Behavior and the Development of the Hatching Muscle. C) Investigation of Changes in Yolk Testosterone Concentration During Development.

RESEARCH GRANTS

National Science Foundation Dissertation Improvement Grant (1997, IBN 97-01334)

American Museum of Natural History (1995)

American Ornithologists' Union (1997)

Indiana Academy of Sciences (1995, 1996, 1997, 1999)

Research Training Grant in Animal Behavior, Indiana University (1995, 1996, 1997, 1999)

Professional Development Grant, Lycoming College (2003)

PUBLICATIONS

Research Papers

Lipar, J.L., E.D. Ketterson, and V. Nolan, Jr. 1999. Intraclutch Variation in Testosterone Content of Red-winged Blackbird Eggs. *Auk* 116: 231-235.

Lipar, J.L., E.D. Ketterson, V. Nolan, Jr., and J.M. Casto. 1999. Egg Yolk Layers Vary in the Concentration of Steroid Hormones in Two Avian Species. *General and Comparative Endocrinology* 115: 220-227.

Lipar, J.L., and E.D. Ketterson. 2000. Maternally-Derived Yolk Testosterone Enhances the Development of the Hatching Muscle in the Red-winged Blackbird *Agelaius phoeniceus*. *Proceedings of the Royal Society of London B* 267: 2005-2010.

Bowden, R.M., M.E. Ewert, J.L. Lipar, and C.E. Nelson. 2001. Concentrations of Steroid Hormones in Layers and Biopsies of Chelonian Egg Yolks. *General and Comparative Endocrinology* 121: 95-103.

- Lipar, J.L. 2001. Yolk Steroids and the Development of the Hatching Muscle in Nestling European Starlings. *Journal of Avian Biology* 32: 231-238.
- Groothuis, T.G.G., Carere, C., Lipar, J.L., Drent, P.J., and Schwabl, H. 2008. Selection on Personality in a Songbird Affects Maternal Hormone Levels Tuned to its Effect on Timing of Reproduction. *Biology Letters – Animal Behavior* 4: 465-467.

Book Chapters

- Schoech, S.J. and J.L. Lipar. 1996. Conservation Endocrinology: Field Endocrinology Meets Conservation Biology. 461-477. In: *Conservation Biology* (P.L. Fiedler and P.M. Kareiva, Editors). Chapman & Hall.
- Schwabl, H. and J. Lipar. 2001. Hormonal Regulation of Begging Behaviour. 221-244. In: *The Evolution of Begging: Competition, Cooperation and Communication* (J. Wright and M. L. Leonard, Editors). Kluwer Academic Publishers.
- Ketterson, E.D., V. Nolan, Jr., J.M. Casto, C.A. Buerkle, E. Clotfelter, J.L. Grindstaff, K.J. Jones, J.L. Lipar, F.M.A. McNabb, D.L. Neudorf, I. Parker-Renga, S.J. Schoech, and E. Snajdr. 2001. Testosterone, Phenotype and Fitness: A Research Program in Evolutionary Behavioral Endocrinology. 19-40. In: *Avian Endocrinology* (A. Dawson and C.M. Chaturvedi, Editors). Narosa Publishing House, New Delhi, India.
- Lipar, J.L. 2003. The Palouse. In: *A Bird Finding Guide to Washington*. Washington Ornithological Society.

Research Featured in Science Media

- BBC Wildlife Magazine, December 2000. “One Shot Ahead of the Nest: Extra Hormones Boost the Chances of Youngest Chicks”.

Published Abstracts

- Lipar, J.L., E.D. Ketterson, and V. Nolan, Jr. 1995. Steroid Hormones in the Yolk of Red-winged Blackbird Eggs. *Poultry and Avian Biology Reviews*. 6: 329.
- Lipar, J.L., and E.D. Ketterson. 1998. Interlayer Variation in Steroid Concentration within the Yolks of Dark-eyed Junco (*Junco hyemalis*) Eggs. *American Zoologist* 38: 21A.
- Atkinson, T., G. Britton, J. Lipar, S. Raouf, S. Schlossberg, B. Van Roo, and D. Sengelaub. 1998. Sexual Experience does not Alter Adult Motoneuronal Morphology. *Society for Neuroscience Abstracts* 24: 1549.
- Lipar, J.L., and E.D. Ketterson. 1999. The Relationship Between Yolk Testosterone Concentration and *Complexus* Mass in Nestling Red-winged Blackbirds. *American Zoologist* 39: 63A.
- Casto, J.M., J.L. Lipar, C.A. Buerkle, J. Grindstaff, E.D. Ketterson, and V. Nolan, Jr. 1999. Extended Phenotypic Effects of Elevated Testosterone in Male Dark-eyed Juncos: Female Mates Produce Smaller Eggs, but do not Alter Yolk Steroid Concentrations or Primary Sex Ratios. *American Zoologist* 39: 63A.

CONFERENCE PRESENTATIONS

- Lipar, J.L., E.D. Ketterson, and V. Nolan, Jr. Steroid Hormones in the Yolks of Red-Winged Blackbird Eggs. VIth International Symposium on Avian Endocrinology, Lake Louise, Alberta, Canada. April 1996.
- Lipar, J.L., E.D. Ketterson, and V. Nolan, Jr. Steroid Hormones in the Yolk of Red-Winged Blackbird Eggs: Implications for Nestling Development and Survival. Animal Behavior Society Midwest Regional Conference, Bloomington, Indiana. November 1996.
- Lipar, J.L., E.D. Ketterson, and V. Nolan, Jr. Steroids in Red-Winged Blackbird Eggs: Implications for Nestling Competition in the Context of Hatching Asynchrony. Annual Meeting of the Indiana Academy of Science, Rennselaer, Indiana. October 1997.
- Atkinson, T., G. Britton, J. Lipar, S. Raouf, S. Schlossberg, B. Van Roo, and D. Sengelaub. 1998. Sexual Experience does not Alter Adult Motoneuronal Morphology. Annual Meeting of the Society for Neuroscience, Los Angeles, California. November 1998.
- Lipar, J.L., and E.D. Ketterson. Interlayer Variation in Steroid Concentration within the Yolks of Dark-eyed Junco (*Junco hyemalis*) Eggs. Annual Meeting of the Society for Integrative and Comparative Biology, Denver, Colorado. January 1999.
- Lipar, J.L., and E.D. Ketterson. The Relationship Between Yolk Testosterone Concentration and *Complexus* Mass in Nestling Red-winged Blackbirds. Annual Meeting of the Society for Integrative and Comparative Biology, Atlanta, Georgia. January 2000.
- Casto, J.M., J.L. Lipar, C.A. Buerkle, J. Grindstaff, E.D. Ketterson, and V. Nolan, Jr. Extended Phenotypic Effects of Elevated Testosterone in Male Dark-eyed Juncos: Female Mates Produce Smaller Eggs, but do not Alter Yolk Steroid Concentrations or Primary Sex Ratios. Annual Meeting of the Society for Integrative and Comparative Biology, Atlanta, Georgia. January 2000.
- Ketterson, E.D., V. Nolan, Jr., J.M. Casto, J.L. Lipar, C.A. Buerkle, and J. Grindstaff. Phenotypic and Extended Phenotypic Effects of Testosterone and Consequences for Fitness in Dark-eyed Juncos. VIIth International Symposium on Avian Endocrinology, Varanasi, India. January 2000.
- Lipar, J.L., and E.D. Ketterson. The Relationship Between Yolk Testosterone Concentration and *Complexus* Mass in Nestling Red-winged Blackbirds. VIIth International Symposium on Avian Endocrinology, Varanasi, India. January 2000.
- Lipar, J.L., E.D. Ketterson, and V. Nolan, Jr. Yolk Testosterone Influences the Development of the Hatching Muscle in the Red-Winged Blackbird. Annual Meeting of the American Ornithologists' Union, Seattle, Washington. August 2001.
- Lipar, J.L. Yolk Testosterone Influences the Development of the Hatching Muscle in an Altricial Avian Species. XXVII International Ethological Conference, Tübingen, Germany. August 2001.

CONFERENCES ATTENDED

- June 23-26, 2004 – Attended Council on Undergraduate Research National Conference at the University of Wisconsin - LaCrosse – “Crossing Boundaries: Innovations in Undergraduate Research”

- September 22-24, 2006 – Attended Michigan Ornithological Congress at the University of Michigan Biological Station, Pellston, MI.
- April 15, 2007 - Attended a meeting of the Michigan IBA (Important Bird Areas) Program in Lansing, MI. The purpose of this meeting was to learn about the IBA Program, which is an international effort, and to organize efforts within the state of Michigan.
- August 27, 2007 - Attended a meeting of the Research/Monitoring Subcommittee of the Michigan Bird Conservation Initiative in Lansing, MI.
- April 27-May1, 2008 – Attended Annual Meeting of the American Association of Museums, Denver, CO.
- April 3-5, 2009 – Attended Michigan Ornithological Congress at Northern Michigan College, Petoskey, MI.

INVITED SEMINARS / SPEAKING ENGAGEMENTS

- University of Nebraska-Cedar Point Biological Station
Summer Seminar Series, June 1997
- Washington State University/University of Idaho-Center for Reproductive Biology
Seminar Series, October 2001
- Invited Speaker at the Williamsport Lions Club Meeting – “Christmas Bird Counts in Williamsport and Across the Country”, February 2004
- November 1, 2007 - Invited Speaker at the Mecosta Audubon Club Meeting – “The History and Purpose of the Card Wildlife Education Center: A Tour of the Museum”.
- Invited Speaker at the Mecosta Audubon Club Meeting – “Investigations of Yolk Hormones in the Eggs of Birds”, November 2008
- Invited Speaker at the Big Rapids Rotary Club Meeting - “Studies of Yolk Hormones and their Effects on Offspring Development”, April 2009

COMMITTEES AND APPOINTMENTS

- | | |
|----------------|--|
| 2003 – 2005 | Director, Medical Technology Program, Lycoming College |
| 2003 – 2005 | Chair, Writing Across the Curriculum Committee, Lycoming College |
| 2004 – 2005 | Chair, Admissions, Financial Aid, and Retention Committee, Lycoming College |
| 2002 – 2005 | Health Professions Advisory Committee, Lycoming College |
| 2003 – 2005 | President Elect, Lycoming College Chapter of Phi Kappa Phi |
| 2006 – Present | Chair, Department of Biology Curriculum Committee, Ferris State University |
| 2006 - Present | College of Arts and Sciences Curriculum Committee, Ferris State University |
| 2006 - 2007 | Member, Department of Biology Faculty Search Committee (Anatomy and Physiology) |
| 2006 - 2007 | Member, Department of Biology Faculty Search Committee (Temporary Development Biology) |

2007 – Present Coordinator, Program in Biology
2007 – Present Member, College of Arts and Sciences Advising Excellence Committee
2007 – Present Member, Department of Biology Assessment Committee
2007 Member, Department of Biology Curriculum Revision Committee
 (Environmental Biology)

SERVICE

2004 – 2006 Reader, AP Biology Exam
2005 – Present Member, Mecosta Audubon Club
2009 – Present President, Mecosta Audubon Club
2006 - Present Judge, Science Competition in the MOISD - Math/Science Center.
2006 – Present Faculty Advisor, Outdoor Club, Ferris State University
2006 – Present Member, Research/Monitoring Subcommittee of the Michigan Bird
 Conservation Initiative
2008 – Present Faculty Advisor, Pre-Physical Therapy Club, Ferris State University
2008 – Present Faculty Advisor, Trout Unlimited, Ferris State University

MANUSCRIPTS REFEREED

American Midland Naturalist
Animal Behaviour
Auk
Behavioral Ecology and Sociobiology
Hormones and Behavior
Journal of Avian Biology
Journal of Comparative Physiology B
Journal of Field Ornithology
Physiological and Biochemical Zoology
Proceedings of the Royal Society of London B
Wiener Tierärztliche Monatsschrift (Veterinary Medicine Austria)

CURRICULUM VITAE

Gary Miller

Address: Ferris State University
820 Campus Drive, ASC 2004
Big Rapids, MI 49307
Phone: 231-591-5844 FAX: 231-591-2540
Email: millerg6@ferris.edu

EDUCATION: Grand Valley State University, B.S., Biology, 1991
Bowling Green State University, Ph.D., Biology, 1997

Dissertation Title: The Evolution of Senescence in *Drosophila melanogaster*
(advisor: Dr. Mark H. Gromko)

POSITIONS HELD

Institution	Title	Year
Ferris State University Biological Sciences	Visiting Assistant Professor	Present
University of Kansas Ecology/Evolutionary Biology	Post-Doctoral Researcher	2004-2006
Cuyahoga Community College	Lecturer	2003-2004
Syracuse University Department of Biology	Assistant Research Professor	2002-2003
Syracuse University Department of Biology	Research Associate	1997-1999; 2000-2002
Syracuse University Department of Biology	Teaching Associate	1999-2000
Bowling Green State University Biological Sciences	Teaching Assistant	1991-1994; 1996-1997
Bowling Green State University Biological Sciences	Non-Service Fellowship	1995-1996
Bowling Green State University Biological Sciences	Research Assistant	1994-1995

TEACHING EXPERIENCE

	<u>Semester</u>
Ferris State University-Assistant Professor BIOL 121 General Biology I	Fall 2006 Summer 2007
BIOL 122 General Biology II	Fall 2007 Spring 2007

Cuyahoga Community College- Instructor

BIO 1500	Principles of Biology I Intro to molecular, cell, genetics, and evolution for majors	Fall 2003 Spring 2004
BIO 1100	Intro to Biological Chemistry	Fall 2003 Spring 2004

Syracuse University - Instructor

Semester

BIO 345	Population Biology Population and evolutionary genetics	Spring 2000
BIO 799	Seminar in Evolutionary Biology Darwin and <u>The Origin of Species</u>	Fall 1997

Bowling Green State University - Laboratory Instructor

BIO 204	Concepts in Biology I Introduction to ecological and evolutionary biology for majors	Fall 1991 Spring 1992 Fall 1992 Spring 1993
BIO 104	Introduction to Biology The cell, metabolism, genetics, reproduction, development, evolution, ecology for non-majors	Fall 1993 Spring 1994
BIO 205	Concepts in Biology II Introduction to molecular and cellular biology for majors	Fall 1996 Spring 1997

PUBLICATIONS:

- Miller, G. T., Starmer, W. T. and S. Pitnick. 2003. Quantitative genetic analysis of among-population variation in sperm and female sperm-storage organ length in *Drosophila mojavensis*. *Genetical Research* 81: 213-220.
- Miller, G. T. and S. Pitnick. 2003. Functional significance of seminal receptacle length in *Drosophila melanogaster*. *Journal of Evolutionary Biology* 16: 114-126.
- Pitnick, S., Miller, G. T., Schneider, K., and T. A. Markow. 2003. Ejaculate-female coevolution in *Drosophila mojavensis*. *Proceedings of the Royal Society of London B* 270: 1507-1512.

Miller, G. T. and S. Pitnick. 2002. Sperm-female coevolution in *Drosophila*. *Science* 298: 1230-1233.

Miller, G. T., Starmer, W. T. and S. Pitnick. 2001. Quantitative genetics of seminal receptacle length in *Drosophila melanogaster*. *Heredity* 87: 25-32.

Pitnick, S., Brown, W. D. and G. T. Miller. 2001. Evolution of female remating behaviour following experimental removal of sexual selection. *Proceedings of the Royal Society of London B* 268: 557-563.

Pitnick, S., Miller, G. T., Reagan, J., and B. Holland. 2001. Males' evolutionary responses to experimental removal of sexual selection. *Proceedings of the Royal Society of London B* 268: 1071-1080.

Pitnick, S. and G. T. Miller. 2000. Correlated response in reproductive and life history traits to selection on testis length in *Drosophila hydei*. *Heredity* 84: 416-426.

INVITED DEPARTMENTAL SEMINARS

Bowling Green State University, Department of Biological Sciences, Fall 1993.

Syracuse University, Department of Biology, Fall 1997.

University of Kansas, Ecology and Evolutionary Biology, Fall 2004

CONFERENCE PRESENTATIONS

Miller, G. T. and M. H. Gromko. 1994. Joint Meeting of the SSE, ASN, SMBE, and SSB, Atlanta, Georgia.

Miller, G. T. and M. H. Gromko. 1995. Joint Meeting of the ASN, SSB, NT and SSE, Montreal, Canada.

Pitnick, S., Miller, G. T., and T. L. Karr. 1998. 7th International Behavioral Ecology Congress, Pacific Grove, California.

Pitnick, S., Miller, G. T., Reagan, J., and B. Holland. 2000. Joint Meeting of the SSE, ASN, ATB, and SSB, Bloomington, Indiana.

Gleason, J. M., Cropp, K. A., Dewoody, R. S., Drury, D., and G. T. Miller. 2004. Kansas NSF Epscor Symposium, Genes in Ecology, Ecology in Genes, Overland Park, Kansas.

Miller, G. T. and J. M. Gleason. 2005. Ecological Genomics Spring Workshop, Manhattan, Kansas.

Miller, G. T., Dewoody, R. S., Cropp, K. A., and J. M. Gleason. 2005. Kansas NSF Epscor Symposium, Genes in Ecology, Ecology in Genes, Overland Park, Kansas.

Curriculum vitae

Mary Rengo Murnik

Department of Biological Sciences
Ferris State University
Big Rapids, Michigan 49307

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email: murnikm@ferris.edu

Education

Michigan State University, Ph.D., Zoology (Genetics)
Michigan State University, B.S. *With High Honor*, Zoology (Honors
College)
Marquette University, Biology

Professional Experience

Professor, Department of Biological Sciences, 1992-
Professor & Head, Dept. of Biological Sciences, Ferris State
University, 1980-92
Acting Head, Dept. of Physical Sciences, Ferris State University,
1983-84
Assistant Professor to Professor, Biology, Western Illinois
University, 1970-80
Sabbatical, Rutgers University, Dept. of Psychology (Behavior
Genetics), 1979
Assistant Professor, Fitchburg State College, Massachusetts,
1968-70

Professional Memberships

American Association for the Advancement of Science, Sigma Xi,
American Society of Genetics, National Science Teachers
Association, American Biology Teachers Association, National
Center for Science Education

Professional Subscriptions

Science, Genetics, The American Biology Teacher, Journal of
College Science Teaching, American Scientist, The Scientist,
Natural History, Science News, Discover, Scientific American

Courses Taught:

BIOL 101 Genetics: Human Aspects
BIOL 375 Principles of Genetics
BIOL 340 Evolution
FSUS 100 Ferris State University Seminar

Advisor: Pre-dental advising chair

Awards and Honors

Ferris Distinguished Teacher award, 2007
Dr. Martin Luther King "Social Justice Award", 2004
Ferris Faculty Merit Award, 2002, 2006
Ferris Professional Women *Woman of the Year*, 1998
Michigan Association of Governing Boards' Award for Teaching Excellence, 1998

Professional Workshops/Seminars Presented (recent)

2011 "Genes, bacteria environmental influences and your weight."
FSU Honors Program lunch + learn series
2008 "New insights about the nature of the gene", FSU Honors
Program lunch + learn series
2007 "Genomic Imprinting and Epigenesis", FSU STEM seminar

2005 "Strategies to encourage students to *think* biologically",
National Association of Biology Teachers annual meeting,
Milwaukee
2004 "Critical Thinking in College Biology Courses", 24th
International Conference on Critical Thinking, Palo Alto, CA
2004 "How to Think about Weird Things", with Judith Hooper,
Critical Thinking Conference for Educators, Ferris Applied
Technology Center, Grand Rapids
2004 "Rosalind Franklin, the Dark Lady of DNA", FSU Chemistry Club
seminar
2004 "Genetics, Development and Human Sexual Orientation"
presentation with Dr. Robert Friar to DSAGA
2003 "Rosalind Franklin, the Dark Lady of DNA, and You", Select 60
Lecture Series, FSU
2003 "Critical Thinking Tips for Teachers", Critical Thinking
Institute, Ferris State University
2003 "Critical Thinking in Science Courses", Critical Thinking in
Higher Education Conference, Northwest Michigan College,
Traverse City
2003 "Critical Thinking Tips for Teachers", Critical Thinking in
Higher Education Conference, Northwest Michigan College,
Traverse City
2002 "Pursuing careers in Science", Ferris YBBW 2002 Annual
Conference

Recent Professional Meetings and Workshops

- 2010 DAT Biology Test Construction Committee workshop, American Dental Association, Chicago
- 2010 OAT Biology Test Construction Committee workshop, American Dental Association, Chicago
- 2009 Drosophila Research Conference, Chicago
- 2009 DAT Biology Test Construction Committee workshop, American Dental Association, Chicago
- 2009 OAT Biology Test Construction Committee workshop, American Dental Association, Chicago
- 2008 DAT Biology Test Construction Committee workshop, American Dental Association, Chicago
- 2008 American Biology Teachers Annual Meeting, Boston
- 2007 Dental Admission Test Item Writing Workshop, American Dental Association, Chicago
- 2006 Teaching Evolution: Applying Critical Thinking and Other Effective Strategies, Chautauqua short course for College Science Teachers, Dayton
- 2006 OAT/DAT Biology Test Construction meeting, American Dental Association, Chicago
- 2005 Dental Admission Test Item Writing Workshop, American Dental Association, Chicago
- 2005 "Making a Difference", FSUS Faculty Development Conference, Ferris State University
- 2004 24th Annual International Conference on Critical Thinking, Palo Alto
- 2003 1st Annual Scientific Thinking Conference, Sonoma State University
- 2002 9th Annual National Academy on Critical Thinking, Sonoma State University
- 2002 Mentorship training in Critical Thinking, Sonoma State Univ.

Research projects with students (recent)

- 2007-8 Quinn, Ashley (Math/Science/Technical Center), Induction of sex-linked recessive lethal mutations by resorcinol in *Drosophila melanogaster*
- 2006-7 Sarkozi, Rebecca (Math/Science/Technical Center), Muller-5 analysis of the mutagenicity of resorcinol in *Drosophila melanogaster*
- 2006 Trombley, Jamie, Toxicity assays with *Drosophila melanogaster*
- 2005-6 Winowiecki, Jenice, Effects of resorcinol on the life cycle of *Drosophila melanogaster*

Reviewer, recent, textbooks

Jones Bartlett Publishers, Thomson Brooks/Cole, W.H. Freeman&Co,
Wm. C. Brown, Publishers, McGraw Hill Companies

Publications

Instructional Materials, recent

- 2010 Evolution: Lecture Guide, for BIOL 340- Evolution,
Ferris State University, 200 p. (annual editions since
2000)
- 2010 Genetics: a Lecture Guide for BIOL 375- Principles of
Genetics, Ferris State University, 333 p. (annual
editions)
- 2010 Genetics: Human Aspects, Lecture Guide for BIOL 101,
Ferris State University, 298 p.(annual editions)
- 2010 BIOL 101 Laboratory Manual, Ferris State University, 197 p.
(annual editions)

Professional Service since 2002

- Academic Program Review, Biology B.S., B.A. panel, 2008-9
2008-10 FSU Diversity Planning Committee
2008- FSUS Board
2008 Judge, Honors Senior Symposium, FSU Honors Program
Faculty sponsor, Ferris Pre-dental Club, 2007-
Faculty sponsor, Ferris Pre-dental Club, 1987-
Dental Admission Test Constructor, Biology Content Area, American
Dental Association, 2006-
Ferris Accreditation Task Force Committee, 2005-2006
Ferris Distinguished Teacher Award Committee, 2003-2006
Volunteer docent for Ferris State University "Jim Crow Museum",
2001-
Judge MOISD Science Fair, Ferris State University, annually,
2001-8
Scientific Understanding Outcomes and Assessment Committee, 2003-8
Biology Department Search Committee (four tenure-track positions),
2004-2005
Biology Department Planning Committee, 2001- 2004, 2006-8
Faculty Mentor, Dr. Karen Strasser, 2002-6
Faculty Mentor, Dr. Bradley Isler, 2005-9
Member, Zimmer Tenure Committee, 2007-
Chair, Strasser Tenure Committee, 2002-6
Chair, Isler Tenure Committee, 2005-9
Member, Klaat Tenure Committee, 2005-9
Ferris Strategic Direction Committee 2002-3
Academic Program Review, Secondary and Vocational Ed. B.S. panel,
2002-3
Academic Program Review, Applied Biology B.S. panel, 2002-3

Faculty Panel, Student Leadership Conference, 2002-2004
Select 60, Ferris mentorship program, 2001-
Chair, Pre-Dental Advisory Committee, 1995-
Pre-Med Advisory Committee, 1995-

Anna M. Rizzo, B.S.

