FERRIS STATE UNIVERSITY
OFFICE OF THE PROVOST AND VICE PRESIDENT FOR ACADEMIC AFFAIRS

16 August 2016

RE: Review of APR Report for Mathematics Department
FROM: Kirk Weller, Department Head

I received the Mathematics APR report on August 15. Although I am listed as member of the Program Review Panel, I was, to the best of my recollection, never invited to a meeting, never asked to review any items or to offer input, and provided little or no information when I asked for updates.

My rating of departmental progress is based on personal observations and experiences and my review of the report.

Numerical Rating: 75 (out of 100)

Positive Developments:
Since the last APR review, the Department has made important curricular changes. This includes streamlining the Applied Mathematics major, development of a stand-alone program in Actuarial Science, and reorganization of the Applied Mathematics Computer Science Concentration.

The Applied Mathematics major originally consisted of six concentrations that shared a common required core. Enrollment in several of the concentrations was low. Most students elected the actuarial, general, and computer science concentrations. In the 2014 revision of the applied program, the Department discontinued the low-enrolled concentrations (industrial mathematics, operations research, and statistics) and strengthened the core. Given positive job prospects in actuarial science, the Department expanded that concentration to a four-year major that provides content preparation for the first two actuarial exams (the principal means for ascendency in the field), features two problem-solving/exam preparation courses, and offers sufficient flexibility for students to pursue one or more related minors offered by the College of Business.

Recent enrollment increases in computer science as well as continued demand for the Computer Science minor, principally from students in the College of Engineering Technology, inspired a revision of the Applied Mathematics Computer Science Concentration. The revision includes more robust course requirements, increased offerings, and new sequencing.

1201 S. State Street, CSS 310
Big Rapids, MI 49307-2747

Phone: (231) 591-2300

In addition to revised curricula, there has been increased involvement in student organizations. Kent started a chapter of Pi Mu Epsilon, the national honor society in mathematics. He also reactivated the Math and Actuarial Science Club. A group of students restarted the Ferris chapter of Gamma Iota Sigma.

Since the last APR review, the department hired five new faculty. Each person was either the first or second ranked candidate in the search process. The group includes one woman and one person from an underrepresented group. The group has made substantial contributions to the Department. David McClendon has guided 10 undergraduate projects, Victor Piercey has developed an innovative course sequence in quantitative literacy for the College of Business, Jerome Trouba has revised the operations research and modeling courses, Erin Militzer supported an undergraduate research project through a summer research grant, and Anil Venkatesh has guided student projects despite having just completed his first year. This group also provides significant leadership in their personal scholarship.

Challenges:
While the curricular structure has been substantially improved, challenges remain. Although not cited in the report, I think the Department is in a position to make the overall program more coherent and cohesive. As it stands right now, the program has no overarching themes or goals that tie together individual courses. Given the University's focus on job-readiness, it seems to me that the Department could improve student learning as well as increase the likelihood of attracting prospective students through more intentional efforts at pedagogical integration. For instance, in their math courses students could be asked to apply the programming skills they develop in their computer science courses to solve problems. When studying mathematical procedures that can be automated, instructors could have students work with symbolic and graphical software to execute those procedures. To reinforce information transfer, instructors might have students reflect on and communicate mathematical ideas in a collaborative environment. These instructional strands – programming, use of technology, active communication – are job-ready skills that could be made a part of every course.

The Department's committee structure provides a means for fostering conversations about curriculum and pedagogy. However, outside of the Scheduling Committee, departmental committees meet sporadically, and some never meet. This is a situation that needs to be addressed before the next review. If a committee never meets, the Department needs to consider whether that committee should be retained. If a committee is necessary but meets infrequently, the Department needs to find a way to encourage regular meetings.

The Department has made substantial progress on course assessment. As the report points out, Holly Price has led an effort to develop master course documents for each course. Each master course document includes learning outcomes, course content, and an assessment plan. Erin Militzer, in her second year with the Department, presented the idea, which she learned about in a prior position. Holly has subsequently worked with the department to implement this tool.

Progress on program assessment is a different matter. While the outcomes have been revised and some data gathered, there are no assessment tools linked to the process outcomes, the departmental exam doesn't provide much insight into issues regarding specific content, and, as yet, course outcomes have not been mapped to program outcomes.

With substantial revision of the curriculum and the addition of talented new faculty, the Department has the potential to make great strides forward. However, that potential will continue to be constrained until Department faculty develop a course scheduling model that places student learning and professional development ahead of personal convenience. I see the current model as one of the principal obstacles to growth. This is an issue which department faculty need to resolve during the next review cycle.