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rizzo@ferris.edu

Education

Bachelor of Science ,Applied Biology with emphasis in Pharmacy, Ferris State University, Big Rapids, MI, 1990.

Masters of Education, Vocational Education, Ferris State University, Big Rapids, MI, Currently Pending.

Professional Profile

- Strong team player who performs equally well independently.
- Knowledgeable in many areas of Biology, i.e. botany, anatomy, genetics, zoology, environmental
- Strong background in course design.
- Teaching approach covers all facets of learning: visual, auditory, kinesthetic

Academic / Teaching Experience

Instructor at Ferris State University, Big Rapids, MI August 1995 – Present

- Biology 101 Lab Basic Human Genetics
- Biology 111 Lab Environmental Biology
- Biology 121 and 122 General Biology (majors)
- Biology 205 Lab Human Anatomy (Allied Health majors)
- Biology 109 Human Anatomy and Physiology
- Biology 114 Turf Grass Management (8 years)

Structured Learning Assistant/CLS Facilitator at Ferris State University, Big Rapids, MI, 1995 – 1999

- Worked cooperatively with appointed staff in order to align curriculum for higher student achievement.
- Applied appropriated study skills for maximum achievement in course work in biology.
- Courses Facilitated: Biology 101, Biology 375 Genetics (majors), Biology 205 and Biology 122

Para-Professional, Academic Support Center, Ferris State University, Big Rapids, MI August 1996 - 1999

- Develop Seminars for Test-anxiety, study skills, test-taking, time management and reading comprehension.

- Tutoring: Biology and Chemistry

Substitute Teacher, Big Rapids Public School and Reed City Public School 1997 -1999

- Fourth Grade, Kindergarten, Music, and high school biology and chemistry

Committees and University Affiliations

Ferris Non-Tenure Faculty Organization, Ferris State University, Big Rapids 2012 – Present

- President July 2013 – Present
- Vice- President May 2012 – July 2013
- Originating member 2012
- Member of the bargaining team 2013

Presidents Leadership Committee, Ferris State University, Big Rapids 2012 – Present

- Discuss and vote on University wide proposals/policies.

Health Care Committee, Ferris State University, Big Rapids, MI 2012 – Present

- Evaluate medical insurance coverage
- Determine which policies benefit employees
- Provide feedback and university recommendations.

AAUW, Ferris State University Big Rapids, MI 2012 – Present

- Women in the workplace discussions
- Community service projects
- Raise Scholarship money for female students.

Community

Big Rapids Garden Club 2000 – 2003

Brookside Elementary, Big Rapids, MI 2008 – 2012

- PTO e-board member
- Secretary, Vice-President, and President

Big Rapids Co-Op Preschool, Big Rapids MI 1994 -1996

- Executive Board Member

References

Dr. David M. Griffith
Professor of Biology
Ferris State University
820 Campus Dr.
SCI 141
Big Rapids, MI 49307
davidgriffith@ferris.edu

Dr. Mary Murnik
Professor of Genetics
Ferris State University
820 Campus Dr.
ASC 2117
Big Rapids, MI 49307
marymurnik@ferris.edu

Mr. John Johnson
Instructor
Biology
Ferris State University
SCI 141
Big Rapids, MI 49307
JohnJohnson@ferris.edu

Curriculum Vitae

Gary Rodabaugh, Ph.D., Professor, C.H.M.M. (Master)

March 11, 2007

Address Ferris State University EEAS
820 Campus Dr., AHSC 2016 15250 92nd Ave.
Big Rapids, Michigan 49307 Rodney, Michigan 49342

Contact FSU Office: (231) 591-2308
FSU FAX: (231) 591-3788
Home: (231) 972-2831
EEAS Office: (231) 972-4779 (FAX/Phone)
Email: rodabaug@ferris.edu

Education Doctor of Philosophy, 1987
Program: Environmental Protection, College of Natural Resources
Michigan State University

Master of Science, 1981
Program: Pollution Ecology/Biology
Eastern Michigan University

Bachelor of Arts, 1976
Program: Biology
University of Michigan

Associate of Science, 1977
Program: Medical Technology
C.S. Mott Community College

Heritage Native American

Present Position Ferris State University – Academic Rank: Professor – Industrial Hygiene
Professor – Industrial Safety
Professor – Hazardous Materials Management
Professor – Biology

Certifications Certified Hazardous Materials Manager at the Master Level (#539)
Licensed Residential Builder (#2101178188 - Michigan)

Specialization and Areas of Interest

As a Full Professor and Consultant, I am currently practicing in the specialty areas of Industrial Hygiene, Indoor Air Quality, Industrial/Construction Safety and Chemical Management/Exposures in the Environment. Specific information on each of these specialties is provided on following pages.

Present & Past Positions

- 1986 - Present Ferris State University
Position: Tenured Full Professor of Biology, Tenured Full Professor of Environmental Health and Safety (EHS) Management (Safety, Industrial Hygiene, Hazardous Materials)
- 1991 - Present Expert Environmental Assessment Services (EEAS)
Position: Owner & CEO
- 1984 - 1986 General Motors Corporation, Flint, Michigan
Position: Senior Environmental Specialist (Level 7)
- 1983 - 1984 General Motors Corporate Fellowship Scholarship at Michigan State University
- 1982 - 1983 General Motors Corporation
Position: Environmental Specialist (Level 6)
- 1980 - 1982 General Motors Corporation
Position: Associate Chemist (Level 5)
- 1979-1981 Graduate Instructor, Anatomy & Physiology
Eastern Michigan University
- 1978-1986 Emergency Medical Technician, Ambulance Attendant/Driver, Byron Area Volunteer Ambulance Squad
- 1978-1980 GLR Construction (General residential construction)
Position: CEO
- 1974-1978 WACO Construction, Saginaw, Michigan
Position: Residential subcontractor
- 1970-1974 Atwood Siding, Saginaw, Michigan
Position: Residential subcontractor

Awards and Accomplishments

- Awarded academic tenure [1991]
- Awarded academic sabbatical leave [1993, 1999, 2006]
- Promoted to Full Professor of Hazardous Waste Management, Industrial Hygiene, and Industrial Safety [1989]
- Nominated for Teacher of the Year award [1990, 1991]
- General Motors Corporate Fellowship award - [1983]
- Captain's Certificate of Meritorious Service, South Dakota State Police [1980]
- Listed in Who's Who in America [1985 through 1990]
- Listed in Who's Who in Environmental Activities [1992]
- Appointed to General Motors Divisional Task Force on Hazardous Materials Control Activities [1986]
- Nominated for service on Michigan Hazardous Waste Site Review Board [1989]
- Member: Michigan Department of Education Task Force on Occupational Education [1992]

International Consulting Expert

- Antigua/Barbuda, British West Indies, Caribbean, Industrial Hygiene Evaluation of Community Exposure to Emissions from Asphalt Production Operations.
 - This series of projects involved the exposure of local residents to emissions from a rock quarrying and asphalt production facility. A detailed evaluation of silica and organic vapor emissions was undertaken for the immediate region and detailed soil evaluations for select contaminants was undertaken for the entire island. High levels of silica were found to be emitted from the quarry operation, VOC emissions were not considered significant at the property border and high levels of arsenic were located from a historical agricultural chemical spill.
- Ontario, Canada, Retained by Farmers Reinsurance Group to evaluate environmental releases of hydrocarbons and associated remediation activities
 - From 2003-2005, case evaluations were undertaken for approximately 30 environmental releases of home heating fuels in residential and rural settings. In each case, the file was evaluated, reports were created to discuss adequacies/inadequacies of the remediation methods, site visits were conducted and recommendations were made for the amelioration of any identified deficiencies.
- Ontario, Canada, Retained by several environmental attorneys to evaluate environmental cleanup strategies and community chemical exposure. Investigation of occupational chemical exposure to benzene and the resultant health risks was undertaken for an attorney in Ontario and investigations related to litigation of improper responses to the remediation of heating oil spills have been undertaken.
- Ontario, Canada, Retained to conduct case file evaluation involving major remediation activity on residential structure impacted by release of approximately 500 liters of fuel oil.

Committees and Offices Held

- Chairman - Hazardous Materials Control Committee (General Motors)
- Chairman - Occupational Health and Safety Committee (Ferris State University)
- Member – College of Allied Health Safety Committee (FSU)
- Secretary - Regional Solid Waste Management Committee (GM)
- Radiation Safety Officer (GM)
- Coordinator - Pollution Emergency Response Team (GM)
- Member - Michigan Department of Education Task Force on Occupational Education
- Member - Divisional Hazardous Waste Task Force (GM)
- Member - Radiation Safety Committee (FSU)
- Member - Regional Solid Waste Management Plan Review Committee for Mecosta County
- Member - Graduate Programs Review Council (FSU)
- Member – Deans Advisory Council (FSU)
- Member - Mecosta County Cooperative Extension Service Advisory Board
- Member - Editorial Review Board for *Journal of Environmental Engineering and Management*
- Member – FSU Information Technology Council

Publications

- *Bloodborne Pathogens in Industry - Best Practices*. All About Bloodborne Pathogens and First Aid (CD training Software, Version 5), Keller-Soft Safety Singles 1998
- *Act 201, Michigan's Version of CERCLA*. Presented in New Orleans at the 1996 National Meeting of the Certified Hazardous Materials Managers.
- *Occupational Lead Exposure; OSHA's New Zero Tolerance Standard*. Summer Regional Meeting of the Michigan Chapter of the Air and Waste Management Association, June 1994.
- *Covenants Not to Sue*. Quarterly Newsletter of the Michigan Chapter of the Air and Waste Management Association. February 1994.
- *Changes in Michigan Environmental Law Through Compilation by the Michigan Environmental Code Commission*. Quarterly Newsletter of the Michigan Chapter of the Air and Waste Management Association. February 1994.
- *Handbook of Hazard Control* - Commissioned by the Board of Hazard Control, this textbook is designed to serve as a reference guide for those individuals interested in becoming a Certified Hazard Control Manager [unpublished].

- *The New ASTM Standard for Conducting Phase I Environmental Site Assessments* - Academy of Certified Hazardous Materials Managers - Proceedings of the August 1993 National Meeting in Seattle, Washington.
- *Voluntary Exposure to Hazardous Chemicals in Michigan Anglers Utilizing Contaminated Waters* - University Microfilm Publications, Ann Arbor, Michigan, August 1987.
- *Bioaccumulation and Competitive Uptake of Polychlorinated Biphenyls in Select Aquatic Organisms* - American Academy of Sciences, Michigan Division, April 1981.

Internet Course Development

- *Environmental Regulations 1 & 2*. Internet courses providing basic (Env. Regs 1) and detailed information (Env. Regs 2) on compliance with environmental regulations for more advanced users and professionals in the field. It will concentrate on compliance plans, regulatory interpretation and processing of appropriate reports/information for submission to governmental agencies.
- *OSHA Law*. A course designed to provide the student with basic information on the use of OSHA laws in industry and how they affect both employees and employers. Detailed attention is given to a wide variety of specific components of the OSHA regulations, such as HAZCOM, confined space, lockout/tagout and the process of participating in an OSHA inspection.
- *EHS Regulations in Industry*. A compilation of environmental and occupational health & safety regulations, this course provides a detailed treatment of regulations important in the protection of human health and the environment. Community, workplace, industrial and other standards are discussed in detail.
- *Epidemiology and Statistics*. A course designed to provide the student with an introduction to epidemiological and statistical methods used in the health fields.

Courses Taught At Ferris State University

CCHS 102 – EHS Issues in Health Care
 EHSM 103 – Fundamentals of Industrial Hygiene and Waste Management
 EHSM 330 – OSHA Laws & Regulations
 EHSM 303 – Ambient Air Quality
 EHSM 304 – Indoor Air Quality
 EHSM 222 – Industrial Fire Prevention & Control
 EHSM 231 – Mechanical Safety
 EHSM 322 – Accident Investigation & Reporting
 EHSM 335 – Air Sampling & Analysis
 EHSM 340 – Risk Assessment and Communication
 EHSM 412 – Industrial Ventilation
 EHSM 208 – Environmental Regulations 1
 EHSM 440 – Environmental Regulations 2

EHSM 315 – Epidemiology and Statistics
EHSM 245 – Emergency Response 1 (HAZWOPER)
EHSM 415 – Environmental Sampling and Project Design
EHSM 421 – EHS Regulations in Industry
EHSM 416 – Noise & Vibration

Graduate Courses for Wayne State University

CHE 554 - Hazardous Waste Law
CHE 555, 556 Environmental Auditing I & II

Major Professional Projects and Experiences

As noted earlier, Dr. Rodabaugh currently practices in several areas of expertise. Selected experience and expertise in identified areas are presented here.

Industrial Hygiene & Indoor Air Quality

- Responsible for all industrial hygiene activities at Chevrolet Flint Manufacturing in Flint Michigan from 1980-1986. Evaluations of occupational chemical exposure, air sampling, noise evaluations and initiation of control activities were a primary responsibility. Prevention of workplace illnesses caused by physical or chemical stress was part of my daily responsibilities.
- Investigation, risk assessment and site safety plan development for a major structural fire that released large quantities of gold cyanide, silver cyanide, sodium cyanide, potassium cyanide, hydrogen cyanide and other hazardous decomposition products (2004).
- Investigation of cancer cluster at small foundry operation in Michigan.
- Conducted a detailed evaluation of indoor air quality complaints at the Mecosta County Courthouse and other government buildings in Mecosta County.
- Consulting Indoor Air Quality expert for the Michigan Education Association. IAQ evaluations of over 20 Michigan schools have been completed to date.
- Evaluated exposure to gasoline vapors in residential setting as a result of the release of fuel from a local government facility.
- Involvement as primary or consulting expert on over 25 indoor air quality studies related to chemical and microbiological contaminants within occupied structure.
- Completed major environmental impact assessment of worker and community exposure to quarry silica and contaminants from an asphalt production facility in the Caribbean, Antigua, West Indies (2001)

Industrial/Construction Safety

- Author of major training manuals and programs in occupational health, safety, PPE, confined space entry, lockout/tagout, general safety, worker exposure, construction safety, construction fatalities, construction accident/injury/fatality investigations, ergonomics, indoor air quality, training techniques, and other topics for UAW-Chrysler [1995-Present].
- Development of Confined Space Entry programs for several foundries, large manufacturing companies and private industries.
- Development of Lockout/Tagout programs for several foundries, large manufacturing companies and private industries.
- Injury/accident investigations in several residential and commercial buildings in Michigan.
- Assisted in the development and national press release of an Ergonomic Stress Reliever in association with KLAI Enterprises [1995].
- Development and administration of OSHA Hazard Communication program for 5000 employees at a medium size General Motors facility.
- Ergonomic review and facility/workstation redesign at several foundries, manufacturing facilities and private offices in Michigan and Indiana.

Chemical Management/Exposures in the Environment

- Author of a “Best Practices” section of JJ Keller software package. *Bloodborne Pathogens in Industry - Best Practices*. All About Bloodborne Pathogens and First Aid (CD training Software, Version 5), Keller-Soft Safety Singles 1998.
- Responsible for tracking and evaluation of over 100 chemical and hydrocarbon releases at General Motors. Identification of contaminant, mitigation of migration, delineation of release, initial response, final remediation and clearance were key activities for each release.
- Monitoring, testing, evaluating data and reporting spill incidents for 130 NPDES outfalls, including daily sampling, conducting laboratory analysis and submitting results to State of Michigan Department of Natural Resources.
- Investigation of accidental fuel releases and resultant attempts at remediation throughout Eastern Ontario, Canada. Approximately 30 sites of fuel oil release in residential areas were visited during 2001-2002. Each file was reviewed prior to the site visit and recommendations on the adequacy of the remediation efforts were submitted to the reinsurance company. Approximately 50% of the sites were inadequately remediated or the remediation effort was misguided and/or totally incorrect.

- Completed major environmental impact assessment of worker and community exposure to quarry silica and contaminants from an asphalt production facility in the Caribbean, Antigua, West Indies. Sampling of soils for a variety of volatile organic compounds and heavy metals were undertaken throughout several areas of the country. High levels of arsenic were found along 3 kilometers of public road, the result of an historic pesticide spill. High levels of airborne silica were found in areas downwind from the quarry operations.
- Developed Spill Prevention Countermeasure and Control, Pollution Incident Prevention Plans, and Contingency plans for several large industrial facilities as required by various Federal and State environmental regulations.
- Coordinated precautionary removal, storage, and disposal of over 500,000 pounds of Polychlorinated Biphenyls from capacitors and transformers.
- Conducted over 100 Phase 1, Phase 2 and Phase 3 Environmental Site Assessments in Michigan. These projects involved detailed documentation searches, identification of released chemicals, delineation of the migration paths, design of sampling protocols, quality control, sample submission, recordkeeping and final report preparation. Some projects involved the supervision of Phase 3 site remediation and verification of reaching cleanup criteria.
- Identified and supervised the removal of 24 leaking underground storage tanks containing gasoline, oil, and other chemical materials at Chevrolet Flint Manufacturing. Identification of leak, removal of tank and supervision of remediation were assigned responsibilities for these releases.
- Conducted identification, delineation and soil remediation activities for release of high levels of lead from a local industrial facility.
- Researched the rates of bioaccumulation of PCB in select aquatic organisms with *in vitro* experiments utilizing radioactive C₁₄-labeled PCB.
- Supervised removal of thousands of meters of asbestos-covered pipe during major renovation activities at Chevrolet Flint Manufacturing.

2007-2008 Rates

EEAS & Dr. Gary Rodabaugh, CHMM

The following rates are effective for Expert Environmental Assessment Services (EEAS) and Dr. Gary Rodabaugh beginning on June 5, 2005.

Hourly rates

Consulting services and document review.....	\$200/hour
Travel time	\$100/hour
Deposition and Trial Testimony	\$2000/day ¹
Technician	\$45/hour
Training and material development time	\$175/hour ²

Expenses

Mileage	\$0.45/mile
Per diem	\$200/day
Laboratory fees & sample shipping	At cost
Airfare and other travel expenses	At cost
Equipment rental	At cost
Miscellaneous and specialized equipment/material purchases	At cost

The fees noted above will be in effect until further notice. Any miscellaneous expenses, materials, equipment or items not specified above will be invoiced at cost. Any professional time or activity not specifically listed above will be invoiced at a rate of \$200/hour.

1 Invoiced in ½ day increments. Minimum ½ day charge.

2 Custom training often requires site visits and approximately 5:1 development time. Charges will vary depending on the level of customized training desired.

CURRICULUM VITAE

(last update: 3 June 2009)

MICHAEL DENNIS RYAN

Business Address:

Department of Biological Sciences, ASC 2115
Ferris State University
Big Rapids, MI 49307
voice: (231) 591-5892 cell: (231) 580-1580
fax: (231) 591-2540
email: ryanm@ferris.edu

Born: 25 March 1947
Pittsburgh, PA

Married: Mary Balestra Ryan
Children: Shawn, Patrick,
Kevin, Michael

Home Address:

327 South Stewart Avenue
Big Rapids, MI 49307
(231) 796-2264

TEACHING/RESEARCH EXPERIENCE

Professor Department of Biological Sciences Ferris State University	1987-88 to Present
Associate Professor Department of Biological Sciences Ferris State College	1981-82 to 1986-87
Visiting Associate Professor Department of Biology Central Michigan University Mt. Pleasant, MI	1983 Fall Semester
Assistant Professor Department of Biological Sciences Ferris State College	1977-78 to 1980-81
Laboratory Teaching Assistant Department of Microbiology SUNY at Buffalo, School of Medicine Buffalo, NY 14214	1974-75 to 1975-76
Microbiology Tutor School of Dentistry SUNY at Buffalo	1974-75 to 1975-76
Research Technician Department of Microbiology School of Medicine SUNY at Buffalo	1972 - 1973

Teaching Assistant
Department of Biological Sciences
Duquesne University
Pittsburgh, PA 1969-70 to 1970-71

Laboratory Teaching Assistant
Chemistry Department
St. Vincent College
Latrobe, PA 1967-68 to 1968-69

FELLOWSHIP

NIH Pre-Doctoral Fellowship
School of Medicine SUNY at Buffalo 1971, 1974 to 1976-77

EDUCATION

Ph.D. Microbiology
Department of Microbiology
School of Medicine
SUNY at Buffalo 1980
Buffalo, NY

Dissertation: "Studies on the Pathogenesis of Infection and the Accompanying Immune Response in Inbred Guinea Pigs Inoculated with *Mycoplasma pneumoniae*"

M.S. Biology
Department of Biological Sciences
Duquesne University
Pittsburgh, PA 1971

Thesis: "Comparative Double Diffusion Studies of Saline Extracted Complement Fixing Antigens of *Fasciola hepatica* and *Fascioloides magna*"

B.A. Biology
St. Vincent College
Latrobe, PA 1969

PRESENTATIONS/PUBLICATIONS (2002-2007 in Bold)

“Strategic Preparation for Bargaining.” Presenter/Panel Discussion Leader. Michigan Association for Higher Education 2007 Conference, Lansing, Michigan, 19 October 2007.

“2005 Current Issues and National Trends in Higher Education” Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI. 5 February 2005.

“Higher Education Forum: Impact of GATS on the Future of Higher Education” National Education Association, Midwest Leadership Conference. Presenter/ Panel Moderator. St Louis, MO. 22 January 2005.

“Status and Concerns: Higher Education Re-Authorization Legislation 2004” Michigan Education Association, Higher Education Forum. Presenter. Professional Development Conference, Dearborn MI 4 December 2004

“Managing Campus Crisis: A Workshop”. Presenter. Southern Illinois University, Carbondale, IL 14-17 Feb 2004.

“2004 Current Issues and National Trends in Higher Education” Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI 7 February 2004.

“Higher Education Forum: Higher Education Re-Authorization Legislation” National Education Association, Midwest Leadership Conference. Presenter / Panel Moderator. Sioux Falls, SD. 24 January 2004.

“2003 Current Issues and National Trends in Higher Education” Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI 11 February 2003.

“Higher Education Re-Authorization and Federal Legislation Update 2003” Michigan Education Association, Higher Education Forum. Presenter. IPD Conference, Dearborn MI. 2 December 2003

“2002 Current Issues and National Trends in Higher Education” Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI 9 February 2002.

“Higher Education Re-Authorization and Federal Legislation 2002 Update” Michigan Education Association, Higher Education Forum. Presenter. IPD Conference, Dearborn MI. 4 December 2002

“Common Sense Answers to the Current Anthrax Threat”. TV Interview, TV 9/10’s “The Evening News”. Cadillac , MI 16 October 2001.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. Fourth Edition. 2001. Kendall-Hunt Publishing Co., Dubuque, IA. 206 pages

“Is This Any Way to Run a Railroad?” A book review. Management Fads in Higher Education: Where They Come From, What They Do and Why They Fail. Robert Birnbaum, Jossey-Bass Press, 2001. In “Thought and Action”, Volume XVII, Number 1, Summer 2001

“The Role of Faculty in the Evolution of Technologically Based Higher Education.” Presenter and panel discussion member. Washington State Higher Education Association, State Meeting. Seattle/Tacoma, WA. 23-25 February 2001.

“The Role of Technology in Higher Education” Lecturer and panel discussion member. Ferris State University’s Futures Conference. 2 September 1999.

“Recent advances in Vaccine Research and Development. A continuing education seminar for the FSU Health Center’s Staff Physicians and Nurses. 24 August 1999

“Recent Advances in Vaccines and You”. TV Interview. TV 9/10’s “Michigan This Morning Show”. Cadillac, MI 17 June 1999.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. Third Edition. 1995. Kendall-Hunt Publishing Co., Dubuque, IA. 227pages

“Immunological Basis of Ocular Inflammation and Pathology”. Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry. East Lansing, MI, June 24, 1995.

“Immunological Basis of Ocular Inflammation and Pathology”. Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry. Iron Mountain, MI, May 20, 1995.

“Immunological Basis of Ocular Inflammation and Pathology”. Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry. Big Rapids, MI, May 16, 1995.

“Immunology and the Western Blot Technique”. Ferris State University/ The Upjohn Company Biotechnology Workshop for Community College Teachers and their Students. Big Rapids, MI. April 8, 1995.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. Second Edition. 1993. Kendall-Hunt Publishing Co., Dubuque, IA. 210 pages.

“World of Microbes”. Hillcrest Elementary School. April 1992

“Attainment of a doctoral Degree in Microbiology while Maintaining Full-Time Employment” with Drs. Debra Stai and Walter Hoeksema. Presented by Dr. Stai at the 89th Annual International Meetings of the American Society for Microbiology, New Orleans, LA, May 14-18, 1989. Published in the Abstracts of the 89th Annual Meeting, ASM, page 492.

“Immunological Basis of Ocular Inflammation and Pathology.” Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry, Big Rapids MI, January 22, 1989.

“Immunological Basis of Ocular Inflammation and Pathology.” Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture, Ferris State University, College of Optometry, Big Rapids MI, January 15, 1989.

"Monoclonal Antibodies: Concept and Applications." Drug Manufacturing Quality Control Training Course for Federal Drug Agency Investigations, October 17, 1988.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. 1986. Kendall-Hunt Publishing Co., Dubuque, IA. 175 pages.

"Pre-medical Career Advising." Cmte on Grad./Prof. Studies. Michigan Association of Collegiate Registrars and Admissions Officers (MACRAO) Annual Meeting, Shanty Creek, Oct. 1986

Ryan, M.D., P. Noker and L.L. Matz. 1975. Immunological properties of glycolipids from membranes of *Acholeplasma laidlawii*. Infection and Immunity 12(4): 799-807.

NOMINATIONS/AWARDS

FSU Martin Luther King Social Justice Award (2005)

Michigan Association of Governing Boards (MAGB)
1985-86 Distinguished Faculty Member Award Winner

Nominee, Outstanding Advisor Award (1985)
ACT/NACADA National Recognition Program for Academic Advising

Nominee, Outstanding Institutional Advising Program Award, 1985
ACT/NACADA National Recognition Program for Academic Advising

Ferris Greek Educator of the Year (1981-82)

CONTINUING EDUCATION

(2002-2009 in Bold)

"The Twelfth Annual Conference on Vaccine Research. Sponsored by the national Foundation for Infectious Diseases. Baltimore, Maryland. 27-29 April 2009.

"The One Health Initiative: The Interrelationship between Humans, Animals and Pathogens."
ASM-MI Branch Spring Meeting, Delta College, University Center, MI. 27-28 March 2009.

"Beneficial Microbes: How Bacteria Impact Human Health!" ASM-MI Branch Fall Meeting
Eastern Michigan University, Ypsilanti, MI October 10-11, 2008,

"Small solution to a big problem: Microbes and Alternative Energy" ASM-MI Branch Spring
Meeting Central Michigan University, Mount Pleasant, MI April 11-12, 2008.

"Critical Issues in Higher Education" Fall 2007 MEA Conference Kellogg Center, MSU, East
Lansing, MI. 19-20 October 2007.

"Emerging Infectious Diseases". ASM-MI Branch Fall Meeting, Traverse City, Michigan.
12-13 October 2007.

"New Risks and New Defenses: The Technology of Bioterrorism". ASM-MI Branch Spring Meeting,
Wayne State University, Detroit, MI 13-14 April 2007.

"Critical Issues in Higher Education" Fall 2006 MEA Conference, Kellogg Center, MSU, East
Lansing, MI. 13-14 October 2006.

"Biofilms" ASM-MI Branch Fall Meeting Fall 2006, Lansing Community College, Lansing Mi,
7 October 2006.

"Microbial Physiology in the Genomics Era",ASM-MI Branch Spring Meeting, Ferris State University, Big Rapids, Mi, 1 April 2006.

"New Perspectives and Paradigms in Environmental Microbiology". ASM-MI Branch Fall Meeting. Dearborn. MI. 8 October 2005

"Responses to Infectious Diseases after Natural Disasters". ASM-MI Branch Spring Meeting. Delta College, University Center, MI. 2 April 2005.

"Dimensions of Diversity: The Changing World of Higher Education". National Council for Higher Education (NCHE). San Antonio, TX. 4-6 March 2005.

"Microbial Products; From Arsenic and Steroids to Wine and Cheese". ASM-MI Branch Fall Meeting. Bellaire, MI. 9 October 2004.

"The Seventh Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC), National Foundation for Allergy and Infectious Diseases and International Society for Vaccines, among others. Crystal City, MD. May 24-26, 2004.

"Infectious Causes of Neuropsychiatric Disorders Disorders". ASM-MI Branch Spring Meeting Eastern Michigan University, Ypsilanti, MI 20 March 2004.

"Higher Education on Dangerous Ground: Defending a Public Good". National Council for Higher Education (NCHE). Seattle, WA. 5-7 March 2004.

"Life in Extreme Environments". ASM-MI Branch Spring meeting. Western Michigan University, Kalamazoo, MI. 4 October 2003

"The Sixth Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC), National Foundation for Infectious Diseases, International Society for Vaccines, (among others). Crystal City, MD. May 6-8, 2003.

ASM-MI Branch Spring Meeting. "Emerging and Re-emerging Pathogens II ". Ann Arbor, Mi. 5 April 2003

"Critical Issues in Higher Education 2003: Process and outcome of Higher Education Accreditation." National Council for Higher Education (NCHE). Washington DC, 1-4 March 2003.

"The Fifth Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Baltimore, MD. May 6-8, 2002.

"Critical Issues in Higher Education 2002: The Promise and the Reality of Distance Education." National Council for Higher Education (NCHE). San Antonio, TX. 1-4 March 2002.

"The Distributed Learning Workshop: Developmental Update" Sponsored by the Midwest Higher Education Commission. Minneapolis, MN 13-15 September 2001.

"The Fourth Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Arlington, MD. May 30-June 2, 2001.

“Critical Issues in Higher Education 2001: The Higher Education Enterprise: Partners, Profits and Politics.” National Council for Higher Education (NCHE). San Diego, CA 1-4 March 2001.

“Learning, the Learner and Teaching Methodology: a course for teachers”. FSU Center for Teaching, Learning and Faculty Development (CTL&FD). Winter Semester 2001.

“Critical Issues In Higher Education: The Twin Challenges of For-profit and Dis-intermediation” National Council for Higher Education (NCHE). Washington, D.C. 26-28 January 2001

“Restructuring Higher Education To Meet the Challenges of A Global Economy”. NEA Higher Education President’s Meeting. Minneapolis, MN 1-5 August 2000

“The Third Annual International Conference on Vaccine Research” Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Washington, D.C. May 30-June 2, 2000.

“Critical Issues in Higher Education 2000: Technology in Education.” National Council for Higher Education (NCHE). Atlanta, GA April 6-9 2000.

“The Distributed Learning Workshop: Initial Developmental Update.” Sponsored by the Midwest Higher Education Commission Emeryville, CA 18-21 January 2000.

“The Second Annual International Conference on Vaccine Research” Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Bethesda, MD. D.C. May 31-June 1, 1999.

“Critical Issues in Higher Education 1999: Distance Education”. National Council for Higher Education (NCHE). San Antonio, TX. March 6-9 1999.

“The First Annual International Conference on Vaccine Research”. Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Washington D.C. May 31-June 1, 1998.

“The Immune System: Minding the Body, Embodying the Mind”. Mind Matters Seminar Series (Mountain View, California) delivered at Grand Rapids, Michigan. March 25, 1998.

“On the Cutting Edge of Quality”. National Council for Higher Education. Savannah, Georgia. March 4-6, 1998.

“Critical Issues Seminar: Quality Teaching and Learning Across the Disciplines”. National Education Association. Washington, DC. May 29-31, 1997.

“Molecular Approaches to the Control of Infectious Diseases”. A Cold Springs Harbor Laboratory Conference. Cold Springs Harbor, New York. September 9-13 1996.

“A Guide to the Internet and the World Wide Web”, NSF Chautauqua Course taught by Dr. Wayne Summers (Arizona State University) taught at Dayton, Ohio. May 8-10, 1996

“50th Anniversary of Universidad Autonoma de Guadalajara, Pre-medicine Advisors’ Conference”. Guadalajara, Mexico. October 25-29, 1995.

“IBM Seminar: Think Pad Applications in Higher Education”. Detroit, MI, October 1995.

“Pre-medical Advisors Conference”. Michigan Medical Schools Council of Deans. University of Michigan, School of Medicine, Ann Arbor, Mi. April 1994.

“Human Immunodeficiency Virus Biology and Clinical Latency”. Michigan Branch of the American Society for Microbiology, Ann Arbor, MI. April 1994.

“Basic Biology of Cancer”. NSF Chautauqua Course taught by Dr. Kenneth J. Soprano (Temple University, School of Medicine) taught at Dayton, Ohio. March 1994.

“Pre-medical Advisors Conference”. Michigan Medical Schools Council of Deans. Wayne State University, School of Medicine, Detroit, MI. April 1993.

“Fundamentals of Virology for the Nineties and Beyond”, NSF Chautauqua Course taught by Dr. Linda Pifer (University of Tennessee, School of Medicine) taught at Memphis, TN, March, 1993.

“Critical thinking Workshop”, Foundation for Critical Thinking (Sonoma State University) taught at Chicago, IL. March 13-14, 1993

“Equity in the Classroom”, Michigan Department of Education, Lansing, MI, April 1993.

“Pathogenic Mechanisms and the Immune Response”. Michigan Branch of the American Society for Microbiology, Ann Arbor Michigan, April 1993.

“Critical Thinking in Biology and Physical Science Courses”, workshop sponsored by FSU Biological and Physical Sciences Departments, taught by Dr. Craig Nelson of Indiana University, Big Rapids, MI, September, 1992

“Pre-medical Advisors Conference”. Michigan Medical Schools Council of Deans. Michigan State University, Schools of Human Medicine and Osteopathic Medicine. East Lansing, MI. April 1992.

“Changing Science Courses to promote Critical Thinking”, NSF Chautauqua Course taught by Dr. Craig E. Nelson (Indiana University) taught at Dayton, Ohio, March 1992.

“Mechanisms of Pathogenicity and Immunology”, Michigan branch of the American Society for Microbiology. Ann Arbor, MI, September 1993.

“Changing Role of the Pre-health Advisor”, national meeting of the National Association of Advisors of Health Professionals, Milwaukee, WI, June 17-21, 1992 .

“Changing Sciences Courses to Promote Critical Thinking”, NSF Chautauqua Course, Dayton OH, May 27-29,1992.

“Equity in the Classroom”, Sponsored by the Michigan Department of Education and Michigan’s Colleges and Universities, Lansing, MI March 27-28, 1992.

CONTINUING EDUCATION (Professor: December 1987 to December 1991)

“Biotechnological Techniques in a Clinical Setting” American Society for Microbiology, Michigan Branch University of Michigan, Flint Campus, Flint, MI April 1991

"Transplantation Immunology" American Society for Microbiology, Michigan Branch University of Michigan, Flint Campus, Flint, MI April 25, 1990

"Methods of Immunological Research and Diagnosis". World Health Organization at-the-bench laboratory program, The Ernest Witebsky Center for Immunology Department of Microbiology, SUNY/AB, Buffalo, NY June 14-23, 1989

"Lyme Disease" American Society for Microbiology, Michigan Branch Eastern University October 1989

"Advances in Immunology: Experimental Approaches and Clinical Application." Chautauqua Short Course, University of Georgia, Atlanta, GA, March, 1989

"Immunology and Immunopathology of the Alimentary Canal." Eleventh International Convocation on Immunology, The Ernest Witebsky Center for Immunology, Department of Microbiology, School of Medicine, SUNY/AB, Buffalo, NY, CME credit, June 12-16, 1988

"Immunology, Virology, and Their Interaction." Chautauqua Short Course, University of Georgia, Atlanta, GA, March, 1988

"Basic Immunology." Chautauqua Short Course, University of Georgia, Atlanta, GA, April, 1987

CONTINUING EDUCATION (Associate Professor: 1981-82 to 1986-87)

"Vaccines: New Concepts and Developments" 10th International Convocation on Immunology The Ernest Witebsky Center for Immunology. School of Medicine. SUNY/AB. Buffalo, NY CME July 14-17, 1986

"Clinical Microbiology for Teachers and Practitioners" Department of Microbiology and Molecular Genetics. Harvard Medical School. Boston, MA CME Credit April 15-19, 1985

"Herpes, Hepatitis and AIDS: Current Concerns of the Health Practitioner" School of Dentistry. The University of Michigan. Ann Arbor, MI CME Credit . November 16, 1983

"Current Topics in Clinical Chemistry and Immunology" Department of Postgraduate Medicine and Health Professions Education. School of Medicine. The University of Michigan. Ann Arbor, MI CME Credit March 10-12, 1982

"Clinical Immunology and Allergy Conference".Department of Postgraduate Medicine and Health Professions Education School of Medicine.The University of Michigan.Traverse City, MI CME Credit June 6-8, 1981

"Current Concepts in Clinical Microbiology: Antibiotic Susceptibility".Department of Postgraduate Medicine and Health Professions Education. School of Medicine.The University of Michigan Ann Arbor, MI. CME Credit. March 27-28, 1981

"Mechanisms of Microbial Pathogenesis: Human Anaerobic Infections" 0.6 CEU Credit

"Detection of Clostridium botulium and its Toxins: Latest Methods" 0.6 CEU Credit

"Mechanisms of Pathogenicity of the Aerobic Cocci" 0.6 CEU Credit February 27- March 1, 1981
American Society for Microbiology. Dallas, TX

CONTINUING EDUCATION (Assistant Professor: 1977/78 to 1980/81)

"Symposium: Frontiers in Biomembrane Research". The Biomembrane Research Center. Wayne State University. Detroit, MI. March 15-16, 1980

"Ocular Bacteriology and Mycology". American Society for Microbiology. Las Vegas, NV. 0.4 CEU Credit. May 14, 1978

TEACHING ASSIGNMENTS: FERRIS (assignments during 2002-09 in bold)

BIOL 108 Medical Microbiology (Nursing, Allied Health students)
BIOL 308 Adv. Medical Microbiology/Immunology (Nursing students) * Discontinued in 2000
BIOL 286 General Microbiology (Med. Tech.)
BIOL 280 Applied Fermentation: Wine and Cheese of Italy
(Open to all students, Scientific Understanding Credit)
BIOL 386 General Microbiology and Immunology (Pre-Med/Dent., Biotechnology)
BIOL 387 Clinical Microbiology and Immunology (Pharmacy)
BIOL 438 Microbiology for Optometry
BIOL 460 Current Topics (mentor to 1-3 Applied Biology majors/semester 1998-2004)
BIOL 480 Microbiology for Optometry (Optometry students) * Discontinued in 2004
BIOL 430/530 Contemporary Microbiology: Basic Concepts and Applications
(High school teachers, special summer course/workshop)
FSUS 100/101 First-Year Transition Seminar
FSUSH 290 Orientation to Medical, Dental and Veterinary Schools

VISITING TEACHING ASSIGNMENTS:

Central Michigan University

Fall Semester 1993: BIO 537 Immunology (Med. Tech., biology majors: grad/undergrad.)

Union Graduate School (Cincinnati, Ohio):

Adjunct Professor/ doctoral thesis advisor, Debra Stai, Ph.D.

NON-TEACHING ASSIGNMENTS/ ACTIVITIES: (2002-2009 in bold)

Member, Board of Directors MESSA (MI Education Special Services Association) (2008- present)
Member of the Editorial Board, Journal of Collective Bargaining in the Academy (2008- present)
(National Center for the Study of Collective Bargaining in Higher Education and the Professions)
Member. Board of Directors, American Society for Microbiology, Michigan Branch (2005- Present)
President –elect, American Society for Microbiology, Michigan Branch (2007-08)
President, American Society for Microbiology, Michigan Branch (2008-09)
Member, Board of Directors, National Education Association, Higher Education at-Large (2002 to 2005)
Member, (non-voting), Board of Directors, Michigan Education Association (2002 to 2005)
Member, NEA, Midwest Leadership Conference Planning Cmte/Conference Facilitator (2002-2005)
Member, NEA, Higher Education Advisory Group (2002-2005)
Member, NEA, Higher Education House of Rep./Senate Lobbying Group
Member, NEA, Continuing Education Distance Learning “Platform Selection” Group
Member, MEA Executive Cmte. (2002-2005)
Member, MEA Board of Directors (2002-2005)
Member, MEA, Local Affiliates Commission (2002-Present)
Member, MEA Area 13, Executive Committee (2002-2005)
Member, MEA Area 13 and 13A Region Leadership Group (2002-2005)
Intel Fellow as Science Judge in the Intel International Science and Engineering Fair (May 2000)
New FSU Faculty Orientation. Annual Presentation on Tenure / Promotion Procedures. (1999-2003) (2004- 2008)

Question author, NY Board of Regents Exam microbiology section (1999, 2000)
Michigan Optometry Board Exam: Immunology Questions (1989 -1994)
Member, Board of Directors/VP for Four-year Colleges/ Univ. Michigan Assn. for Higher Education (1998- 2006)
Member, Board of Directors, Michigan Assn for Higher Education (1994 to Present)
Member, Board of Directors, Friends of Ferris. A registered political action committee for FSU (1996- present)
FSU Presenter, Michigan House Higher Education Appropriations Subcmte (1996-1999)
Member of the National Association of Advisors for the Health Professions (1984 to present)
Applied Biology (Pre-medicine tract) Advisor: graduation clearance (1996 to present)
Outside Reviewer for International Journal of Pharmacognacy (1998-99)
Participant in Ferris Dental Hygiene Program National Accreditation Site Visit (Nov. 1998)
Member, American Society for Microbiology (1970-1988) (2006- Present)
Member, Buffalo Collegium of Immunology (An Invitation only international association) (1977 to present)
Member, Connecting With the Learner Committee, State of Michigan, Department of Education (1997-98)

FSU SERVICE ACTIVITIES (2002-2009 in bold)

Departmental:

Microbiology Candidate Selection Cmte	(2005-06)
Individual Tenure Review Subcmte, (Herron), member	(2002-03 to present)
Individual Tenure Review Subcmte. (Franklund). Chair	(2005-06 to present)
Curriculum Cmte.	(1998-99 to 2002-03)
	(1984-85 to 1992-93)
	(1979-80 to 1981-82)
Department Rep. Athletic Recruiting	(1995-96 to 2002-03)
Chair, Kenneth E. Spoerk Memorial Award Cmte	(1982-83 to present)
Planning Cmte. Chair	(1991-92 to 1994-95)
Biotechnology Advisory Cmte.	(1985-86 to 1994-95)
Ad Hoc Biotechnology Group	(1985-86 to 1994-95)

COLLEGE OF ARTS AND SCIENCES:

College Planning Cmte	(1999-00 to 2007-08)
	(1991-92 to 1995-96)
First-Year Transition Program, faculty	(1996-97 to 1997-98)
Academic Advisor: CAS Registration Program	(1987-88 to 2004-05)
Pre-medical Advisory Cmte., Chair	(1978-79 to present)
Pre-dental Advisory Cmte.	(1982-83 to present)
First-Year Challenge Retention Program, Guide	(1993-94 to 1995-96)
Re-vision Cmte (Semester Conversion)	(1990-91 to 1991-92)
Promotion/Merit Cmte., Chair	(1982-83 and 1983-84)
Member	(2004-05)

UNIVERSITY-WIDE: (2002-2009 in bold)

Student Organizations:

Lead, Pre-medical Club Faculty Advisor	(1978-79 to present)
Phi Delta Chi, Faculty Advisor	(1979-80 to 1999)

Ferris Faculty Association:

Member, FSU Board-President-FFA Leadership	(2008- present)
“Culture Discussion Group”	
Past- president	(2008- present)
President	(2005-2007)
	(1996 to 2003)

Contact Negotiation Team member:	(1983-84) (1986-87) (1994-1997) (2001-02) (2006-2007) (2009-10)
Employee Assistance Program Dev. Cmte,	(1997-98)
President's Leadership Council	(1996-03 (2005-2006-07)
Semi-monthly Discussions with VPAA/Provost	(1996-97 - 2006-07)
Executive Board Member (CAS Rep./Past Pres.)	(1989-90) (2006- present)
Faculty Workload Review Cmtes.	(1987-92)
Vice-president	(1987-89)
Summer Quarter Employment Cmte	(1984 to 1989)
FSU MLK Program Cmte	(1999-2000)
Recruitment Retention Policy Cmte	(2000-02)
Web-Based Instruction Policy Cmte	(2000-2001)
Ferris Communicable Disease Task Force	(1985-86 - present)
Strategic Planning and Resources Council (SPARC)	(2006-07 – present)
Assessment Tracking System Task Force	(2006-07)
Faculty Senate:	
University Planning Cmte.	(1995-96 to 2002-03)
Senator, College of Arts and Sciences	(1995-96 to 2002-03)
NCA Executive Cmte., Steering Cmte.,	(1992-93 to 1993-94) (1985-86 to 1987-88)
Budget Systems Cmte.	(1994-95 to 1995-96)
University Semester Transition Team	(1990-91 to 1991-92)
APR:College of Arts and Sciences (Biotechnology)	(1991-92)
APR:College of Business: Personnel Management	(1990-91)
Chair, Undergraduate Curriculum Council	(1987-88 to 1990-91)
Member, University Curriculum Committee	(1987-88 to 1990-91)
Educational Planning Cmte. (EPC):	
Academic Program Review Cmte	(1986-87)
Chair, EPC	(1985-86)
Senate Formation Election Cmte.	(1986)
New Faculty Orientation Cmte	(1985-86)
Vice-chair, EPC	(1984-85)
Chair, Long-Range Planning Subcommittee	(1983-84)
National Board Examination Review Session (Dental Hygiene)	(1995-96)
Recruiting Advisory Committee, Office of Admissions	(1994-95)
Ferris Chlamydia Research Project, Co-leader	(1985-86 to 1988-89)
All -College Promotion Cmte member/Chair	(1982-83)/ (1983-84)
Ad Hoc FSC Cmte. on Hepatitis B Vaccination	(1983)
Student Health Advisory Cmte.	(1977-78 to 1983-84)

COMMUNITY SERVICE: (2002-2007 in bold)

Member, Board of Directors, Friends of Ferris (PAC)	(1998- present)
Big Rapids Friends of the Library, volunteer	(1996 – present)
Mecosta Intermediate School Dist., Science Center Adv. Board	(1990-91 to 1993-94)

Curriculum Vitae

James P Scott DVM

Address: Department of Biological Sciences
Ferris State University
820 Campus Drive, ASC 2018
Big Rapids, Michigan 49307

Phone: 231-591-2620

Email: James_Scott@Ferris.edu

Education

1973 –1976 Central Michigan University Mt Pleasant, MI

- major in Biology
- minor in Chemistry

1976 – 1981 Michigan State University East Lansing, MI

- BS degree Veterinary Science. Major in Fisheries and Wildlife
- Doctorate degree in Veterinary Medicine

Professional Experience:

2004 – Present Ferris State University Big Rapids, MI

Assistant Professor Of Biology Tenure Tract

- **Teaching responsibilities** include Lecture and Laboratory sections in:
 - Human Physiology and Anatomy for Biology Majors BIOL 321-322, 2004 →
 - Human Anatomy and Physiology for Optometry OPTM 537-538, 2006 →
 - Human General Pathology for Optometry OPTM 630, 2004 →
 - Human Forensic Pathology BIOL 307, 2005 →
 - Pathophysiology BIOL 300, 2005 →
- **University service:**
 - Academic Advising of Pre-Veterinary Medicine and Forensic Science Students
 - Procurement and Care of Ferris State University Human Cadaver collection for use in Anatomy and Physiology Laboratories
 - Supervisor of the Biology Department Animal Use and Care protocols
 - Advisor and instructor of Advanced Biology to high school junior students in the Math Science and Technology Center at Ferris State University
- **University Committee work:**
 - Biology Department Curriculum Committee, 2005 - present
 - Biology Department Faculty Development Committee, 2005 - present
 - Biology Department Head Search Committee, 2005-2006
 - Chair, Biology Department Physiology Faculty Search Committee, 2005 -2006
 - Biology Department Physiology Faculty Search Committee, 2006 - present
 - Ferris State University Institutional Animal Care and Use Committee, 2002 - present
 - Ferris State University AAALAC Accreditation Committee, 2004 – present
 - Forensic Accreditation Review Committee 2006 - present

1987 – Present Ferris State University Big Rapids, MI

Ferris State University Animal Care Facility Attending Veterinarian

- Responsibilities are oversight of the Animal Care Facilities at Ferris State University including treatment and care of all animals used in research projects and teaching laboratories. Since 2004 I have been the only one to carry this responsibility due to the retirement of Dr Norwood Neumann DVM.