Academic Program Review Report

Actuarial Science (B.S.)

Applied Mathematics (B.S.)

Applied Mathematics/Computer Science Concentration (B.S.)

Pre-Engineering (A.S.)

Computer Science (Minor)

Mathematics (Minor)

Computer Science (Certificate)

2016

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Membership of the Program Review Panel

Chair:	Kent Sun
Administrative Representative:	Kirk Weller
Program Coordinator:	Kent Sun
Program Faculty:	Hengli Jiao
Program Faculty:	Holly Price
Individual with Special Interest in the Program:	Dharma Shetty
Faculty Member from Outside the College:	Chuck Drake

Special thanks to two non-panel members, James Nystrom and Amy Truong for their help with this review.

Program Name and History

The mathematics department offers majors in Actuarial Science (B.S.), Applied Mathematics (B.S.), Applied Mathematics with a Computer Science concentration (B.S.), and Pre-Engineering (A.S.).
The department also offers minors in computer science and mathematics as well as a certificate in computer science. The Applied Mathematics degree has been in existence since the late 1970's. The degree was revised in fall 1997 by specializing it into concentrations which include the computer science and actuarial concentrations. The actuarial science concentration was revised in fall 2014 into the actuarial science major.

The following acronyms will be used to denote the B.S. and A.S. programs:

ACSC = Bachelor of Science in Actuarial Science

AMTH = Bachelor of Science in Applied Mathematics

AMCS = Bachelor of Science in Applied Mathematics with Computer Science Concentration

PENG = Associates in Science in Pre-Engineering

Program Mission

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 services 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.

The math department has not adopted a separate mission statement for the department or its programs and is currently following Ferris's and the College of Arts and Sciences Mission Statements as can be shown from the surveys.

Program Goals

As a member of the College of Arts and Sciences, the department follows its goal which is to "enable students to develop the skills and abilities necessary to succeed in college and to function effectively and responsibly as reflective, ethical, and creative human beings." The math programs are focused on developing quantitative understanding skills which are necessary for students to become critical thinkers and therefore valuable workforce members and responsible citizens.

These goals are communicated directly or indirectly to students when they are in the classroom and in their student organizations. These goals are eternal.

What the program has done to help meet these goals is to find a way of measuring how much students have learned. The math department revised two of the three program outcomes and assessment and will look into revising the third one soon. The department is also in the process of revising course outcomes and assessments. Departmental division chairs within the department are responsible for the course revisions within their division while the math coordinators are responsible for the program outcomes and assessments. After assessment data comes in, it will be examined and it will be used to adjust our pedagogy and/or measuring instruments. It will be a feedback loop.

Curriculum

Program check sheets and syllabi are located in the appendix.

The math department has Departmental Divisions (committees) that oversee the quality, consistency, and content of the courses within the respective division. The divisions and the courses within each division are as follows:

ALGEBRA: MATH 010, 110, 115, 117
EDUCATION: MATH 218, 219, 317, 318, 319, 325, 326, 418, 438
SERVICE: MATH 116, 122, 126, 132, 216, 226
CORE: MATH 120, 130, 220, 230, 320
STATISTICS: MATH 251, 414, 416, 417
THEORETICAL: MATH 322, 324, 420, 430, 435

APPLIED: MATH 328, 330, 340, 360, 380, 440, 450, 451
COMPUTER SCIENCE: CPSC 130, 200, 300, 320, 326, 340

In addition, the department is in the process of creating and approving master course documents for all MATH and CPSC courses. Each course document will contain, among other things, the course's learning outcomes, course content, and an assessment plan. These master course documents are located in the appendix. The point of these documents is to help the department with consistency with the outcomes and how to access the courses.

The academic advisors are responsible for communicating all of the requirements, including general education, to the students. These advisors and the mathematical related registered student organizations (RSO) emphasize the importance of learning outside of the classroom with activities such as tutoring, being active in organizations, doing presentations or posters, going to conferences, getting internships, networking, in general, learning as much about their field as possible.

In 2012, the MATH B.A. was eliminated due to low enrollment. In addition, the credit hours in the calculus sequence MATH 220, 230, and 320 was changed from 5, 5, 3, to 4, 4, 4 respectively, primarily to match the credit hours assigned at other universities.

In 2014, there were several changes to the math programs. The changes and their rational are listed below.

1) The Applied Math concentrations in Operations Research, Industrial Mathematics, and Statistics were closed due to low enrollment.