1981- present Riversbend Animal Hospital Big Rapids, MI

Doctor of Veterinary Medicine

- Specializing in canine, feline, reptile and avian internal medicine and surgery
- Other clinic duties include; management of employees, ordering and maintenance of supplies and equipment, public relations and client education

1987-2004 Ferris State University Big Rapids, MI

Part Time and Temporary Full Time Adjunct Faculty

- Courses Taught:
 - Human Anatomy and Physiology, BIOL 109 Laboratory 1987 – 1992
 - Human Anatomy and Physiology, BIOL 205 Lecture and Laboratory 1992 – 2004
 - Human Physiology and Anatomy, BIOL 232 Laboratory 1994 – 2000
 - Human Anatomy and Physiology for Optometry, BIOL 431 2000 – 2004
 - General Minors Biology, BIOL 103 Lecture and Laboratory 2000 – 2003
 - General Majors Biology, BIOL 121 -122 Lecture and Laboratory 1994 – 2000
 - Introduction to Human Genetics Lecture and Laboratory 1994-1995
 - Botany, BIOL 113 1993 – 1994
 - Plant Identification II, HORT 112 1996 – 1998
 - Plant Propagation, HORT 152 2000 – 2004
 - Fundamentals of Soil Science, HORT 143 1999 - 2004
- During this time I had also been taught lecture and laboratory sections in Biology/Anatomy and Physiology for High School Juniors in the Math/Science Technology Center from the Mecosta/Osceola School District. This responsibility began in 1998 and continues to this date.

1985-present 7522 East Pierce Drive Big Rapids, MI

Greenhouse Operator

- Own and operate a 1200 square foot greenhouse and small scale plant retail center
- Specialized in annual/ perennial flowers and vegetables from 1985-1995
- Hardwood and softwood cutting experience
- From 1985 until 1993 I had been working extensively with lily breeding and culture until disease and several late frosts forced me into other areas of horticulture
- Since 1995 I have been growing Orchids and now have a collection of over 600 species and hybrids

1976-1981 Giltner Hall Michigan State University East Lansing, MI

Laboratory Animal Care Service

Responsible for care and maintenance of several large colonies of rats and mice used for research at Michigan State University

Continuing Education

1981- present

- Although Michigan State Law does not require continuing education after graduation from medical school for veterinarians, I have earned hundreds of hours of continuing education credits through seminars and short courses since graduation (documentation available upon request)
- **Most recent meetings attended:**
 - American Association for Laboratory Animal Science, Salt Lake City, UT, November 2006
 - American Veterinary Medical Association Eastern States Conference, Orlando FL Jan 2006
 - Michigan Veterinary Medical Association Conference, Lansing, MI, Jan. 2006
 - American Academy of Forensic Sciences Seattle, WA, Feb. 2006

Affiliations

- American Association of Laboratory Animal Care – Member since 2004
- American Veterinary Medical Association 1981-present
- Michigan Veterinary Medical Association 1981-present
- Grand Rapids Small Animal Academy 1981-present
- Big Rapids area Wildlife Rescue advisory Board 1981-1995
- Chief Veterinarian of The Wildlife Rescue Organization 1981-1995
- Pine View School Board Treasurer from 1982-1988
- Trustee of Norwich Township Zoning and Planning Board 1995-2000
- North American Lily Society 1987-present
- American Orchid Society 1994 - present
- Grand Valley Orchid Society – President in 2000-01 and 2003-04
- Master Gardener Certification through Michigan State University

References:

- **Dr. Ray Cross, President**
Morrisville State College
Morrisville, New York 13408
Office: (315) 684-6044
Home: (315) 684-6344
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crossrw@morrisville.edu
- **Dr Nancy Peterson-Kline**
Associate Dean
Ferris State University Michigan College of Optometry
Pen 402A
Big Rapids, MI 49307
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- **Paul Bigford**
Math Science and Technology Center Coordinator
MOISD – Mecosta/Osceola Intermediate School District
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- **Dr James Hoerter**
Biology Department Faculty Ferris State University
820 Campus Drive ASC 2005
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- **Dr Karen Strasser**
Ferris State University Biology Department Interim Head
820 Campus Drive ASC 2004
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CURRICULUM VITAE

Karen M. Strasser

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Big Rapids, Michigan 49307

Phone: (231) 591-2543

Email karen_strasser@ferris.edu

Education

Ph.D. University of Louisiana, Lafayette, Louisiana, Environmental and Evolutionary Biology,
graduation: December 12, 1998 , GPA: 4.0 (4.0 scale)

D.L. Felder advisor

B. S. University of Tampa, Tampa, Florida, double major: Marine Science/Biology, minor:
chemistry

Graduation: May 1994 GPA: 3.86 (4.0 scale)

Research Interests

- I. Systematics and Biogeography of Decapod Crustaceans
 - A. Comparative studies of larval development (including observations on morphology, number and duration of larval stages) to infer phylogenetic associations.
 - B. Comparative morphology of adults
- II. Larval ecology- Effects on development, dispersal, settlement, recruitment, and behavior of marine invertebrate larvae (particularly with decapod crustaceans).
 - A. Environmental factors such as temperature, salinity and light.
 - B. Biological factors such as conspecifics, competitors, predators, tannins, and other species associated with the adult habitat.
 - C. Human impacts such as pollutants, pesticides, fertilizers.
- III Burrowing behavior of postlarvae; effects of sediment type, grain size, presence of organics, and other species.

Professional Experience

- 7/07 to present Department Head, Department of Biological Sciences, Ferris State University, Big Rapids, Michigan.
- 7/06 to 7/07 Interim Department Head, Department of Biological Sciences, Ferris State University, Big Rapids, Michigan.
- 8/05 to present Associate Professor of Biology; Ferris State University, Big Rapids, Michigan. Courses taught: Environmental Conservation (upper level majors), General Biology I and II (for biology majors), Developmental Biology (upper level majors)
- 8/02 to 9/05 Assistant Professor of Biology; Ferris State University, Big Rapids, Michigan. Courses taught: Biological Concepts (non-majors biology), Environmental Conservation (upper level majors), General Biology I and II (for biology majors), Developmental Biology Lab (upper level majors)
- 8/99 to 5/02 Assistant Professor of Biology; The University of Tampa, Tampa, Florida. Courses: Ecology, Ecology Lab, Conservation Biology, Biological Diversity, Environmental Science, Senior Seminar, Gateways (Freshman seminar).
- 5/99 Member of Organizing Committee for the Crustacean Society Meeting in Lafayette, Louisiana.
- 1/99 to 5/99 Visiting Assistant Professor; University of Tampa; Tampa, Florida. Courses: Conservation Biology, Environmental Science, and Marine Biology;
- Summer, 1998 Instructor; Biology 101 (for majors); University of Louisiana; at Lafayette Lafayette, Louisiana.
- 5/95 Research cruise to the Dry Tortugas, Florida, on the R/V Bellows; trip sponsored by the University of Florida. Survey of Florida Straits decapod fauna by demersal sampling.
- Fall 1995, 1996, 1997 Lab Instructor; Invertebrate Zoology; University of Louisiana; Lafayette, Louisiana. Set up labs, ordered and collected specimens, prepared lab handouts, held review sessions, set up and administered lab practicals, and lectured for Dr. Felder as needed.
- 6/94 to 6/95 Research Assistant; Dr. Julie Bailey-Brock; University of Hawaii, at Manoa; Honolulu, Hawaii. Gained experience in benthic sampling, elutriation, and identification of polychaete worms. Assisted with the generation of reports and data entry into the ODES network.

Spring 1994 Teaching Assistant; University of Tampa; Tampa, Florida. Biology Laboratory (for non-majors): Assisted in lab set up, tutored and held review sessions for students.

5/93 to 5/94 Lab Assistant; Thornton Laboratories; Tampa, Florida. Worked in the Bioassay Department culturing *Pimephales promelas* and *Cyprinella leedsii*, conducted acute and chronic tests, and monitored pH, DO, conductivity, alkalinity, and hardness of breeding tanks.

Fall 1992, 1993 Teaching Assistant; University of Tampa; Tampa, Florida. Introductory Biology Lab (for majors), set up practical exams, tutored, and held review sessions for students.

5/93 to 8/93 Research Assistant; Dr. Stan Rice; University of Tampa; Tampa, Florida. Cultured and assisted with feeding experiments of the wood-boring isopod *Sphaeroma terebrans*, and gathered data on his barnacle settlement study.

Classes taught

General Biology I (BIOL 121, Ferris State University) Lecture and Lab
 General Biology 2 (BIOL122, Ferris State University) Lab and Lecture
 Developmental Biology (BIOL 370, Ferris State University) Lab and Lecture
 Environmental Conservation (BIOL 347, Ferris State University) Lab and Lecture
 Biological Concepts (BIOL 103, Ferris State University) Lab and lecture
 Ecology (BIO 212, University of Tampa) Lab and Lecture
 Conservation Biology (BIO 346, University of Tampa) Lecture and seminar sections
 Biological Diversity (BIO 203, University of Tampa) Lecture and Lab
 Environmental Science (BIO 112, University of Tampa) Lecture only
 Marine Biology (MAR 126, University of Tampa) Lecture only
 Gateways I and II (Freshman seminar GTW 100, 102, University of Tampa)
 Senior Seminar (BIO 410, University of Tampa) lecture only
 Biology II (Majors biology, BIO 102, University of Louisiana) Lecture only
 Invertebrate Zoology (BIO 410L, University of Louisiana) lab only

Committee Work (since employed at Ferris State University)

IACUC committee (Fall 2006 →)
 Biotech Advisory Board (Fall2006→)
 Card Wildlife Center Advisory Board Fall 2006 →)
 University Enrollment Task Force (Fall 2006 →)
 Chair, Search committee for 2 tenure track positions in Physiology (Fall 2006→ Sp 2007)
 National Competitive Scholarship Committee (Fall 2005 → 2007)
 CAS Online Learning Steering Committee (Fall 2005→Winter 2006)

CAS Scientific Understanding Committee (Fall 2004→)
Chair, Search committee for 4 tenure track positions in Biology (Fall 2004-Winter 2005)
College Board CLEP National Test Development Committee (July 2004 -->)
Departmental Faculty Development Committee (Fall 2003 -->Winter 2006)
Departmental Planning Committee (Fall 2003 --> Winter 2006)
College of Arts and Sciences Graduate Education Committee (Fall 2003 –Fall 2004)
University Arts and Lectures Committee (Fall 2003 --> Winter 2006)
Chair, Laboratory Tech Search Committee (Winter 2004)
Chair, Department Microscope Committee (Fall 2003, 2006)

Academic Honors, Awards and Fellowships

University of Louisiana Doctoral Fellowship. Stipend and tuition waver. \$12,000/yr 1995-1999.
University of Tampa Outstanding Graduate in Biology 1994
Honors Program Member at the University of Tampa. 1990-1994.
Crawford and Company Scholarship. 1992-1994. Merit scholarship helped defray costs of housing and books at the University of Tampa.
University of Tampa Presidential and Life Science Scholarships. 1990-1994. Merit scholarship that covered tuition costs at the University of Tampa.

Reviewerships

Marine Biology
Journal of Crustacean Biology
NSF Division of Ocean Sciences
NSF Assembling the Tree of Life (AToL)
Memoirs of Museum Victoria
Gulf of Mexico Science
Scientia Marina
Gulf and Caribbean Research
Invertebrate Biology

Professional Affiliations

The Crustacean Society
The Society for Conservation Biology

Research Support

Pierce Cedar Creek Institute, Muter B., Strasser KM, Watson P. Approx. \$7000 as part of the Undergraduate Research Grant in Environmental Science Program. Funds for summer stipend for B. Muter and equipment to support the project. Summer 2005

Ferris State University Faculty Research Grant, \$6,563 to purchase equipment. 2003-2004.

USGS, Felder DL, Strasser KM, Klerks P. - \$36,014 funded by as part of the Tampa Bay Project. 2001, and 2002

Delo Grant , The University of Tampa- \$5000. 2001-2002

Dana Grant , The University of Tampa - \$1700. Summer 2001

Dana Grant, The University of Tampa – \$1275. Summer 2000

Graduate student fellowship-- Smithsonian Institution. Provided stipend to work at the Smithsonian Marine Station at Linkport for ten weeks. \$3000, 1997.

Graduate student research grant-- Louisiana Universities Marine Consortium. Supplies for dissertation research. \$2000, 1996-1998.

Graduate student research grants-- Graduate Student Organization at the University of Louisiana. Covered cost of supplies for dissertation research and travel expenses. \$160, Spring 1996; \$160, Summer 1996; \$240, Spring 1998.

Undergraduate research internship-- NSF Research Experience for Undergraduates. Stipend and supplies for summer research at Shannon Point Marine Center in Anacortes Washington. \$2200, 1992.

Honors Research Fellowship-- University of Tampa Honors Program. Merit award for undergraduate research. \$1000, 1992-1993; \$1000, 1993-1994.

Presented Papers at Professional Meetings

The larval development of two sibling species of hermit crabs in the genus *Paguristes* (Crustacea: Anomura: Diogenidae) under laboratory conditions. Poster presentation at the Annual meeting of the Society of Integrative and Comparative Biology (SICB) January, 2003 in New Orleans, Louisiana. . (K. Strasser)

Settlement Cues determining the distribution and host preference of *Tunicotheres moseri* (Rathbun) in the Tampa Bay, FL. Poster presentation at the Crustacean Society Meeting June, 2003 in Williamsburg, Virginia. (J. Ambrosio, W. Price, and K. Strasser).

Settlement cues determining the distribution and host preference of *Tunicotheres moseri* (Rathbun) in Tampa Bay. March 20-23, 2003. Poster presentation at the Southeastern Estuarine Research Society Meeting, Atlantic Beach, NC (J. Ambrosio, W. Price, and K. Strasser)

Preliminary evidence of molecular variability among populations of the hermit crab *Paguristes tortugae* (Diogenidae), on the basis of the 16s rRNA gene. November 2002. Poster presentation at the Congresso Brasileiro Sobre Crustáceos, Sao Paulo, Brazil (Biagi, Mantelatto, Strasser and Felder).

Effects of ghost shrimp on Tampa Bay sediment characteristics. Poster presentation at the Second Annual Science Conference, Gulf of Mexico Estuaries Integrated Science Tampa Bay Pilot Study, Sept. 2002 in St. Petersburg, FL. (Klerks, Paul, Darryl Felder , Karen Strasser, Pete Swarzenski).

Protracted larval development in *Axianassa australis* (Thalassinidea: Axianassidae). Poster presentation at the 8th Colloquium Crustacea Decapoda Mediterranea, September, 2002 in Corfu Isl., Greece. (Strasser, K. M. & D.L. Felder)

Preliminary evidence of molecular variability among populations of the hermit crab *Paguristes tortugae* (Diogenidae), on the basis of the 16S rRNA gene. Poster presentation at the 8th Colloquium Crustacea Decapoda Mediterranea, September, 2002 in Corfu Isl., Greece. (Garcia, R.B., F.L. Mantelatto, K. Strasser & D.L. Felder)

Factors determining host selection of the symbiotic copepod *Clausidium dissimile* Wilson, 1921 (Crustacea: Cyclopoidia: Clausiidae) in sympatric populations of *Sergio trilobata* (Biffar 1970) and *Lepidophthalmus louisianensis* (Schmitt 1935) (Crustacea: Decapoda: Callianassidae)
Poster presented at the National Honors Collegiate Conference Nov. 4 to Nov. 7, 2001 in Chicago, and in March, 2002 at the Benthic Ecology Meeting in Orlando, Florida.
(J. Corsetti and K.M. Strasser)

Investigation of the population biology of the ghost shrimp *Sergio trilobata* (Biffar 1970) (Crustacea: Decapoda: Thalassinidea). Poster presented in February, 2002 at the Southeastern Estuarine Research Society meeting in South Carolina. (J. Corsetti and K.M. Strasser)

Preliminary observations on the symbiotic Relationship between the pea crab *Tumidotheres maculatus* and the sea squirt *Styela plicata* in Tampa Bay, FL. Poster presentation at the Southeastern Research Society in Charleston, SC March 29 – 31, 2001 (Jeff Grim, Anthony DiGirolamo, and K.M. Strasser)

Sand as a stimulus for settlement in the ghost shrimp *Callichirus major* (Say) and *C. islagrande* (Schmitt) (Crustacea: Thalassinidea: Callianassidae). May, 1999. Oral presentation at the Crustacean Society Meeting in Lafayette, Louisiana.

Settlement cues in successive developmental stages of the ghost shrimp *Callichirus major* and *C. islagrande* (Crustacea: Decapoda: Thalassinidea). March, 1998. Oral presentation at the Benthic Ecology Meeting in Melbourne, Florida. (K.M. Strasser and D.L. Felder).

A comparison of settlement cues in the Gulf of Mexico and western Atlantic populations of the ghost shrimp *Callichirus major* (Crustacea: Decapoda: Thalassinidea). January, 1998. Oral presentation at the annual meeting of the Society for Integrative and Comparative Biology in Boston, Massachusetts. (with published abstract, *American Zoologist* 37 (5): 409. (K.M. Strasser and D.L. Felder).

Settlement cues in the Gulf of Mexico population of the ghost shrimp *Callichirus major* (Crustacea: Decapoda: Thalassinidea). May, 1997. Oral presentation at the summer meeting of the Crustacean Society in Mobile, Alabama, 1997. (K.M. Strasser and D.L. Felder).

The hermit crabs of Tampa Bay, Florida. Oral presentation at the annual meeting of Tri Beta regional conference in Tuscalusa, Alabama, 1992, and at the Florida Academy of Science in Tallahassee, Florida, 1994. (K.M. Strasser and W.W. Price).

Publications

Klerks, Paul L., Felder, Darryl L., **Strasser**, Karen, Swarzenski, Peter W. 2007. Effects of ghost shrimp on zinc and cadmium in sediments from Tampa Bay, FL, *Marine Chemistry* 104: 17-26.

- Strasser** , K. M. and D. L. Felder. 2005. Larval development of the mud shrimp *Axianna australis* (Decapoda: Thalassinidea) under laboratory conditions. *Journal of Natural History*. 39:2289-2306.
- Corsetti, J.L and K. M. **Strasser**. 2003 Host selection of the symbiotic copepod *Clausidium dissimile* in two sympatric populations of ghost shrimp. *Marine Ecology Progress Series* 256 : 151-159.
- Corsetti, J.L. and K. M. **Strasser**. 2003 Population biology of the ghost shrimp *Sergio trilobata* (Biffar 1970) (Crustacea: Decapoda: Thalassinidea). *Gulf and Caribbean Research*. 15: 13-19.
- Strasser** K. M., and D. L. Felder. 2001 Effect of decreased salinity on development of the ghost shrimp *Callichirus islagrande* and two populations of *C. major* (Crustacea: Decapoda: Thalassinidea). *Gulf and Caribbean Research* 13:9-19.
- Strasser** K. M., and D. L. Felder. 2000. Larval development of the ghost shrimp *Callichirus islagrande* (Decapoda: Thalassinidea). *Journal of Crustacean Biology* 20(1):100-117
- Strasser** K. M., and D. L. Felder. 1999. Larval development of two populations of the ghost shrimp *Callichirus major* (Decapoda: Thalassinidea). *Journal of Crustacean Biology* 19(4):844-878.
- Strasser** K. M., and D. L. Felder. 1999. Sand as a stimulus for settlement in the ghost shrimp *Callichirus major* and *C. islagrande* (Crustacea: Decapoda: Thalassinidea). *Journal of Experimental Marine Biology and Ecology* 239: 211-222.
- Strasser** K.M. and D. L. Felder. 1999. Settlement cues in an Atlantic coast population of the ghost shrimp *Callichirus major* (Crustacea: Decapoda: Thalassinidea). *Marine Ecology Progress Series* 183: 217-225.
- Strasser**, K. M. and W. W. Price. 1999. Species composition and spatial distribution of hermit crabs in Tampa Bay, Florida and surrounding waters. *Gulf Research Reports* 11: 33-50.
- Strasser** , K. M. and D. L. Felder. 1998. Settlement cues in successive developmental stages of the ghost shrimp *Callichirus major* and *C. islagrande* (Crustacea: Decapoda: Thalassinidea). *Marine Biology* 132: 599-610.

Referees:

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 address- Ferris State University
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- 3) Darryl L. Felder, Professor and Head, Department of Biology (Ph.D. Advisor)
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- 6) Dr. Wayne Price, Professor of Biology (Colleague at University of Tampa)
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Christopher M. Westerkamp

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Professional Experience

2010- Associate Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI
2007-2010 Assistant Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI

Education

Ph.D. East Carolina University Greenville, NC 2003- 2007
Dissertation Title: The Role of 5' AMP-activated Protein Kinase in Skeletal Muscle Hypertrophy with Age and Overload
Major: Bioenergetics
Advisor: Scott E. Gordon, Ph.D.

M.A. East Carolina University Greenville, NC 2001-2003
Thesis Title: The Effects of Angiotensin-Converting Enzyme (ACE) Inhibition on Nuclear Proliferation and Hypertrophy in Overloaded Skeletal Muscle
Major: Exercise and Sport Science, Concentration: Exercise Physiology
Advisor: Scott E. Gordon, Ph.D.

B.S. Ball State University Muncie, IN 1997-2001
Major: Exercise Science and Wellness Minor: Anthropology

Teaching Experience (* Denotes new prep)

Ferris State University

Fall 2011 Human Anatomy & Physiology (BIO 109) 4 lecture/ 3 lab sections and Exercise Physiology (BIO 301) 1 lecture section
Sum 2011 Human Anatomy & Physiology (BIO 205) 2 lecture/lab sections and Pathophysiology (BIO 300) 1 lecture section
Spr 2011 Human Anatomy & Physiology (BIO 205) 4 lecture/ 3 lab sections and Pathophysiology (BIO 300) 1 lecture section
Fall 2010 Human Anatomy & Physiology (BIO 109) 4 lecture/ 3 lab sections and *Exercise Physiology (BIO 301) 1 lecture section
Sum 2010 Human Anatomy & Physiology (BIO 205) 1 lecture/lab sections and Pathophysiology (BIO 300) 1 lecture section
Spr 2010 Human Anatomy & Physiology (BIO 205) 2 lecture/lab sections and Pathophysiology (BIO 300) 1 lecture section
Fall 2009 *Human Anatomy & Physiology (BIO 109) 5 lecture/3 lab sections and Pathophysiology (BIO 300) 1 lecture section
Sum 2009 Human Anatomy & Physiology (BIO 205) 1 lecture section, and Pathophysiology (BIO 300) 1 lecture section.
Spr 2009 Human Anatomy & Physiology (BIO 205) 3 lecture/lab sections, and Pathophysiology (BIO 300) 1 lecture section
Fall 2008 Clinical Anatomy and Physiology 1 (BIO 331) 7 lab sections
Sum 2008 Human Anatomy & Physiology (BIO 205) 2 lecture/lab sections

- Spr 2008 *Human Anatomy & Physiology (BIO 205) 3 lecture/2 lab sections, and
*Pathophysiology (BIO 300) 1 lecture section
Fall 2007 *Clinical Anatomy and Physiology 1 (BIO 331) 6 lecture sections

East Carolina University

- 2004 *Physiology of Exercise
Instructor of record for junior/senior level course, and designed all lectures, tests, and quizzes.
2001-2003 *Physiology of Exercise Lab
Organized and taught laboratory lectures.
2002-2007 Undergraduate Independent Study
Instructed undergraduate students with laboratory procedures.

Research Experience

- 2003-2007 Research Assistant, East Carolina University, Human Performance Laboratory
Conducted research on the impairment of overload-induced hypertrophy in aged skeletal muscle.
2001-2003 Research and Teaching Assistant, East Carolina University, Human Performance Laboratory
Directed graded exercise testing, body composition assessments, and exercise prescriptions. Conducted research examining the proliferative response of myonuclei, endothelial cells, and fibroblasts to skeletal muscle overload.
2001 Undergraduate Intern, Ball State University, Human Performance Laboratory
Duties included exercise testing and prescription. Assisted with master's thesis experiments involving the effects of water loss on body composition measurements and the effects of menstruation on lactate threshold in women.

Professional Organizations and Certifications

- 2001-present American College of Sports Medicine
2002-present ACSM Certified Exercise Specialist®
2003-present American Physiological Society
2008-present Human Anatomy and Physiology Society
1999-present CPR/AED Certification

Publications

S.E. Gordon, J.A. Lake, **C.M. Westerkamp**, and D.M Thomson. Does AMP-activated protein kinase negatively mediate aged fast-twitch skeletal muscle mass? *Exerc. Sport Sci. Rev.*, Vol. 36, No. 4, pp. 179-186, 2008.

S.E. Gordon, **C.M. Westerkamp**, K.J. Savage, R.C. Hickner, S.C. George, C.A. Fick, and K.M. McCormick, Basal, but not overload-induced, myonuclear addition is attenuated by

N^{G} -nitro-L-arginine methyl ester (L-NAME) administration, Canadian Journal of Physiology and Pharmacology 2007 85: 646-651.

C.M. Westerkamp and S.E. Gordon, Angiotensin-converting enzyme inhibition attenuates myonuclear addition in overloaded slow-twitch skeletal muscle, Am J Physiol Regul Integr Comp Physiol. 2005 Oct; 289(4): R1223-31.

Abstracts

R. M. Kraus, **C.M. Westerkamp**, T.K. Brtis. The 30-minute Time Trial as a Predictor of Ventilatory Threshold Running Velocity and Heart Rate. ACSM National Conference, Denver, CO. May 2011.

J.D. Redford, E. Coccimiglio, D. Benham, **C.M. Westerkamp**. Skeletal Muscle Hyperplasia in Response to Synergist Removal. Ferris State University College of Arts and Sciences Recognition Event, Big Rapids, MI. April 2011.

T.K. Brtis, **C. M. Westerkamp**, & R. M. Kraus. The 30-minute time trial as a predictor of ventilatory threshold running pace and heart rate: a preliminary report. Midwest ACSM Conference, Indianapolis, IN. October 2010.

S.E. Gordon and **C.M. Westerkamp**. 5'-AMP-activated protein kinase (AMPK) inhibition restores overload-induced growth of fast-twitch skeletal muscle in aged rats. Nathan Shock Center Conference on Aging, San Antonio, TX. October 2007.

S.E. Gordon and **C.M. Westerkamp**, 5'-AMP-activated Protein Kinase (AMPK) Inhibition Restores Overload-induced Growth of Fast-twitch Skeletal Muscle in Aged Rats. American Federation for Aging Research, New York, NY. October 2007.

C.M. Doty, **C.M. Westerkamp**, J.K. LeMoine, R.C. Hickner, D.M. Thomson, L.C. Katwa, and S. E. Gordon. Acute resistance exercise does not increased skeletal muscle fibroblast content in young, untrained men. Med. Sci. Sports Exerc. Vol. 37(5): S242, 2005, ACSM National Conference, Indianapolis, IN. June 2005.

S.C. George, R.C. Hickner, T.P. Gavin, **C.M. Westerkamp**, L.M. Westerkamp, and S.E. Gordon, Effect of L-NAME administration on angiogenesis in overloaded hypertrophying rat skeletal muscle. Med Sci Sports Exerc. 37: 2005, ACSM National Conference, Indianapolis, IN. June 2005.

C.M. Westerkamp, C.A. Fick, E.M. Hedberg, R.C. Hickner, and S.E. Gordon, Effect of L-NAME administration on myonuclear addition in overloaded skeletal muscle, FASEB, Washington, D.C. April 2004.

C.M. Westerkamp, C.A. Fick, E.M. Hedberg, R.C. Hickner, and S.E. Gordon, Effect of L-NAME administration on myonuclear addition in overloaded skeletal muscle, East Carolina University Graduate Student Research Day, Greenville, NC. March 2004.

C.M. Westerkamp & S.E. Gordon, The effects angiotensin-converting enzyme (ACE) inhibition on nuclear proliferation and hypertrophy in overloaded skeletal muscle. FASEB Satellite Cell Summer Research Conference, Tucson, AZ. July 2003.

C.M. Westerkamp, F.W. Booth, R.C. Yeager, T.P. Gavin, and S.E. Gordon, Angiotensin converting enzyme (ACE) inhibition attenuates angiogenesis and overload-induced hypertrophy in skeletal muscle. East Carolina University Graduate Student Research Day, Greenville, NC. April 2003.

C.M. Westerkamp, F.W. Booth, R.C. Yeager, T.P. Gavin, and S.E. Gordon, Angiotensin converting enzyme (ACE) inhibition attenuates angiogenesis and overload-induced hypertrophy in skeletal muscle. Southeast American College of Sports Medicine Conference, Atlanta, GA, February 2003.

Grants

Ferris Foundation Grant, Title: Fiber-type-specific Skeletal Muscle Hyperplasia with Overload, Not Awarded, 2009.

Gatorade Sports Science Institute Student Grant, Title: Prevention of atrophy and apoptosis in unloaded skeletal muscle, Awarded: \$3,200, 2005-2006.

NASA Pre-doctoral Student Research Grant, Title: Apoptosis and AMP kinase in skeletal muscle unloading, Not Awarded, 2005.

Service and Awards

Senate Health Promotion and Substance Abuse Prevention Committee member, 2010-.

Senate Liason, Institutional Animal Care and Use Committee, 2009-.

Chair, College of Arts and Sciences Planning Committee, 2009-2011, Member 2008-2011.

Lead Advisor for Pre-Optometry students 2009-.

Chair, Biology Department Planning Committee 2009-2011.

Member, University Planning Committee (SPARC), 2009-.

Dawg Days Volunteer

Pack 3116 Cub Scout Den Leader 2008-.

Northland United Soccer Coach 2008-.

Graduate Scholar Award, Graduate School, East Carolina University 2003-2007.

Dean's Advisory Committee, College of Health and Human Performance, East Carolina University, 2005-06.

Examiner, ACSM Health Fitness Instructor Certification Exam, 2003.

Patient Simulator, ACSM Health Fitness Instructor Certification Exam, 2002.

Graduate Student Organization, College of Health and Human Performance, East Carolina University, 2001-2006.

Youth Soccer Coach, Greenville FutureStars, 2005-2006.

Deans' List, Ball State University, Spring 2001.

Team Captain and Most Valuable Runner, Ball State University Men's Cross-Country, Fall 2000.

President's Scholar-Athlete Award, Ball State University, 1997-2001.

Professional Development

McGraw-Hill Digital Media Symposium February 2008, San Diego, California

Meeting discussing and presenting various uses of digital media in teaching Anatomy & Physiology.

Faculty Center for Teaching and Learning Classroom Project, Spring 2008.

Analysis of student assessment to determine trends in classroom performance based on students' major, first exam grade, and self-reported studying habits.

Grant Writing Seminar, Fall 2008, Ferris State University

Monthly course discussing how to find funding, prepare, write and submit grants for intra- and extramural funding.

Faculty Center for Teaching and Learning Adobe Flash Learning Group, Fall 2008.

Introductory course into use of Adobe Flash animations and their potential use in the classroom.

Faculty Center for Teaching and Learning Advanced Flash Training, Spring 2009.

Course for advanced users of Adobe Flash concentrating on designing Flash animations for use in the classroom.

Christopher Westerkamp

American Physiological Society Physiological Understanding (PhUn) Week participant,
November 2009.

Educational outreach program involving planning and delivering interactive lessons in physiology for elementary students with Biology Education student with visit to St. Mary's school of Big Rapids.

Faculty Center for Teaching and Learning Presentation Zen training, Summer 2010.

Introduction to optimize presentations using Microsoft PowerPoint.

American Physiological Society Physiological Understanding (PhUn) Week participant,
November 2010.

Educational outreach program involving planning and delivering interactive lessons in physiology for elementary students with Biology majors with visits to St. Mary's school and the Big Rapids Middle School.

Lilly North Conference attendee, September 2011.

Attended presentations, symposia, and workshops on scholarship of teaching and learning.

Curriculum Vitae
Arlene Westhoven
westhova@ferris.edu

5630 157th Avenue
Big Rapids MI 49307
231-796-6153

PO Box 162
Eastport MI 49627
231-599-3132

BIRTHDATE – 8 January 1943

EDUCATION

- 1960 Graduated, Sparta High School, Sparta MI
- 1964 B.S. Design, English minor, Teaching Certificate
University of Michigan, Ann Arbor MI
- 1983 B.I.S. Biology, Department of Biological Sciences
Central Michigan University, Mt. Pleasant MI
- 1988 M.S. Biology – Central Michigan University
Ecology, Animal Behavior

TEACHING AND OTHER EMPLOYMENT EXPERIENCE

- 1964-1967 Teacher - Art and English, Jefferson Junior High School, Pontiac MI
- 1967-1968 Sales - Knapp's Department Store, Lansing MI
- 1968-1970 Server- Valleywood Golf Club, Swanton OH
- 1970-1972 Teacher – Art and English, Delta High School, Delta OH
- 1972-1980 Owner-Chef of The Rowe Inn, Ellsworth MI
- 1988-2005 Instructor – Department of Biological Sciences
Ferris State University, Big Rapids MI
- 2001-2005 Naturalist – Grass River Natural Area, Bellaire MI

ECOLOGICAL AND CONSERVATION ASSOCIATIONS

- 1986–1990 Coordinator, Michigan Loon Registry
- 1987-2007 MLPA Loonwatch Area Coordinator
Benzie, Grand Traverse, Kalkaska Counties
- 1997-2007 President, Michigan Loon Preservation Association
- 1987 – 2007 Three Lakes Association (Torch, Bellaire, Clam)
2006 – 2007 TLA District Director
- 1980 - 2007 Michigan Audubon Society Board of Directors

EDUCATIONAL AND CONSERVATION PUBLICATIONS

- 1989 *The Management of Common Loons, Henderson Lake, Ogemaw County*
 Author
- 1993 *Laboratory Manual for Environmental Biology,*
 Watson, Westhoven (co-author, illustrator)
- 2001 *Laboratory Manual for Environmental Biology,*
 Watson, Westhoven (co-author, illustrator)
- 2007 *Laboratory Manual for Environmental Biology,*
 Rodabaugh, Watson, Westhoven (co-author, illustrator)
- 2001-2007 Wetland Education Programs, Purple Loosestrife Control Program
 Grass River Natural Area, Bellaire MI
- 2002 – 2007 *Loon Echoes*, Newsletter of the Michigan Loon Preservation
 Association, Editor and Contributor

CLASSES TAUGHT AT CENTRAL MICHIGAN UNIVERSITY

- BIO 101 GRA for labs, biology for majors, emphasis on scientific method,
 statistics, and scientific writing
- Field Illustration – Beaver Island

CLASSES TAUGHT AT FERRIS

- 1988 – 2007 BIOL 100 – Nature Study
 BIOL 105 - Basic Human Anatomy and Physiology
 BIOL 119 - Field Ornithology
 Sabbatical Replacement for Bruce Beetley, 1988-89
- BIOL 105 morphed into BIOL 109
 I taught both lecture and labs
- BIOL 101 Genetics labs
- BIOL 121 General Biology 1 labs
- BIOL 122 General Biology 2 labs
- BIOL 111 – Environmental Biology
 lecture and labs
- BIOL 109 – Anatomy and Physiology lab

ART CLASSES TAUGHT

Summer 1987,1988 Biological Illustration, CMU Biological Station, Beaver Island MI

Summer 2004 – 2010 Grass River Natural Area, Bellaire MI

Watercolor

Basic Illustration

PRESENTATIONS

February 2005

Into the Ice

Michigan Association of Environmental Educators
Ralph MacMullan Center, Higgins Lake MI

April 2007

Loons and Lead

Michigan Lake and Stream Associations Annual Conference
Boyne Mountain Conference Center, Boyne Falls MI

ARTWORK EXHIBITED

Artworks, Big Rapids MI, watercolors, pastels, prints

Blue Heron Gallery, Elk Rapids MI, watercolors, pastels, prints

R. Douglas Workman, Ph.D – Curriculum Vitae

Education:

- **Ph. D. in Fisheries, March 2002.** Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan.
- **M. S., Biology, 1994.** Emphasis in Fisheries and Aquatic Sciences. Murray State University. Murray, Kentucky.
- **B. S. Department of Fisheries and Wildlife, June 1991.** Michigan State University. East Lansing, Michigan.

Professional Experience:

Advanced Ecological Management, Inc. Reed City, MI

Fisheries/Aquatic Biologist 05/06 to present. Conducting comprehensive fisheries community and aquatic habitat assessments for numerous private firms, including hydro-facilities, as part of environmental assessments. Perform weekly hydrologic monitoring, including stream flow and water level measurement. Conduct threatened and endangered species surveys. Conduct and implement aquatic habitat improvement as part of habitat restoration projects. Coordinate and conduct environmental assessments, and Phase I Environmental Site Assessments. Conduct wetland assessments using a combination of field investigations and GIS analyses.

Ferris State University, Big Rapids, MI

Adjunct Faculty, Biology Department 08/06 to present. Instructor for biology courses.

King & MacGregor Environmental, Inc., Grand Rapids, MI

Fisheries/Aquatic Biologist 01/01 to 05/06. Conducted aquatic habitat sampling and fisheries community assessments for hydro-facility licensing, roadway improvement projects, and other environmental assessment projects. Conducted threatened and endangered species fish surveys. Used GIS to assess land use features that influence invasive plant distributions within mitigation wetlands. Conducted large-scale wetland assessments using a combination of field investigations and GIS analyses. Developed and implementing quantitative study designs for analyses of sensitive headwater systems and other aquatic systems.

Michigan State University, East Lansing, MI

Research Assistant 01/96 to 01/01. Conducted a movement and spawning study of steelhead and longnose suckers in the Pere Marquette River, Michigan using radio telemetry. Investigated fish movement using GIS and developed a model to predict steelhead migratory behavior in response to changes in water temperature and stream flow. Evaluated the influence of an electric sea lamprey barrier on the movements of steelhead and longnose suckers, and described steelhead spawning habitat selection.

R. Douglas Workman, Ph.D. Curriculum Vitae

Snell Environmental Group Inc., Lansing, MI

Environmental Scientist 05/94 to 01/96. Conducted aquatic habitat sampling. Prepared Environmental Impact Statements, Environmental Assessments, and Phase I Environmental Assessments. Conducted public meetings, wetland delineations, monitored wetland mitigation sites, and conducted corridor land-use analyses using GIS. Project manager for several airport Environmental Assessments.

Murray State University-Hancock Biological Station, Murray, Kentucky

Laboratory Technician/Student Worker 06/93 to 02/94. Water sample collection and analysis for the Kentucky Lake Monitoring Program. Analysis of benthic community distribution in relation to groundwater flow in a Kentucky Lake embayment. Provided seminar presentations for visiting high-school students.

Murray State University. Murray, Kentucky

Research Assistant 08/91 to 06/93. Studied movement and spawning of largemouth bass in Reelfoot Lake, Tennessee to identify problems with recruitment. Evaluated movement patterns and identified home range size using GIS. Identified spawning habitat and movements in relation to water quality.

Michigan State University East Lansing, Michigan

Field Technician/Summer Internship 06/90 to 09/90. Stream ecosystem and habitat study of smallmouth bass and rockbass in relation to water flow on the Huron River, Michigan. Gained familiarity with IFIM by conducting stream flow measurements, habitat identification, and other data collection.

Activities and Achievements:

Chair of the Membership Committee, North Central Division of the American Fisheries Society, 2006-present

Past-President of the Michigan Chapter of the American Fisheries Society 2006

President of the Michigan Chapter of the American Fisheries Society, 2005-2006

President-elect of the Michigan Chapter of the American Fisheries Society, 2004

Chair of Continuing Education Committee, Michigan Chapter of the American Fisheries Society, 2003-8

Web-page Development Committee, Michigan Chapter of the American Fisheries Society, 2002-3

Recipient of best poster award at the Midwest Fisheries Conference in Bettendorf, IA, 2002.

Newsletter Editor of the Education Section of the American Fisheries Society, 1998 to 2001

Administrator and Developmental Assistant of the Non-Game Fish Identification Class of the Michigan Chapter of the American Fisheries Society's Committee for Continuing Education, 1997 to 1998

Activities and Achievements continued:

Moderator of the Fisheries Publications Bulletin Board, Department of Fisheries and Wildlife Graduate Student Organization, 1996 to 1997

Volunteer Conservation Officer for the Michigan Department of Natural Resources, 1989 to 1997

Member: American Fisheries Society
1989 to Present

Trout Unlimited
1996 to 2004

Recipient of the Sigma Xi, scientific fraternity award for public speaking and scientific paper presentation, 1993

Recipient of the Sisk Scholarship Award for academic excellence in aquatic sciences, 1992

Courses and Lectures Taught:

- BIO 103 Biology for non majors, Fall 2006, Spring 2008, Ferris State University
- Computer/network training workshop 1999-2000, conducted workshop to provide training to College of Business graduate students to connect personal computers to MSU network, Michigan State University
- Chaos and Fractals, one lecture during Spring 2000 Teaching Seminar Series, Michigan State University
- FW 471 Ichthyology Teaching Assistant Fall 1997, and frequent guest lecturer Fall 1998 and 1999
- Ecology, guest lecture, Summer 1998, Michigan State University
- Zebra Mussel Workshop-Hancock Biological Station, Murray State University

Certifications and Professional Training:

- Aquatic Plant Identification Workshop, American Fisheries Society, 2009
- Mine Safety and Health Administration 24-hour Part 46 New Miner Training, October 2008
- Smith-Root Electro-Fishing Techniques Workshop, American Fisheries Society, 2008
- Mussel Identification/Life History Workshop, American Fisheries Society, 2007
- Introductory Fluvial Geomorphology Workshop, American Fisheries Society, 2005
- Fisheries Population Estimation Workshop, American Fisheries Society, 2005
- Statistical Aspects of Sampling Freshwater Fish Populations and Habitats, American Fisheries Society, 2003

Certifications and Professional Training continued:

- Basic/Intermediate GIS for Fisheries Biologists/Managers, American Fisheries Society, 2003
- Wetland delineation training course, Wetland Training Institute of Frederick Maryland. 1995
- PADI Open-Water Diver Certification, 1991

Presentations:

- Workman, R.D. 2010. Invasive species: Asian carp and the Great Lakes Region. Benzie County Chamber of Commerce Public Forum. March 2010.
- Workman, R.D. 2010. Invasive species: Asian carp and the Great Lakes Region. Branch County Exposition. March 2010.
- Workman, R.D., M.P. Owens, C.L. Wolverton, G.J. Goodman. 2006. Creating wetlands for compensatory mitigation by reclamation of iron mine tailings basins at the Republic Mine in Marquette, Michigan. The 7th Annual International Conference of Acid Rock Drainage. St. Louis, MO. March 2006.
- Workman, R. D. 2005. An investigation of landscape features that influence the invasiveness of reed canarygrass in compensatory mitigation wetlands. Midwest Fish and Wildlife Conference. Grand Rapids, MI. December 2005.
- Workman, R. D. 2005. Career opportunities in Michigan's environmental consulting industry. Lake Superior State University Fisheries and Wildlife Club. Sault Ste. Marie, MI. April 2005.
- Workman, R. D., and M. Selzer. 2004. Reed canarygrass (*Phalaris arundinacea*) landscape evaluation and experimental control study. Multi-resource agency meeting in Lansing, MI. November 2004.
- Workman, R. D., D. Hayes, and T. G. Coon. 2002. Steelhead spawning habitat selection in the Pere Marquette River, Michigan. Poster presentation at the North Central Division of the American Fisheries Society Midwest Fisheries Conference, Bettendorf, IA. December 2002.
- Workman, R. D. 2002. Steelhead spawning habitat selection in the Pere Marquette River, Michigan. Michigan Chapter of the American Fisheries Society Spring Meeting, Muskegon, MI. March 2002.
- Workman, R. D., D. Hayes, and T. G. Coon. 2000. A temperature and flow-based model for predicting upstream movement of migratory steelhead in Lake Michigan. American Fisheries Society Annual Meeting, St. Louis, MO. August 2000.