2) The following courses were removed from the FSU catalog either due to low enrollment or not being needed in the revised programs:
   - MATH 310 (Linear Models in Statistics)
   - MATH 314 (Probability)
   - MATH 327 (Theory of Numbers)
   - MATH 380 (Applied Analysis)
   - MATH 435 (Introduction to Complex Variables)

3) The MATH minor was revised so that the above courses in 2) were no longer approved electives. In addition, MATH 325 (Modern Geometry) was removed from the approved electives because it was deemed inappropriate for the minor.

4) The following courses were modified:
   a) MATH 322 (Linear Algebra) increased the prerequisite from MATH 220 to 230 for additional mathematical maturity.
   b) MATH 328 (Discrete Structures) added CPSC 130 (Programming and Problem Solving) as a prerequisite since it was deemed that programming skills were a necessary prerequisite.

c) MATH 330 (Differential Equations) and MATH 340 (Numerical Analysis) were changed in the catalog from being offered every other year to every year.

d) MATH 414 (Mathematical Statistics I) added MATH 320 (Calculus III) as a prerequisite since it was deemed that a topic in 320 was a necessary prerequisite. The credit hours in MATH 414 was increased from 3 to 4 to cover additional topics.

e) MATH 416 (Mathematical Statistics II) increased credit hours from 3 to 4 to cover additional topics.

5) The following courses were added as requirements in the AMTH major because they were deemed to be necessary or were a hidden prerequisite.

a) CPSC 130 (Programming and Problem Solving) which is a prerequisite for CPSC 200 (Object Oriented Programming) which was already a prerequisite for the major.

b) MATH 324 (Fundamental Concepts in Mathematics)

6) The Applied Math concentration in Actuarial Science was modified into the ASCS major due to a perceived need to adjust the requirements to remain competitive in the job market. The following changes were done:

a) Creation and addition of MATH 417 (Problems Solving Strategies in Probability Theory)

b) Creation and addition of MATH 450 (Theory of Interest)

c) Creation and addition of MATH 451 (Problem Solving Strategies in Interest Theory)

d) Addition of CPSC 130 (Programming and Problem Solving)

e) Addition of MATH 330 (Differential Equations)

e) Addition of ECON 222 (Principles of Microeconomics)

In 2016, there were several changes made to the AMCS major and computer science minor. The changes to the AMCS major and their rational are listed below.

1) Adding MATH 330 (Differential Equations) as a core requirement to align with the AMTH and ACSC majors.

2) Moving CPSC 130 (Programming and Problem Solving), CPSC 200 (Object Oriented Programming), and MATH 340 (Numerical Analysis) from concentration requirements to core requirements to be consistent with the AMTH and ACSC majors.

3) Moving CPSC 330 (Parallel Programming) from a requirement to an elective since it was deemed important but not necessary

4) Adding MATH 360 (Operations Research) and MATH 440 (Mathematics Modeling) as electives since the applications aspect would work well with programming

5) Course caps for CPSC 200 (Object Oriented Programming), 300 (Data Structures and Algorithms), and 320 (Computer Simulation) were lowered to 25 for pedagogical reasons

The changes to the computer science minor are as follows:

1) Dropping CPSC 130 (Programming and Problem Solving) as a requirement.
This was a hidden requirement since it is a prerequisite for CPSC 200 (Object Oriented Programming) which is, and continues to be, a requirement for the minor.

2) Substituting CPSC 340 (Computer Organization) and MATH 328 (Discrete Structures) as requirements for two of the directed electives. The change is to make the minor more robust.

Assessment of Student Learning

The math department has recently given a strong effort to improve the way it assesses how well students are learning in courses and how well prepared they are upon graduation.
Part of the improvements has been in revising program outcomes and assessment plans for the AMTH and ACSC majors.

The new outcomes and assessment plans for the AMTH major are as follows:

Program Outcomes for Applied Mathematics (AMTH)

Upon completion of the four-year program in applied mathematics, a student will be able to:

1) Solve problems using calculus, linear algebra, statistics, differential equations, numerical analysis, and deductive reasoning.

2) Communicate mathematical ideas in both oral and written form.

3) Employ appropriate modeling, simulation tools and technology to assist in solving mathematical problems.

Assessment Plan

1) The students will take a departmental exam when entering the applied math program and again close to graduation. In addition, the student will give a mathematical presentation in a class, registered student organization, or conference. The use of modeling, simulation tools, and technology will be assessed in CPSC 200 (Object Oriented Programming). Analysis of the scores and presentation will indicate program or course modifications.

2) The department will maintain a database on relevant employment information of applied math graduates. Employers will be asked to comment on the quality of preparation of Ferris Applied Mathematics hires.