Presentations continued:

- Workman, R. D., D. Hayes, and T. G. Coon. 2000. A temperature and flow-based model for predicting upstream movement of migratory steelhead in Lake Michigan. Michigan Chapter of the American Fisheries Society Spring Meeting, East Lansing, MI. March 2000.
- Workman, R. D., D. Hayes, and T. G. Coon. 1999. A temperature-based model for predicting upstream movement of migratory steelhead in Lake Michigan. 61st Annual Midwest Fish and Wildlife Conference, Chicago, IL. December 1999.
- Workman, R. D., and T. G. Coon 1999. Spawning and movement of steelhead and longnose suckers in the Pere Marquette River. Annual Report to the Michigan Department of Natural Resources, Ann Arbor, MI. April 1999.
- Workman, R. D., and T. G. Coon 1998. Spawning and movement of steelhead and longnose suckers in the Pere Marquette River. Lansing, MI Chapter of Trout Unlimited. Lansing, MI. October 1998.
- Workman, R. D., and J. M. Jones. 1994. Spawning and movement of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Environmental Systems Research Institute, Inc. 1994 User Conference. Palm Springs, CA. May 1994.
- Workman, R. D., and Tom Timmons. 1994. Spawning and movement of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Southeastern Conference of the American Fisheries Society Annual Meeting, Chattanooga, Tennessee. March 1994.
- Workman, R. D., and Tom Timmons. 1993. Movement behavior of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Kentucky Chapter of the American Fisheries Society Annual Meeting, Frankfort, Kentucky. March 1993.

Publications:

- Workman, R.D., M.P. Owens, C.L. Wolverton, G.J. Goodman. 2006. Creating wetlands for compensatory mitigation by reclamation of iron mine tailings basins at the Republic Mine in Marquette, Michigan. Proceedings of the 7th Annual Interational Conference of Acid Rock Drainage.
- Workman, R. D., M. Selzer, and M. Pennington. 2006. Assessing the invasiveness of reed canarygrass using landscape features. Michigan Department of Transportation. Lansing, Michigan
- Workman, R. D., D. B. Hayes, and T. G. Coon. 2004. Rainbow trout spawning habitat selection in the Pere Marquette River, Michigan. Journal of Great Lakes Research 30(3):397-406.
- Workman, R. D., D. B. Hayes, and T. G. Coon. 2002. A temperature and flow-based model for predicting upstream movement of migratory steelhead in Lake Michigan. Transactions of the American Fisheries Society 131:463-475.

Publications continued:

- Workman, R. D., D. B. Hayes, and T. G. Coon. 2000. A description of the migratory behavior of steelhead (*Oncorhynchus mykiss*) and longnose suckers (*Catostomus catostomus*) in the Pere Marquette River, Michigan. Research Report to the Michigan Department of Natural Resources, Ann Arbor, Michigan.
- Workman, R. D., and J. M. Jones. 1994. Spawning and movement of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Environmental Systems Research Institute, Inc. 1994 User Conference Proceedings.
- White, D. S., K. Johnston, G. Rice, and R. D. Workman. 1994. Ecology of the Hyporheic Interface of a Third Order Kentucky Stream. Abstract. Proceedings of the Second International Conference on Ground Water Ecology.

MARY ELIZABETH ZIMMER (née Schroeder)

University:	Department of Biological Sciences Ferris State University 820 Campus Drive, 2120 ASC Big Rapids, MI 49307 Tel. (231) 591-5022 Email: MaryZimmer@ferris.edu	Home:	19200 Seneca Ave Big Rapids, MI 49307 Tel. (231) 480-4731
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EDUCATION

1997-2002 Ph.D. - The Modulation and Regulation of Episodic Breathing in Mammals
Department of Zoology – Comparative Physiology Section
University of British Columbia, Vancouver, BC

1994-1996 M.S. - Pulmonary Annexin 1 Expression and Synthesis: Effects of Hyperoxia
Department of Animal Health and Biomedical Sciences
University of Wisconsin-Madison, Madison, WI

1985-1989 B.S. - Zoology
Department of Zoology
University of Wisconsin-Madison, Madison, WI

PROFESSIONAL EXPERIENCE

2015-present Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI

2010-2015 Associate Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI

2007-2010 Assistant Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI

2003-2007 Post-doctoral Fellow, Department of Anatomy and Cell Biology, Wayne State University, School of Medicine, Detroit, MI

1996 Assistant Faculty Associate, UW-Madison, Teacher Enhancement Program in Biology, Madison, WI

1989-1994 Research Specialist, UW-Madison, School of Veterinary Medicine, Department of Comparative Biosciences

1989 Project Assistant, UW-Madison, Veterans Administration Hospital

1986-1989 Laboratory Assistant, UW-Madison, Wisconsin Regional Primate Center

TEACHING EXPERIENCE

Courses Taught

2012-present BIOL 423 Neurobiology, Ferris State University

2011-present BIOL 460 Current Topics in Biology, Ferris State University

2009-2011 OPTM 635 Neuroanatomy and Neurophysiology, Michigan College of Optometry, Lecture, Ferris State University

- 2007-present BIOL 321, Human Anatomy and Physiology-1 Lecture and Laboratory, Department of Biological Sciences, Ferris State University
- 2007-present BIOL 322 Human Anatomy and Physiology-2, Lecture and Laboratory, Department of Biological Sciences, Ferris State University
- 2004-2006 Lecture: Advanced Respiratory Physiology, Department of Physiology, School of Medicine, Wayne State University
- 1999-2002 Teaching Assistant: Nursing Anatomy and Physiology Laboratory, University of British Columbia
- 1999-2001 Teaching Assistant: Comparative Neuroscience, University of British Columbia
- 1997-1999 Teaching Assistant, Animal Physiology Laboratory, University of British Columbia
- 1995 Teaching Assistant, Veterinary Histology, School of Veterinary Medicine, UW-Madison
- 1995 Volunteer Tutor, Cherokee Middle School, Madison, WI

Invited Guest Lecturer

- FSU, SCWK 220, Theories- Methods of Practice 1 - basic neurophysiology - 2009
- UBC, Biol 354, Environmental Physiology, hibernation – 2002
- UBC, Biol 454, Comparative Animal Physiology, hibernation - 2001
- UBC, Biol 353, Animal Physiology, hibernation – 1998, 1999
- UBC, Biol 450, Molecular Adaptation of Animals to the Environment, hibernation, 1997, 1998, 1999

Student Research Projects

- 2015 Summer Undergraduate Research Fellowship (Ferris State): Rachel Kempisty
- 2014-2015 Student Research Projects (Ferris State): Jacqueline Tieu, Katherine Hart, Rachel Kempisty, Robert Pacella, Enefe Adaji, Zac Kramer
- 2014 Summer Undergraduate Research Fellowship (Ferris State): Jacqueline Tieu
- 2013-2014 Student Research Projects (Ferris State): Illyas Fana (Student Research Assistantship), Aaron Jackowski (Student Research Assistantship), Brendan Doyle, Catherine Plischke, Sarah Harp, Jacqueline Tieu
- 2013 Summer Undergraduate Research Fellowship (Ferris State): Catherine Plischke
- 2012-2013 Student Research Projects (Ferris State): Aaron Jackowski, Brendan Doyle, Illyas Fana, Catherine Plischke,
- 2011-2012 Independent Study (Ferris State): Danielle Clear, Liala Al-Shatel
- 2011 Summer Undergraduate Research Fellowship (Ferris State): Liala Al-Shatel
- 2010-2011 Biotechnology Internship (Ferris State): Rachel Scheib
- 2009-2010 Independent Study 497 (Ferris State): Marziah Hashimi, Joseph Dalton, Ruben Vaughn
- 2008-2009 Independent Study 497 (Ferris State): Tim Hotchkiss, Ruben Vaughn
- 2000 Senior Honors thesis (UBC): Jerome Lee, The Influence of the Pontine Respiratory Group and Vagal Feedback on Inspiratory Termination in the Golden-Mantled Ground Squirrel,.
- 1999 Senior Honors thesis (UBC): Krista Shaw, The Effect of Body Temperature on Metabolic Rate, Respiratory Pattern and Ventilation in Hibernating Golden-

- 1999 Mantled Ground Squirrels (*Spermophilus lateralis*),
High school honors thesis (UBC): Karolina Dziejdzic and Linda Tay; The Effects of Humidity on Apneic Oxygen Uptake in Hibernating Squirrels,
- 1998 Senior Honors thesis (UBC): Danielle Brochu, Distribution of NMDA-type Glutamate Receptors in Respiratory Nuclei of Euthermic vs. Hibernating Golden-mantled Ground Squirrels, *Spermophilus lateralis*,.

Course development

Digestion Laboratory, Ferris State. I established a new lab to be used to introduce students to the physiology of digestion; fats, proteins and carbohydrates.

Biology Metabolism Laboratory, UBC. I assisted in establishing a first year biology laboratory to teach students about basic cellular metabolism using hibernating ground squirrels.

Teacher Enhancement Program in Biology, UW-Madison. I developed a University course to teach high school teachers basic physiology, as well as easy, practical lessons to be used in the high school classroom. I wrote and received a grant (Eisenhower grant 1996-1997) to purchase equipment for use in 1) the course and 2) for these teachers to use in their high school classrooms in the state of Wisconsin. This allowed them to provide their students with the opportunity to see physiology experiments firsthand using exercise and human based problems as the motivational tool.

PROFESSIONAL SERVICE

- | | |
|----------------|--|
| 2015 – present | Member – Academic Senate |
| 2015 – present | Member – Academic Program Review Council |
| 2014 – 2015 | Member – Biology Awards Committee, Ferris State University |
| 2013 - present | Member – College Graduate Education Committee, Ferris State University |
| 2011 - present | Biology Research Seminar Coordinator |
| 2011 – 2014 | Member – College Curriculum Committee, Ferris State University |
| 2009 - 2012 | Member/Secretary – Institutional Strategic Planning Committee, Ferris State University |
| 2008 - 2010 | Member – Biology Faculty Development Committee, Ferris State University |
| 2008 - present | Member – Biology Curriculum Committee, Ferris State University |
| 2008 - present | Advisor to pre-optometry students |
| 2007- present | Advisor to the Registered Student Organization, the Circle K International Group |

GRANTS AND AWARDS

Ferris Foundation Exceptional Merit Award, 2014-2015	\$3500
Ferris Faculty Research Award, 2013-2014	\$7500
Ferris Foundation Exceptional Merit Award, 2011-2012	\$5500
Ferris Faculty Research Award, 2009 - 2010	\$7250
Dean's Initiative Grant, 2009	\$1500
Ferris Foundation Exceptional Merit Award, 2008 - 2009	\$7500

Travel Award, International Symposium on Neural Regeneration, 2003
McLean Fraser Summer Research Fellowship, 2001
Wisconsin Alumni Scholarship, 1985

PROFESSIONAL SOCIETIES

American Physiological Society, 2002-present
Society for Neuroscience, 2002

AD HOC EDITORIAL REVIEWS

Respiration physiology and neurobiology - 2003

INVITED PRESENTATIONS

The effect of spinal cord injury on learning and memory. August 2014. Michigan AALAS meeting. Ferris State University
Getting inside your student's heads – literally! Feb, 13, 2014. New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University
The biological and psychological aspects of learning. Spring 2013. New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University
Control mechanisms of episodic breathing in mammals. August 2012. Michigan AALAS meeting. Ferris State University
Latent motor pathways after spinal cord injury: "latent" or just inhibited? January 30, 2006, Department of Biological Sciences, University of Idaho
Latent motor pathways after spinal cord injury: "latent" or just inhibited? January 27, 2005, Department of Physiology, Wayne State University
The effect of the pons and neonatal age on respiratory rhythm in the hypothermic rat brainstem-spinal cord preparation, July 2001, Department of Anatomy and Cell Biology Wayne State University

PUBLICATIONS

1. Zimmer MB, Fong AY, Milsom WK. (*In preparation*). The effect of age and the pons on respiratory rhythm during hypothermia in neonatal rats. *Respiration Physiology and Neurobiology*
2. Zimmer MB, Grant J, Ayar A, Goshgarian HG. 2014. Ipsilateral inspiratory intercostal muscle activity after C2 spinal cord hemisection. *Journal of Spinal Cord Medicine*, 26: Epub ahead of print PMID: 2499369.
3. Fong AY, Zimmer MB, Milsom WK. 2009. The conditional nature of the "Central Rhythm Generator" and the production of episodic breathing. *Respiration Physiology and Neurobiology*, 168: 179-187.
4. Fong AY, Corcoran AE, Zimmer MB, Andrade DV, Milsom WK. 2008. Respiratory rhythm of brainstem-spinal cord preparations: effects of maturation, age, mass, and oxygenation. *Respiration Physiology and Neurobiology*, 164: 429-440.
5. Zimmer MB, Nantwi KD, Goshgarian HG. 2008. Effect of spinal cord injury on the neural regulation of respiratory function. *Experimental Neurology*. 209: 399-406.
6. Zimmer MB, Goshgarian HG. 2007. Spinal cord injury in neonates alters respiratory

- motor output via supraspinal mechanisms. *Experimental Neurology*. 206(1): 137-145.
7. Zimmer MB, Nantwi KD, Goshgarian HG. 2007. Effect of spinal cord injury on the respiratory system: basic research and current clinical treatment options. *Journal of Spinal Cord Medicine*. 30(4): 319-30.
 8. Zimmer MB, Goshgarian HG. 2007. GABA, not glycine, mediates inhibition of latent respiratory motor pathways after spinal cord injury. *Experimental Neurology*. 203(2): 493-501.
 9. Zimmer MB, Goshgarian HG. 2006. Spinal activation of serotonin 1A receptors enhances latent respiratory activity after spinal cord injury. *Journal of Spinal Cord Medicine*. 29(2): 147-155.
 10. Zimmer MB, Goshgarian HG. 2005. Spontaneous crossed phrenic activity in the neonatal respiratory network. *Experimental Neurology*. 194: 530-540.
 11. Milsom WK, Chatburn J, Zimmer MB. 2004. Pontine influences on respiratory control in ectothermic and heterothermic vertebrates. *Respiration Physiology and Neurobiology*. 143: 263-280.
 12. Zimmer MB, Milsom WK. 2004. Effect of hypothermia on respiratory rhythm generation in hamster brainstem-spinal cord preparations. *Respiration Physiology and Neurobiology*. 142: 237-249.
 13. Zimmer MB, Milsom WK. 2002. Ventilatory pattern and chemosensitivity in unanesthetized, hypothermic ground squirrels (*Spermophilus lateralis*). *Respiration Physiology*. 133:49-63.
 14. Milsom WK, Zimmer MB, Harris MB. 2001. Vagal control of cardiorespiratory function in hibernation. *Experimental Physiology*. 86(6):791-79
 15. Zimmer MB, Milsom WK. 2001. Effects of changing ambient temperature on metabolic, heart and ventilation rates during steady state hibernation in golden-mantled ground squirrels (*Spermophilus lateralis*). *Physiological and Biochemical Zoology* 74(5):714-723.
 16. Barros RC, Zimmer ME, Branco LGS, Milsom WK. 2001. Hypoxic metabolic response of the golden-mantled ground squirrel. *Journal of Applied Physiology* 91:603-612.
 17. Milsom WK, Zimmer MB, Harris MB. 1999. Regulation of cardiac rhythm in hibernating mammals. *Comparative Biochemistry and Physiology*. 124A:383-391.
 18. Christou M, Keith IM, Shen X, Schroeder ME, Jefcoate R. 1993. Reversal of cytochrome P450-1A1 and P450-EF expression in MCA-C3H/10T cell derived tumors as compared to cultured cells. *Cancer Research*. 53(5):968-976.
 19. Uno H, Schroeder ME, Fors T, Mori O. 1990. Macaque and rodent models for the screening of drugs on stimulating hair growth. *Journal of Cutaneous Aging and Cosmetic Dermatology*. 1(3):193-204.

Books

Zimmer, MB. 2015. *Fundamentals of Human Physiology; A Comparative Examination*. Cognella, San Diego, CA.

Conference Proceedings

Zimmer MB, Harris MB, Milsom WK. 2000. Control of cardiac and ventilation frequencies during hibernation in ground squirrels. In: *Life in the Cold*, edited by G.Heldmaier, M

Klingenspor. Springer-Verlag, Berlin, Heidelberg, Germany. Pp 159-167.

Conference Abstracts

1. Tieu J, Zimmer MB, 2014. The effect of spinal cord injury on learning and memory in rats. *Experimental Biology*. Boston, MA.
2. Tieu J, Zimmer MB, 2014. The effect of spinal cord injury on learning and memory. West Michigan Regional Undergraduate Science Research Conference. Grand Rapids, MI.
3. Doyle B, Zimmer MB, 2014. The effect of exercising intensity on learning and memory in humans. *Experimental Biology*. San Diego, CA.
4. Jackowski A, Harp S, Zimmer MB 2014. Effect of upper body resistance training on memory. *Experimental Biology*. San Diego, CA
5. Plischke C, Fana I, Zimmer MB, 2014. The effect of C2 spinal cord injury on learning and memory. *15th International Symposium on Neural Regeneration*. Pacific Grove, CA
6. Fong AY, Zimmer MB, Milsom WK, 2012. Effects of postnatal development, temperature and the pons on respiratory rhythm and pattern generation in rat pups. *Experimental Biology*.
7. Zimmer MB, Grant J, Ayar A, Goshgarian, HG, 2011. Ipsilateral inspiratory intercostal muscle activity after C2 spinal cord hemisection. *14th International Symposium on Neural Regeneration*. Pacific Grove, CA.
8. Scheid R, Fong AY, Milsom WK, Zimmer MB, 2011. GABAergic mechanisms underlying breathing pattern in rat brainstem-spinal cord preparations. *Experimental Biology*.
9. Zimmer MB, Grant J, Ayar A, Goshgarian, HG, 2007. Ipsilateral inspiratory intercostal activity persists after C2 hemisection. *Experimental Biology*.
10. Zimmer MB, Goshgarian HG, 2006. Spinal cord injury in neonate rats alters respiratory neural output via supraspinal mechanisms. *Experimental Biology*.
11. Zimmer MB, Alilain W, Goshgarian HG, 2005. GABA-mediated inhibition of crossed phrenic pathways. *International Symposium on Neural Regeneration*.
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- cold tolerance: hibernator versus non-hibernator. The power of comparative physiology: evolution, integration, and application. the-aps.org/publications/ p9.
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 20. Zimmer ME, Milsom WK. 1999. Episodic breathing in ground squirrels (*Spermophilus lateralis*): a consequence of “state,” temperature or metabolic rate? *Canadian Society of Zoologists Bulletin*. 29:121.
 21. Zimmer ME, Milsom WK. 1998. Ventilatory chemoresponses during hypothermia (5 and 10C) in golden-mantled ground squirrels (*Spermophilus lateralis*). *Faseb Journal* 12(4):A335.
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EDUCATION:

2002-2009. Ph.D. in Microbiology. Department of Botany and Microbiology, University of Oklahoma, College of Arts and Sciences and Institute for Earth and Energy, Norman, OK.

2002. B.S. in Biology, minor in Chemistry (*Summa Cum Laude*). Central Michigan University, College of Arts and Sciences, Mt. Pleasant, MI.

APPOINTMENTS:

2014-Present	Ferris State University	Associate Professor of Biol. Sciences
2011-2014	Ferris State University	Assistant Professor of Biol. Sciences
2009-2011	University of Oklahoma	Postdoctoral Research Associate

TEACHING EXPERIENCE:

2011-Present: Faculty member in the Department of Biological Sciences, Ferris State University (Big Rapids, MI). Courses taught include General Biology 2 (Biol 122; lecture + lab), Medical Microbiology (Biol 108; lecture + lab), Microbial Ecology (Biol 218; lecture + lab) and Current Topics in Biology (Biol 460; lecture).

2008: Graduate Teaching Assistant for Microbial Physiology and Molecular Biology Laboratory (MBIO 4873). Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

2007-2008: Graduate Teaching Assistant for Ecology/Pathology Laboratory (MBIO 4813). Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

2006: Graduate Teaching Assistant for Fundamentals of Microbiology Introductory Laboratory (MBIO 3812). Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

1999-2000: Chemistry Laboratory Aide for Introduction to Chemistry Laboratory. Department of Chemistry, Central Michigan University, Mt. Pleasant, MI.

1998: Anatomy and Physiology Lecture Course Tutor. Central Michigan University, Mt. Pleasant, MI.

RESEARCH EXPERIENCE:

2011- Present: Principal investigator and research advisor for undergraduate students. Department of Biological Sciences, Ferris State University, Big Rapids, MI.

2009-2011: Postdoctoral Research Associate. Department of Botany and Microbiology, University of Oklahoma, Norman, OK. Contact: Lee Krumholz, (405) 325-0427.

2002-2009: Graduate Research Assistant. Department of Botany and Microbiology, University of Oklahoma, Norman, OK. Dissertation title: Characterization of Subsurface Microbial

Communities Involved in Bioremediation of Uranium and Nitrate. Research advisor: Lee Krumholz, (405) 325-0427.

2000-2002: General Student Research Assistant. Biology Department, Central Michigan University. Contact: Elizabeth Wheeler Alm, (989) 774-2503.

2000: Research Technician for Hospital Disinfectant Research and Development. Caltech Industries, Inc., Midland, MI. Contact: Catherine Anders, (800) 234-7700.

PUBLICATIONS:

Spain, A. M., M. S. Elshahed, F. Z. Najjar, and L. R. Krumholz. Metatranscriptomic analysis of a high-sulfide aquatic spring reveals insights into sulfur cycling and unexpected aerobic metabolism. *Peer J* *In review*.

Spain, A. M. and L. R. Krumholz. 2012. Cooperation of three denitrifying bacteria in nitrate removal of acidic nitrate- and uranium-contaminated groundwater. *Geomicrobiol J* **29**: 830-842

Spain, A. M. and L. R. Krumholz. 2011. Nitrate reducing bacteria at the nitrate and uranium contaminated Oak Ridge Integrated Field Research Challenge Site: A Review. *Geomicrobiol J* **28**: 418-429.

Spain, A. M., A. D. Peacock, and L. R. Krumholz. 2011. Effects of microbial community structure, terminal electron accepting conditions, and molybdate on the extent of U(VI) reduction in landfill aquifer sediments. *Geomicrobiol J* **28**:430-443.

Spain, A. M., C. W. Forsberg, and L. R. Krumholz. 2011. Phylum XVII. *Fibrobacteres*, p. 737-746. *In* N. R. Krieg, J. T. Staley, D. R. Brown, B. Hedlund, B. J. Paster, N. Ward, W. Ludwig, and W. B. Whitman (ed.), *Bergey's Manual of Systematic Bacteriology*, 2nd ed, vol. 4. Springer Verlag, New York.

Istok, J. D., M. Park, M. Michalsen, **A. M. Spain**, L. R. Krumholz, C. Liu, J. McKinley, P. Long, E. Roden, A. D. Peacock, and B. Baldwin. 2009. A thermodynamically-based model for predicting microbial growth and community composition coupled to system geochemistry: Application to uranium bioreduction. *J Contam Hydrol* **112**:1-14

Spain, A. M., L. R. Krumholz, and M. S. Elshahed. 2009. Abundance, composition, diversity and novelty of soil *Proteobacteria*. *ISME J* **3**:992-1000.

Michalsen, M. M., A. D. Peacock, A. N. Smithgal, D. C. White, **A. M. Spain**, Y. Sanchez-Rosario, L. R. Krumholz, S. D. Kelly, K. M. Kemner, J. McKinley, S. M. Heald, M. A. Bogle, D. B. Watson, and J. D. Istok. 2009. Treatment of nitric acid-, U(VI)-, and Tc(VII)-contaminated groundwater in intermediate-scale physical models of an in situ biobarrier. *Environ Sci Technol* **43**:1952-61.

Elshahed, M. S., N. H. Youssef, **A. M. Spain**, C. Sheik, F. Z. Najjar, L. O. Sukharnikov, B. A. Roe, J. P. Davis, P. D. Schloss, V. L. Bailey, and L. R. Krumholz. 2008. Novelty and uniqueness patterns of rare members of the soil biosphere. *Appl Environ Microbiol* **74**:5422-8..

Spain, A. M., A. D. Peacock, J. D. Istok, M. S. Elshahed, F. Z. Najjar, B. A. Roe, D. C. White, and L. R. Krumholz. 2007. Identification and isolation of a *Castellaniella* species important during biostimulation of an acidic nitrate- and uranium-contaminated aquifer. *Appl Environ Microbiol* **73**:4892-904.

Michalsen, M. M., A. D. Peacock, **A. M. Spain**, A. N. Smithgal, D. C. White, Y. Sanchez-Rosario, L. R. Krumholz, and J. D. Istok. 2007. Changes in microbial community composition and geochemistry during uranium and technetium bioimmobilization. *Appl Environ Microbiol* **73**:5885-96.

Alm, E., J. Burke, and **A. Spain**. 2003. Fecal indicator bacteria are abundant in wet sand at freshwater beaches. *Water Research* **37**:3978-3892.

ABSTRACTS AND PRESENTATIONS (Names of undergraduate student mentees are underlined):

Muriset, R. and **A.M. Spain**. Characterization of two bacterial soil isolates that display unique surface growth patterns. Presented at the American Society for Microbiology General Meeting. Poster presentation. New Orleans, LA. 2015.

Muriset, R. and **A.M. Spain**. Characterization of growth and surface motility in soil isolates, *Paenibacillus* sp., strains A1 and A3. Presented at the American Society for Microbiology Michigan Branch Fall Meeting. Poster presentation. Traverse City, MI. 2014.

Carr, A. L. and **A. M. Spain**. Prevalence and characterization of tetrathionate-reducing bacteria isolated from environmental samples. Presented at the American Society for Microbiology General Meeting. Poster presentation. Denver, CO. 2013.

Carr, A. L. and **A. M. Spain**. Prevalence and characterization of tetrathionate-reducing bacteria isolated from environmental samples. Presented at the American Society for Microbiology Michigan Branch Spring Meeting. Poster presentation. Big Rapids, MI. 2013.

Spain, A. M., Elshahed, M. S., Najar, F. Z., and L. R. Krumholz. Comparative metatranscriptomic analysis of an anaerobic high-sulfide spring reveals insight into sulfur cycling pathways and unexpected aerobic metabolism. Presented at the American Society For Microbiology General Meeting. Poster presentation. New Orleans, LA. 2011.

Spain, A. M., Krumholz, L. R., and M. S. Elshahed. Composition, diversity, and novelty within soil *Proteobacteria*. Presented at the American Society For Microbiology General Meeting. Poster presentation. Boston, MA. 2008.

Spain, A. M., Senko, J.M., and L. R. Krumholz. Characterization of denitrifying bacteria from a nitrate- and uranium-contaminated aquifer. Presented at the American Society For Microbiology General Meeting. Poster presentation. Toronto, ON, Canada. 2007.

Spain, A. M., Peacock, A. D., Elshahed, Istok, J. D., White, D. C., and L. R. Krumholz. Bioremediation of acidic nitrate- and uranium contaminated groundwater by ethanol results in stimulation of β -Proteobacteria and decrease in bacterial diversity. Presented at the 11th International Symposium for Microbial Ecology. Poster Presentation. Vienna, Austria. 2006.

Spain, A. M., Elshahed, M. S., Najar, F. Z., Roe, B. A., Istok, J, and L. R. Krumholz. Culture-dependent and -independent identification of denitrifying bacteria in an aquifer undergoing bioremediation for nitrate and uranium. Presented at the American Society For Microbiology General Meeting. Poster presentation. Atlanta, GA. 2005.

Spain, A. M., Elshahed, M. S., Najar, F. Z., Roe, B. A., Istok, J, and L. R. Krumholz. Culture-dependent and -independent identification of denitrifying bacteria in Areas 1 and 2 at the FRC. Presented at the Annual Natural and Accelerated Bioremediation Research Program Principal Investigators' Meeting. Poster Presentation. Airlie, VA. 2005.

Spain, A. M., Peacock, A., White, D. C., Istok, J., and L. R. Krumholz. Microbial communities involved in uranium reduction under sulfate-reducing, iron-reducing, and methanogenic conditions. Presented at the American Society For Microbiology General Meeting. Poster presentation. New Orleans, LA. 2004.

Spain, A. M., Peacock, A., White, D. C., Istok, J., and L. R. Krumholz. Microbial communities involved in uranium reduction under sulfate-reducing, iron-reducing, and methanogenic conditions. Presented at the Annual Natural and Accelerated Bioremediation Research Program Principal Investigators' Meeting. Poster Presentation. Airlie, VA. 2004.

Spain, A. M., Senko, J., and L. R. Krumholz. The effect of pH on denitrifying bacteria. Presented at the Joint American Society For Microbiology Missouri Valley Branch Annual Meeting & Midwest Microbiology Educators Conference. Oral presentation. Kansas City, MO. 2004.

INVITED PRESENTATIONS:

Advice to a Young Scientist: Finding Balance in a Scientific Career. Friday, March 23, 2012. College of Science and Technology's Alumni Career Day, Central Michigan University.

Seeing the Unseen: Using Metatranscriptomics to Address Questions in Microbial Ecology. January 12, 2012, Department of Biology, Central Michigan University.

Seeing the Unseen: Using Metatranscriptomics to Address Questions in Microbial Ecology. September 23, 2011. Department of Biological Sciences, Ferris State University.

UNDERGRADUATE STUDENT RESEARCH PROJECTS:

Brett Walker (Fall, 2015). Project title: Molecular identification of *Paenibacillus* strains A1 and A3. This student will complete up to 300 hours of a biotechnology internship (Biol 491) by working in my lab on this project. Ferris State Univ.

Crisha Barrett (Fall, 2015). Project title: Phenotypic characterization of *Paenibacillus* strains A1 and A3. This student is working on her project as a paid research assistant. Ferris State Univ.

Sarah Mathie (2015-Present). Project title: Effects of nutritional parameters on the growth and surface growth pattern of soil isolates *Paenibacillus* species strains A1 and A3. This student was awarded a Summer Research Fellowship (2015) from Ferris State University for her work on this project.

Rebecca Muriset (2014-2015). Project title: The study environmental parameters that affect surface growth and motility patterns of soil isolates *Paenibacillus* species strains A1 and A3. This student completed 400 hours of a biotechnology internship (Biol 491) by working in my lab on this project and was awarded a Student Research Grant from the College of Arts and Sciences to present her research at a national conference. Ferris State Univ.

Megan Knight (Fall, 2014). Project title: Leifson staining procedure on *Paenibacillus taiwanensis* isolates A1 and A3 from soil adjacent to the Muskegon River. This student enrolled in and completed an independent research project (1 credit, Biol 497). Ferris State Univ.

Spencer Crittendon (2013-2014). Project title: Identification and characterization of two soil bacterial isolates that display unique motility features. This student was granted a Student Research Assistant award (2013-2014) from Ferris State University for his work on this project.

Amber Carr (2012-2013). Project title: Prevalence and characterization of tetrathionate-reducing bacteria isolated from environmental samples. This student was awarded a Summer Research Fellowship (2012) from Ferris State University for her work on this project.

Stephanie Demsich (Summer, 2013). Project title: Effects of artificial sweeteners on gastrointestinal tract bacteria. This student enrolled in and completed an independent research project (3 credits, Biol 497). Ferris State Univ.

Chepchumba Kottutt (Spring, 2013). Paper title: Discovering Thiosulfate and Tetrathionate Reduction. This student enrolled in and completed an independent research project (1 credit, Biol 497). Ferris State Univ.

Blaire Kerwin (2011). Project title: Enrichment and enumeration of sulfate-reducing and thiosulfate-disproportionating bacteria from Zodletone source sediment. Univ. Oklahoma.

Foster Dobry (2011). Project title: Microaerophilic sulfur oxidizers from Zodletone Spring. Univ. Oklahoma.

John Frink (2006-2008). Project title: pH-dependent heavy metal (copper, aluminum, and nickel) tolerance in bacteria isolated from nitrate- and uranium-contaminated groundwater. Univ. Oklahoma.

Additional research students (trained/participated on a volunteer basis):

Julie Cohen (Fall, 2012-Spring, 2012)

Maria Ilyukhina (Fall, 2013)

Chepcumba Kotutt (Fall, 2012)

Megan Knight (Spring, 2014)

Zachary Brady (Summer, 2013)

Alyx-Andrea Johnson (Spr-Summer, 2014)

Brett Jenkins (Summer, 2013)

Crisha Barrett (Spring-Summer, 2015)

Alexander Totten (Fall/Spring, 2013-2014)

Elizabeth Utke (Spring, 2015)

DEPARTMENT, COLLEGE, AND UNIVERSITY SERVICE:

2012-Present. Academic Advisor for Biology majors with Pre-Physician Assistant intentions, Ferris State Univ.

2015-Present. Member of the curriculum sub-committee on establishing scientific literacy among Biology majors. Department of Biol. Sciences, Ferris State Univ.

2015-Present. Member of the Standards and Policies Committee, College of Arts and Sciences, Ferris State Univ.

2014-Present. Member of the Promotion/Merit Committee, College of Arts and Sciences, Ferris State Univ.

2012-2015. Member of the Curriculum Committee, Dept. of Biol. Sciences, Ferris State Univ.

2012-2015. Member of the Special Grants Committee, College of Arts and Sciences, Ferris State Univ.

2012-2015. Member of the Health Promotions Committee, Academic Senate, Ferris State Univ.

Fall, 2014. Temporary Coordinator of the "Friday Afternoon Research Talks" seminar series, held by the Dept. Biol. Sciences, Ferris State University.

2013-2014. Member of the Biology Faculty Search Committee (Genetics), Department of Biol. Sciences, Ferris State Univ.

2013. Finalist judge for the Honor's Program Public Address Contest, Ferris State Univ.

2013. Temporary member of the Standards and Policies Committee, College of Arts and Sciences, Ferris State Univ.

2006. Chair of the Graduate Student Committee for the Annual Donald C. Cox Lecture in Microbiology Department of Botany and Microbiology, Univ. Oklahoma

PROFESSIONAL SERVICE:

2012-Present. Board member for the Michigan branch of the American Society for Microbiology (MI-ASM). Served as President-Elect during the 2014-2015 academic year, and have been serving as President of MI-ASM since July 1, 2015.

2015. Oral presentation judge for the spring regional meeting of MI-ASM held at Eastern Michigan University.

2015. Invited reviewer for the journal *PLoS ONE*.

2012 and 2015. Invited reviewer for the journal *Environmental Science and Technology*.

2014. Invited reviewer for the *Journal of Applied Microbiology*.

2012 and 2014. Poster judge for regional meetings of the MI-ASM (held at Central Michigan University in the Spring, 2012 and at Davenport University in the Spring, 2014)

2013. Panelist reviewer for the National Science Foundation's Molecular and Cellular Biosciences Program.

2011 and 2013. *Ad hoc* reviewer for the National Science Foundation's Dimensions of Biodiversity Grant Program.

2013. Planning committee member and co-host for the MI-ASM Spring Meeting at Ferris State University.

2012. Invited reviewer for Central Michigan University's Early Career Grant Program.

2005. Organized and taught a 2-day workshop for the Microbiology department and a visiting research scientist on how to build phylogenetic trees from bacterial 16S rRNA sequences, Univ. Oklahoma.

2005-2006. Volunteered for the Oklahoma Regional Science Bowl.

GRANTS, FELLOWSHIPS, AND SCHOLARSHIPS:

Faculty Research Grant, Ferris State University (2014-2015). Project Title: Effects of Physical and Chemical Parameters on Surface Growth Patterns and Cell Motility of Soil Isolates, *Paenibacillus* species (sp.), Strains A1 and A3. Award total: \$7,446.

Faculty Research Grant, Ferris State University (2013-2014). Project Title: Prevalence and Characterization of Tetrathionate-Reducing Bacteria Isolated from Anaerobic Sediments. Award total: \$7,270

George L. and Cleo Cross Graduate Scholarship, Department of Botany and Microbiology, University of Oklahoma (2008)

Lois Pfister Scholarship for Women in Science, Department of Botany and Microbiology, University of Oklahoma (2006).

University of Oklahoma Graduate College Graduate Foundation Fellowship (2002-2006).

International Society for Microbial Ecology Travel Grant Award to attend the 11th International Symposium for Microbial Ecology (ISME-11) in Vienna, Austria, 2006.

American Society for Microbiology Corporate Activities Program Student Travel Grant Award, 2005.

Department of Energy's Natural and Accelerated Bioremediation Research Program Principal Investigators Meeting Student Travel Award, 2004 and 2005.

American Society for Microbiology Undergraduate Research Fellowship (2001). Title: Microbial Community Structure of Arsenic-Contaminated Groundwater.

Arthur Loren Kontio Outstanding Young Biologist Award (2000-2001).

Centralis Gold Scholarship from Central Michigan University (1998-2002).

PROFESSIONAL AFFILIATIONS:

American Society for Microbiology, Member (2012-Present)

American Society for Microbiology, Michigan Branch, Member (2012-Present)

American Society for Microbiology, Postdoctoral Member (2010-2011)

American Society for Microbiology, Student Member (2000, 2002, 2004-2009)

International Society for Microbial Ecology, Student Member (2006)

American Society for Microbiology, Missouri Valley Branch, Student Member (2003-2004, 2011)

American Society for Microbiology, Michigan Branch, Student Member (2002)

Appendix H: Graduating Student Survey and Data

6. We would like information about your future plans as they relate to your biotechnology degree:
- Are you planning to attend graduate or professional school? _____
 If so, what kind of school and where? _____
 Have you applied? _____
 Have you been accepted? _____
 - Are you seeking employment? _____
 What kind of job/career are you intending to pursue? _____
 Have you applied? _____
 Have you been hired, and if so, where? _____
 - If your future plans are not encompassed by the categories above, please indicate your career/academic intentions.

7. On a scale of 1 (strongly disagree) to 5 (strongly agree), please rate the biotechnology program in the following areas:

The biotechnology program provided a solid foundation of knowledge in the following areas such that I am competitive for entry into graduate school, professional school, or the workforce:	
Genetics and molecular genetics	1 2 3 4 5
Biochemistry	1 2 3 4 5
Cell biology	1 2 3 4 5
My coursework has allowed me to develop a proficiency in laboratory techniques.	1 2 3 4 5
My coursework developed my ability to formulate hypotheses, make careful observations, analyze data, and draw conclusions.	1 2 3 4 5
My coursework developed my ability to evaluate, analyze, and synthesize information from scientific literature and exhibit critical thinking skills.	1 2 3 4 5
My coursework was intellectually challenging.	1 2 3 4 5
My advisor was helpful in planning my course selections and completing my degree.	1 2 3 4 5
My advisor was helpful with respect to providing advice about my career.	1 2 3 4 5

8. If there was an option to stay an additional year at Ferris and receive a Master's degree in biotechnology, would you have pursued this option? Would you have pursued a graduate degree if it would have required two additional years? Please elaborate why you would or would not have pursued either graduate option.

9. Please list the two biotechnology courses that you feel were the most beneficial to you and your career. What specifically did you like about them?

10. Please list two biotechnology courses that you feel were the least beneficial to you and your career. What improvements could be made in those courses?

11. In your opinion, what are the overall strengths of the biotechnology program? Please be thoughtful and truthful in your answer.

12. What suggestions can you make to assist our efforts in improving the program?

Appendix I: Alumni Survey and Data

Alumni Survey

Every six years, each academic program at Ferris State University is evaluated via an Academic Program Review (APR) process. As part of this process, the Biotechnology program is asking Biotechnology alumni for their perceptions of the Biotechnology program and how well the program prepared them for their future careers. Please take just a few minutes to complete this short survey to assist us in our continuing efforts to maintain the educational quality of the Biotechnology program.

1. I graduated with a degree from the following programs at Ferris State (mark all that apply):
 - a. B.S. Biotechnology
 - b. B.S. Forensic biology
 - c. Other B.S. biology concentrations
 - d. B.A. Biochemistry
 - e. B.A. Chemistry
 - f. Other
2. What year and semester did you graduate with your biotechnology degree?
 - a. Fall 2010
 - b. Spring or Summer 2011
 - c. Fall 2011
 - d. Spring or Summer 2012
 - e. Fall 2012
 - f. Spring or Summer 2013
 - g. Fall 2013
 - h. Spring or Summer 2014
 - i. Fall 2014
 - j. Spring or Summer 2015
 - k. Fall 2015
 - l. Spring 2016
3. Currently, I am:
 - a. Attending graduate school
 - b. Attending professional school
 - c. Employed in a position related to my major
 - d. Employed in a position unrelated to my major
 - e. Other
4. What is your job title?
5. Who is your employer?
6. How long did it take to find a job after receiving your terminal degree?
7. What was your starting annual salary?
 - a. \$29,999 or less
 - b. \$30,000-\$34,999
 - c. \$35,000-\$44,999
 - d. \$45,000-\$54,999

- e. \$55,000 or more
- 8. How long have you held your current position?
 - a. Less than one year
 - b. 1-2 years
 - c. 3-4 years
- 9. What is your current annual salary?
 - a. \$29,999 or less
 - b. \$30,000-\$34,999
 - c. \$35,000-\$44,999
 - d. \$45,000-\$54,999
 - e. \$55,000-\$64,999
 - f. \$65,000 or more

If you are currently attending a graduate or professional school or have already attended a graduate or professional school, please answer questions 9-11.

- 10. What type(s) of degrees have you pursued, are currently pursuing, or have completed (mark all that apply)?
 - a. M.S.
 - b. PhD
 - c. M.D.
 - d. D.O.
 - e. MBA
 - f. Other
- 11. What is/are the name of the school(s) that you have attended?
- 12. What was your date of completion or is your expected date of completion for your highest pursued degree?
 - a. 2011
 - b. 2012
 - c. 2013
 - d. 2014
 - e. 2015
 - f. 2016
 - g. 2017
 - h. Did not finish
- 13. I entered the biotechnology program as a:
 - a. Freshman
 - b. From the pre-pharmacy program at Ferris
 - c. From any other program at Ferris
 - d. A transfer student from another institution
- 14. Please indicate your level of satisfaction with your background in **biology** when compared to other B.S. entry-level lab personnel or graduate/professional students:

- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
15. Please indicate your level of satisfaction with your background in **chemistry** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
16. Please indicate your level of satisfaction with your background in **mathematics** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
17. Please indicate your level of satisfaction with your background in **preparation for laboratory work** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
18. Please indicate your level of satisfaction with your background in **problem solving and critical thinking skills** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
19. Please indicate your level of satisfaction with your background in **computer and database usage** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied
20. Please indicate your level of satisfaction with your background in **scientific and technical writing** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Somewhat dissatisfied
 - d. Very dissatisfied

21. Please indicate your level of satisfaction with your background in **oral and interpersonal communication** when compared to other B.S. entry-level lab personnel or graduate/professional students:
- Very satisfied
 - Somewhat satisfied
 - Somewhat dissatisfied
 - Very dissatisfied
22. My satisfaction with **the level of expertise of the biotechnology program faculty in their professional area** is:
- Very satisfied
 - Somewhat satisfied
 - Somewhat dissatisfied
 - Very dissatisfied
23. My satisfaction with the **academic advising I received while in the biotechnology program** is:
- Very satisfied
 - Somewhat satisfied
 - Somewhat dissatisfied
 - Very dissatisfied
24. My satisfaction with the **ability of my degree in biotechnology to help me achieve my career goals** is:
- Very satisfied
 - Somewhat satisfied
 - Somewhat dissatisfied
 - Very dissatisfied
25. I would recommend the biotechnology program at Ferris State to prospective students.
- Strongly agree
 - Somewhat agree
 - Neutral
 - Somewhat disagree
 - Strongly disagree
26. My **overall** level of satisfaction with the biotechnology program is:
- Very satisfied
 - Somewhat satisfied
 - Somewhat dissatisfied
 - Very dissatisfied
13. What do you see as the strengths of the Biotechnology program?
14. What do you see as areas needing improvement in the Biotechnology program?

15. Please use this space for additional comments.

2016 Biotechnology APR Alumni Frequencies

Prepared by: Institutional Research & Testing, 08/16

Statistics

	N		Mean	Median	Std. Deviation
	Valid	Missing			
q1 1 Degree: BS Biotechnology	17	0	1.00	1.00	.000
q1 2 Degree: BS Forensic Biology	17	0	.24	.00	.437
q1 3 Degree: Other BS Biology concentrations	17	0	.00	.00	.000
q1 4 Degree: BA Biochemistry	17	0	.06	.00	.243
q1 5 Degree: BA Chemistry	17	0	.00	.00	.000
q1 6 Degree: Other, Please Specify	17	0	.00	.00	.000
q1a Degree: Other specified	17	0			
q2 Year & semester graduated	17	0	5.82	6.00	3.226
q3 Currently am	17	0	3.41	3.00	1.064
q3a Currently Other specified	17	0			
q4 Job title	17	0			
q5 Employer	17	0			
q6 How long to find a job	17	0			
q7 Starting annual salary	17	0	1.76	1.00	1.091
q8 How long in current position	16	1	2.06	2.00	.929
q9 Current annual salary	17	0	2.71	3.00	1.105
q10 1 Grad Degree: MS	17	0	.18	.00	.393
q10 2 Grad Degree: PhD	17	0	.18	.00	.393
q10 3 Grad Degree: MD	17	0	.00	.00	.000
q10 4 Grad Degree: DO	17	0	.00	.00	.000
q10 5 Grad Degree: MBA	17	0	.00	.00	.000
q10 6 Grad Degree: Pharm-D	17	0	.00	.00	.000
q10 7 Grad Degree: Other, Please Specify	17	0	.06	.00	.243
q10a Grad degree Other Specified	17	0			
q11 Name of school(s) attended	17	0			
q12 Date of completion of highest degree	8	9	5.88	6.00	3.091
q12a Date of completion Other specified	17	0			
q13 Entered the Biotechnology program as	17	0	2.82	3.00	1.074
q14a Background in biology	16	1	3.69	4.00	.479
q14b Background in chemistry	16	1	3.50	3.50	.516
q14c Background in mathematics	16	1	2.94	3.00	.574
q14d Preparation for laboratory work	16	1	3.88	4.00	.342
q14e Problem solving/critical thinking skills	17	0	3.82	4.00	.393
q14f Computer & database usage	16	1	3.25	3.00	.683
q14g Scientific & technical writing	16	1	3.38	4.00	.885
q14h Oral & interpersonal communication	17	0	3.41	3.00	.507
q15a Level of expertise of the biotech program faculty in their professional area	17	0	3.82	4.00	.393
q15b Academic advising I received while in the biotech program	17	0	3.71	4.00	.849
q15c Ability of my degree in biotech to help me achieve my career goals	17	0	3.59	4.00	.507
q15d Overall level of satisfaction with the biotech program	17	0	3.82	4.00	.393
q16 Recommend biotech program to prospective students	17	0	4.00	5.00	1.620
q17 Strengths of program	17	0			
q18 Areas needing improvement	17	0			
q19 Additional comments	17	0			

Frequency Table

q1_1 Degree: BS Biotechnology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selected	17	100.0	100.0	100.0

q1_2 Degree: BS Forensic Biology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	13	76.5	76.5	76.5
	Selected	4	23.5	23.5	100.0
	Total	17	100.0	100.0	

q1_3 Degree: Other BS Biology concentrations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q1_4 Degree: BA Biochemistry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	16	94.1	94.1	94.1
	Selected	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q1_5 Degree: BA Chemistry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q1_6 Degree: Other, Please Specify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q1a Degree: Other specified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		17	100.0	100.0	100.0

q2 Year & semester graduated

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fall 2010	1	5.9	5.9	5.9
	Spring or Summer 2011	4	23.5	23.5	29.4
	Spring or Summer 2012	1	5.9	5.9	35.3
	Fall 2012	1	5.9	5.9	41.2
	Spring or Summer 2013	3	17.6	17.6	58.8
	Spring or Summer 2014	4	23.5	23.5	82.4
	Spring or Summer 2015	2	11.8	11.8	94.1
	Fall 2015	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q3 Currently am

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Attending graduate school	1	5.9	5.9	5.9
	Employed in a position related to my major	11	64.7	64.7	70.6
	Employed in a position unrelated to my major	1	5.9	5.9	76.5
	Other, Please Specify	4	23.5	23.5	100.0
	Total	17	100.0	100.0	

q3a Currently Other specified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		13	76.5	76.5	76.5
	Attending Graduate School at Western Michigan University and employed as an Adjunct Faculty at Kalamazoo Valley Community College.	1	5.9	5.9	82.4
	Employed in a position related to my major and attending graduate school	1	5.9	5.9	88.2
	I am Transitioning from working in a position related to my major to Attending Graduate school for a PhD related to my major	1	5.9	5.9	94.1
	Unemployed and recovering from multiple surgeries	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q4 Job title

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	5.9	5.9	5.9
	Adjunct Faculty	1	5.9	5.9	11.8
	Analytical Quality Assurance Auditor	1	5.9	5.9	17.6
	Cell Line Engineering Technician	1	5.9	5.9	23.5
	Centralized Laboratory Support Services	1	5.9	5.9	29.4
	Lab Science Data/Quality Associate	1	5.9	5.9	35.3
	Lab Technician Associate	1	5.9	5.9	41.2
	Laboratory Technician	1	5.9	5.9	47.1
	Pathology Technical Specialist	1	5.9	5.9	52.9
	PhD Candidate	1	5.9	5.9	58.8
	Project Manager	1	5.9	5.9	64.7
	QC Tech/Research Analyst AKA The Scientist	1	5.9	5.9	70.6
	Quality Assurance Lab Tech	1	5.9	5.9	76.5
	Research Associate	1	5.9	5.9	82.4
	Research Specialist B	1	5.9	5.9	88.2
	Scientist	1	5.9	5.9	94.1
Technical Sales	1	5.9	5.9	100.0	
Total	17	100.0	100.0		

q5 Employer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	5.9	5.9	5.9
	Biosolutions LLC	1	5.9	5.9	11.8
	Dow Chemical/Kelly Services	1	5.9	5.9	17.6
	Eurofins Lancaster Labs	1	5.9	5.9	23.5
	Finished Basement Company	1	5.9	5.9	29.4
	Kalamazoo Valley Community College	1	5.9	5.9	35.3
	Mercy Health Saint Mary's Hospital	1	5.9	5.9	41.2
	MPI Research	3	17.6	17.6	58.8
	Oxford Genetics	1	5.9	5.9	64.7
	Pfizer/Aerotek	1	5.9	5.9	70.6
	Pinnacle Foods- Vlastic	1	5.9	5.9	76.5
	The University of Pennsylvania	1	5.9	5.9	82.4
	University of Michigan, Pharmacology Dept	1	5.9	5.9	88.2
	Van Andel Research Institute	1	5.9	5.9	94.1
	Virtue Cider	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q6 How long to find a job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	5.9	5.9	5.9
	1 month	2	11.8	11.8	17.6
	1 yr	1	5.9	5.9	23.5
	2 months	1	5.9	5.9	29.4
	3-4 weeks	1	5.9	5.9	35.3
	4 months	1	5.9	5.9	41.2
	8 months to find a job that utilized my degree	1	5.9	5.9	47.1
	About a month	1	5.9	5.9	52.9
	Had it before I graduated	2	11.8	11.8	64.7
	I received my job offer prior to graduating and started one week after commencement	1	5.9	5.9	70.6
	Immediate	1	5.9	5.9	76.5
	n/a	1	5.9	5.9	82.4
	Roughly 2 months	1	5.9	5.9	88.2
	Started current job while still working on PhD.	1	5.9	5.9	94.1
	Was already working	1	5.9	5.9	100.0
Total	17	100.0	100.0		

q7 Starting annual salary

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	\$29,999 or less	9	52.9	52.9	52.9
	\$30,000-\$34,999	5	29.4	29.4	82.4
	\$35,000-\$39,999	2	11.8	11.8	94.1
	\$45,000-\$49,999	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q8 How long in current position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than one year	5	29.4	31.3	31.3
	12 years	6	35.3	37.5	68.8
	34 years	4	23.5	25.0	93.8
	5 or more years	1	5.9	6.3	100.0
	Total	16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q9 Current annual salary

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	\$29,999 or less	3	17.6	17.6	17.6
	\$30,000-\$34,999	4	23.5	23.5	41.2
	\$35,000-\$44,999	5	29.4	29.4	70.6
	\$45,000-\$54,999	5	29.4	29.4	100.0
	Total	17	100.0	100.0	

q10_1 Grad Degree: MS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	14	82.4	82.4	82.4
	Selected	3	17.6	17.6	100.0
	Total	17	100.0	100.0	

q10_2 Grad Degree: PhD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	14	82.4	82.4	82.4
	Selected	3	17.6	17.6	100.0
	Total	17	100.0	100.0	

q10_3 Grad Degree: MD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q10_4 Grad Degree: DO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q10_5 Grad Degree: MBA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q10_6 Grad Degree: Pharm-D

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	17	100.0	100.0	100.0

q10_7 Grad Degree: Other, Please Specify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Selected	16	94.1	94.1	94.1
	Selected	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q10a Grad degree Other Specified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		16	94.1	94.1	94.1
	Started a Master's Program and left after 4 months	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q11 Name of school(s) attended

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		10	58.8	58.8	58.8
	MD Anderson Cancer Center/ UT Houston	1	5.9	5.9	64.7
	Michigan State	1	5.9	5.9	70.6
	Michigan State University	1	5.9	5.9	76.5
	University of Tennessee Health Science Center	1	5.9	5.9	82.4
	Van Andel Research Institute	1	5.9	5.9	88.2
	Washington State University	1	5.9	5.9	94.1
	Western Michigan University	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q12 Date of completion of highest degree

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2011	1	5.9	12.5	12.5
	2013	1	5.9	12.5	25.0
	2014	1	5.9	12.5	37.5
	2015	1	5.9	12.5	50.0
	2017	1	5.9	12.5	62.5
	Other, Please Specify	3	17.6	37.5	100.0
	Total	8	47.1	100.0	
Missing	System	9	52.9		
Total		17	100.0		

q12a Date of completion Other specified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		14	82.4	82.4	82.4
	2018	2	11.8	11.8	94.1
	2021	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q13 Entered the Biotechnology program as

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Freshman	2	11.8	11.8	11.8
	From the PrePharmacy program at Ferris	5	29.4	29.4	41.2
	From any other program at Ferris	4	23.5	23.5	64.7
	A transfer student from another institution	6	35.3	35.3	100.0
	Total	17	100.0	100.0	

q14a Background in biology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	5	29.4	31.3	31.3
	Very Satisfied	11	64.7	68.8	100.0
	Total	16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q14b Background in chemistry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	8	47.1	50.0	50.0
	Very Satisfied	8	47.1	50.0	100.0
	Total	16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q14c Background in mathematics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Dissatisfied	3	17.6	18.8	18.8
	Somewhat Satisfied	11	64.7	68.8	87.5
	Very Satisfied	2	11.8	12.5	100.0
	Total	16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q14d Preparation for laboratory work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	2	11.8	12.5	12.5
	Very Satisfied	14	82.4	87.5	100.0
	Total	16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q14e Problem solving/critical thinking skills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	3	17.6	17.6	17.6
	Very Satisfied	14	82.4	82.4	100.0
	Total	17	100.0	100.0	

q14f Computer & database usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Dissatisfied	2	11.8	12.5	12.5
	Somewhat Satisfied	8	47.1	50.0	62.5
	Very Satisfied	6	35.3	37.5	100.0
	Total	16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q14g Scientific & technical writing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Dissatisfied	1	5.9	6.3	6.3
	Somewhat Dissatisfied	1	5.9	6.3	12.5
	Somewhat Satisfied	5	29.4	31.3	43.8
	Very Satisfied	9	52.9	56.3	100.0
Total		16	94.1	100.0	
Missing	System	1	5.9		
Total		17	100.0		

q14h Oral & interpersonal communication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	10	58.8	58.8	58.8
	Very Satisfied	7	41.2	41.2	100.0
	Total	17	100.0	100.0	

q15a Level of expertise of the biotech program faculty in their professional area

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	3	17.6	17.6	17.6
	Very Satisfied	14	82.4	82.4	100.0
	Total	17	100.0	100.0	

q15b Academic advising I received while in the biotech program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Dissatisfied	1	5.9	5.9	5.9
	Somewhat Dissatisfied	1	5.9	5.9	11.8
	Very Satisfied	15	88.2	88.2	100.0
	Total	17	100.0	100.0	

q15c Ability of my degree in biotech to help me achieve my career goals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	7	41.2	41.2	41.2
	Very Satisfied	10	58.8	58.8	100.0
	Total	17	100.0	100.0	

q15d Overall level of satisfaction with the biotech program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Satisfied	3	17.6	17.6	17.6
	Very Satisfied	14	82.4	82.4	100.0
	Total	17	100.0	100.0	

q16 Recommend biotech program to prospective students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	17.6	17.6	17.6
	Somewhat Disagree	1	5.9	5.9	23.5
	Somewhat Agree	2	11.8	11.8	35.3
	Strongly Agree	11	64.7	64.7	100.0
	Total	17	100.0	100.0	

q17 Strengths of program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		4	23.5	23.5	23.5
	Advanced techniques in biotechnology as it gave real world applications.	1	5.9	5.9	29.4
	Bradley Isler is one of the best professors/advisors ever! Experience in both biology and chemistry.	1	5.9	5.9	35.3
	Course work at higher levels was very challenging and was excellent preparation for graduate coursework and research. Many courses were actually more difficult than those I have taken as part of my graduate coursework.	1	5.9	5.9	41.2
	Critical thinking skills Hands on lab experience	1	5.9	5.9	47.1
	Hands on lab work and use of techniques. Exploring non automated and automated techniques in the field. Depth of learning covered in the curriculum of molecular biology.	1	5.9	5.9	52.9
	How much it encompasses. There are many methods taught and machinery used that is crucial to development and far beyond what some schools can afford.	1	5.9	5.9	58.8
	I see the main strength of the Biotech program as it's staff. The professors and advisors were extremely knowledgeable in their fields and had the desire and ability to help the students learn and grow.	1	5.9	5.9	64.7
	In my experiences as a lab technician working with several students and professionals from diverse backgrounds, I can proudly say that the biotech program at Ferris is among the best in preparing students for working hands on in the lab. I have worked with undergrads and grad students from U of M, MSU, Purdue, Oberlin, John's Hopkins, and others. while these are all great programs none of them have the practical, and hands on lab technique training that can even compare to the experience I already had by the time I graduated Ferris.	1	5.9	5.9	70.6
	Small class size so you get hands on lab experience.	1	5.9	5.9	76.5
	Small class size, which can translate into more time spent with the instructor, though this is not always the case. Lab courses. There was a lot of at-the-bench training. However, the equipment & resources are dated.	1	5.9	5.9	82.4
	The amount of hands on lab work. Every student leaving the program should have great experience in buffer preparation, agar plate prep, and basic lab notebook SOP.	1	5.9	5.9	88.2

q17 Strengths of program

		Frequency	Percent	Valid Percent	Cumulative Percent
	The in-lab experience that students receive in the biotechnology program is unlike any other program. Most graduate programs expect that students 'have hands' and are able to synthesize their scientific knowledge into experiments, but the majority of students are actually lacking in this area. This places students from our program miles ahead of others; they are able to begin meaningful experiments much sooner in their program. In addition, the expertise of the faculty in our program is a huge benefit to the students. Students need to be exposed to scientific literature and current topics as soon as possible, and this has always been a priority to our faculty.	1	5.9	5.9	94.1
	The student to professor ratio allows for more personalized learning. All of the laboratory experience was helpful as well.	1	5.9	5.9	100.0
	Total	17	100.0	100.0	

q18 Areas needing improvement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	29.4	29.4	29.4
	Although the tech was great, there could be more money allocated to rising and new machinery. Besides that, I think it's a very well rounded program.	1	5.9	5.9	35.3
	Better help with internship placements and expanding the experience globally for science internships. Maybe trying to collaborate with a foreign university in an exchange program.	1	5.9	5.9	41.2
	Equipment, Resources & Hands-On Training. The program is in desperate need of new instrumentation. Specifically, students should have wet-lab training in Flow Cytometry, Next-Generation Sequencing, Quantitative PCR (including RT-qPCR), and mammali	1	5.9	5.9	47.1
	Facing reality of the average income	1	5.9	5.9	52.9
	I think the program could benefit by offering their students a medical science certificate.	1	5.9	5.9	58.8
	Learning more about industry instead of just academia.	1	5.9	5.9	64.7
	my only primary complaint with my experience at Ferris can not be blamed on the Biotech program. It is however with the leadership in the physical sciences dept. in my Junior year the primary Biochemistry professor was on sabbatical. while this was know for a long time & the Biological sciences dept immediately found a great temporary replacement the physical sciences dept waited until the last minute & hired someone completely substandard. this led to sever detriments to my learning my major & resulted in our class having to teach ourselves. this problem even continued into the spring semester where once again there was failure to hire a lab instructor. we ended up being primarily taught but an upperclassman who had merely taken the class the year before. so to sum up The Biotech program is great, but its greatest weakness is the side that's affiliated with Physical sciences mainly due to poor & inept leadership at the top.	1	5.9	5.9	70.6
	None	1	5.9	5.9	76.5

q18 Areas needing improvement

	Frequency	Percent	Valid Percent	Cumulative Percent
None, I think the biotechnology program has prepared me well for everything I have done up until now.	1	5.9	5.9	82.4
Our math background is very weak, especially when going into a research-based graduate program or career. Statistics is an absolutely necessary skill in this field; in order to publish data, journals require that biological occurrences deemed significant	1	5.9	5.9	88.2
Perhaps there could be the option of taking a physical or analytical chemistry class in order to gain more experience or to be more well-rounded.	1	5.9	5.9	94.1
While the program is strong, I believe the main focus of Biotech is to prepare the students for grad school or work in academia, but not for work in industrial applications. I believe a greater emphasis on industry outside of pure academics could benefit the students.	1	5.9	5.9	100.0
Total	17	100.0	100.0	

q19 Additional comments

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	13	76.5	76.5	76.5
another great resource for the students is increasing the amount of on campus research being done. lab classes are great but following a single project day after day for over a year is incredibly valuable knowledge and experience.	1	5.9	5.9	82.4
I didn't pursue a career in biotech because my interests shifted, but the faculty made it worth every penny. I learned so much more than just sciences from the program that helped me pursue a career in an entirely different field. Two thumbs up!	1	5.9	5.9	88.2
I felt my experience and time at Ferris prepared me very well for graduate school and working as a scientist. I'm so grateful for the biotechnology program and happy that it's still doing well.	1	5.9	5.9	94.1
The academic support side of the program was lacking. There was little guidance in how to get a job post-graduation, or even where to look. Mentors did not spend time aiding in establishing connections between graduates & potential employers. The job fair is not enough. I had strong training in molecular & cell biology, but I believe this to be the direct result of the instructor, Dr. Connie Boogaard, who is now retired.	1	5.9	5.9	100.0
Total	17	100.0	100.0	

Appendix J: Faculty Survey and Data

Faculty Survey

Every six years, each academic program at Ferris State University is evaluated via an Academic Program Review (APR) process. As part of this process, the Biotechnology program is asking faculty members for their perceptions of the students' abilities and the Biotechnology program. Please take just a few minutes to complete this short survey to assist us in our continuing efforts to maintain the educational quality of the Biotechnology program.

1. The mission of the biotechnology program (see mission statement below) is consistent with the Ferris State mission statement.
 - a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree

Biotechnology program mission statement: The biotechnology program will provide students a quality undergraduate education and a strong foundation in the principles of biology, chemistry, and the biomolecular sciences. A program graduate will have acquired advanced technical laboratory skills and an ability to communicate these skills effectively both orally and in writing. These skills will position the graduate for success in graduate and professional schools or in careers in the biotechnology industry.

2. The mission of the biotechnology program is consistent with the objectives and goals of the biology department as a whole.
 - a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
3. The biology faculty supports the biotechnology program.
 - a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
4. The Ferris State University administration supports the biotechnology program.
 - a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
5. The biotechnology program trains students in technical and management skills needed for a successful career in the biomolecular laboratory sciences.
 - a. Strongly agree

- b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
6. The biotechnology program offers sufficient opportunity for students to develop critical thinking and problem solving skills.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
7. The biotechnology program offers sufficient opportunity for students to develop good written communication skills.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
8. The biotechnology program offers sufficient opportunity for students to develop good oral communication skills.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
9. The biotechnology program offers sufficient opportunity for students to master the foundations of biochemistry, molecular biology, cell biology, and molecular genetics in the classroom and laboratory.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
10. The biotechnology curriculum challenges students academically.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
11. The biotechnology curriculum is relevant to the career goals of students.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree
12. The biotechnology program responds to the needs of the biotechnology and life sciences industries.
- a. Strongly agree
 - b. Somewhat agree

- c. Somewhat disagree
- d. Strongly disagree

13. What do you see as the strengths of the Biotechnology program?

14. What do you see as areas needing improvement in the Biotechnology program?

15. Please use this space for additional comments.

2016 Biotechnology APR Faculty Frequencies

Prepared by: Institutional Research & Testing, 08/16

Statistics

	N		Mean	Median	Std. Deviation
	Valid	Missing			
q1a Ferris State mission statement	6	0	4.00	4.00	.000
q1b objectives and goals of the biology department as a whole	6	0	4.00	4.00	.000
q2a has the support of the biology faculty	5	1	4.00	4.00	.000
q2b has the support of the Ferris State University administration	6	0	3.83	4.00	.408
q2c trains students in technical & mgmt skills	6	0	4.00	4.00	.000
q2d responds to the needs of the biotechnology and life sciences industries	6	0	3.83	4.00	.408
q3a develop critical thinking and problem solving skills	6	0	3.83	4.00	.408
q3b develop good written communication skills	6	0	3.50	3.50	.548
q3c develop good oral communication skills	6	0	3.67	4.00	.516
q3d master the foundations of biochemistry, molecular biology, cell biology & molecular genetics in the classroom & lab	6	0	3.83	4.00	.408
q4a challenges students academically	6	0	4.00	4.00	.000
q4b is relevant to the career goals of students	6	0	4.00	4.00	.000
q5 Strengths of Biotech program	6	0			
q6 Areas needing improvement	6	0			
q7 Additional comments	6	0			

Frequency Table

q1a Ferris State mission statement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	100.0	100.0	100.0

q1b objectives and goals of the biology department as a whole

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	100.0	100.0	100.0

q2a has the support of the biology faculty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	5	83.3	100.0	100.0
Missing	System	1	16.7		
Total		6	100.0		

q2b has the support of the Ferris State University administration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Agree	1	16.7	16.7	16.7
	Strongly Agree	5	83.3	83.3	100.0
	Total	6	100.0	100.0	

q2c trains students in technical & mgmt skills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	100.0	100.0	100.0

q2d responds to the needs of the biotechnology and life sciences industries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Agree	1	16.7	16.7	16.7
	Strongly Agree	5	83.3	83.3	100.0
	Total	6	100.0	100.0	

q3a develop critical thinking and problem solving skills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Agree	1	16.7	16.7	16.7
	Strongly Agree	5	83.3	83.3	100.0
	Total	6	100.0	100.0	

q3b develop good written communication skills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Agree	3	50.0	50.0	50.0
	Strongly Agree	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

q3c develop good oral communication skills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Agree	2	33.3	33.3	33.3
	Strongly Agree	4	66.7	66.7	100.0
	Total	6	100.0	100.0	

q3d master the foundations of biochemistry, molecular biology, cell biology & molecular genetics in the classroom & lab

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Agree	1	16.7	16.7	16.7
	Strongly Agree	5	83.3	83.3	100.0
	Total	6	100.0	100.0	

q4a challenges students academically

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	100.0	100.0	100.0

q4b is relevant to the career goals of students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	100.0	100.0	100.0

q5 Strengths of Biotech program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	16.7	16.7	16.7
	Biotech program offers rigorous training for students through compact, challenging courses.	1	16.7	16.7	33.3
	Outstanding faculty who are truly interested in their students.	1	16.7	16.7	50.0
	Strong faculty, students & lab skills. Hands on, some research, and small class sizes.	1	16.7	16.7	66.7
	The practical and hands-on nature of the program. This is also true of the internships the students perform.	1	16.7	16.7	83.3
	The program attracts good students who are interested in lab & related work. The program prepares students for successful careers in a profession that is needed. The faculty are dedicated & they are doing an excellent job of motivating & guiding the students to master the essential & related concepts, knowledges, procedures & skills needed for the grads to success in this profession. I've also been very impressed, that in a few cases, this program has accepted handicapped students with medical, physical, or emotional problems; & the faculty have worked closely with the disadvantaged students to help them master the coursework, the lab skills & the communicative skills needed to succeed & guided & helped them to reduce their handicap. Several of these disadvantaged students have gone on to find jobs, build a successful career & become successful & productive citizens.	1	16.7	16.7	100.0
Total	6	100.0	100.0		

q6 Areas needing improvement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	16.7	16.7	16.7
	A better Cell Biology course is needed. Also, some coverage of open science principles and reproducible research.	1	16.7	16.7	33.3
	Offering a master's degree in Biotech would be an improvement allowing students to obtain the level of training that many jobs in their industry require. Could be more research starting earlier in their program.	1	16.7	16.7	50.0
	Some required courses are offered in alternate years, forcing some students to take a course before they have a good background while others have the advantage of previous coursework. Also, students who encounter difficulty in one of these courses would have to wait 2 years to take that course again; most choose to change their major in order to graduate in a reasonable amount of time.	1	16.7	16.7	66.7
	Support from other faculty members from the Dept of Biological Sciences who are able to teach biotechnology courses & offer research opportunities in their labs for students. Review the current course offerings and make corresponding changes when they are needed.	1	16.7	16.7	83.3
	Work just a little closer with industries that hire biotech graduates to be sure the program is teaching all of the skills needed by the industry.	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

q7 Additional comments

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	50.0	50.0	50.0
	Please fully fund this program, their faculty and staff. They are an asset to the university. Consider building bridges to colleges of Pharmacy and Optometry.	1	16.7	16.7	66.7
	Some of the above I did not observe- and there was no option- so I put strongly agree - thus some answers may be skewed.	1	16.7	16.7	83.3
	The Ferris Biotech Program is doing a superb job and the faculty deserve a lot of credit for its success.	1	16.7	16.7	100.0
	Total	6	100.0	100.0	