3) Exit interviews will be conducted with graduating seniors. The purpose of these interviews will be to determine students' level of satisfaction with the program.

Results

1) Eight graduating math students took the departmental exam. Note that the departmental exam tested each of the subjects listed in item 1 of the program outcomes. The intention was to compare growth in mathematical understanding from when they entered the program to graduation. Since the department gave the exam for the first time in April and May 2016, the department only has exit exam results. The average scores, ranked from high to low, for the core courses are given below:

Course	Title	Average % correct
MATH 220	Analytical Geometry-Calculus I	81
CPSC 200	Object Oriented Programming	72
MATH 251	Statistics for the Life Sciences	60
MATH 340	Numerical Analysis	60
MATH 320	Analytical Geometry-Calculus III	45
MATH 230	Analytical Geometry-Calculus II	40
MATH 324	Fundamental Concepts in Mathematics	40
MATH 330	Differential Equations	32
CPSC 130	Programming and Problem Solving	16
MATH 322	Linear Algebra	16

Given that only eight graduates took the exam, it's not unusual for averages to be greatly influenced by outliers, however the scores for CPSC 130 and MATH 322 are still very low. It may be that the problem is that the questions chosen for these exams are too narrow in focus. Another possible reason is that there is no incentive for the students to do well on the exam. The issue will be brought to the department for a discussion.

The department has not had an opportunity to assess their communication skills since this new assessment plan was put into place in late spring.

2) Because the number of responses was low, the surveys for the AMTH, ACSC, and AMCS were combined. In general, the employers for the students who entered the job market and the advisors for the students who started graduate school strongly agreed that the graduates had adequate mathematical training and knowledge, adequate oral and written communication skills. They also had a very positive impression of the math/computer science program at Ferris. However, the number of surveys is low. The comments to the surveys are in the "Perceptions of Overall Quality" section.

3) Comments have been collected since 2013 when the present applied math coordinator started his position. Almost all of the comments were of the nature that the students enjoyed the program.

Program Outcomes for Actuarial Science (ACSC)
Upon completion of the four-year program in applied mathematics, a student will be able to:

1) Solve problems using concepts of calculus, linear algebra, probability, interest theory, and statistics.

2) Apply actuarial mathematics to problems in insurance, finance, investment, and other business contexts.

3) Be prepared to pass actuarial science exams P and FM

4) Complete coursework satisfying the requirements for Validation by Educational Experience (VEE) credentials for Economics and Corporate Finance.

5) Learn the proper use of mathematical language, and acquire experience writing and presenting both logical mathematical arguments and quantitative analysis relevant to actuarial science applications.

Assessment Plan

1) Students will take the ETS (Educational Testing Services) major field exam in mathematics. Analysis of subspecialty results will indicate program or course modifications.

2) The department will monitor student performance on Exam P (Probability exam) and Exam FM (Financial Mathematics). Among the measures will be the percentage of actuarial science majors who progress to each exam and the pass rate of those who take each exam.

3) The department will maintain a database on relevant employment information of actuarial science graduates. Employers will be asked to comment on the quality of preparation of Ferris actuarial science hires.

4) Exit interviews will be conducted with graduating seniors. The purpose of these interviews will be to determine students' level of satisfaction with the program.

Results

1) Five actuarial students took the ETS (Educational Testing Service) Major Field Test in Mathematics. The overall scores ranged from 145 (25^{th} percentile) to 170 (78^{th} percentile) i.e. the scores were essentially within the second and third quartiles. This indicates that Ferris math graduates are competitive with other math graduates across the country when it comes to their mathematical knowledge. Subscores were not provided by ETS at this time due to too few students taking the exam but will be available in the future as more of graduates take the exam.

2) Of the students who were registered for MATH 414 in fall 2014, ten students took the P exam. Six of the ten students passed the exam for a pass rate of 60%. This compares well with the national pass rate in May 2015 of 47.1%.

Of the students who were registered for MATH 451 in spring 2016, six students took the FM exam. Four of the six students passed the exam for a pass rate of 67%. This compares well with the national pass rate in April 2016 of 44.6%.

3) See part 2) of the results for the AMTH program

4) Two of the comments complemented the department for keeping them on track for preparing them well. Dr. McClendon was thanked for preparing the student for taking the actuarial exam by making courses difficult. One student asked that the department to "keep developing the actuarial program, pay for first attempts on exams many universities do. Add in SAS, R, SQL, and Excel/VBA classes to the major."

The outcomes and assessment plans for the AMCS major are:

<u>Program Outcomes for Applied Mathematics Computer Science Concentration (AMCS)</u>
A graduate of this concentration will be able to solve a wide-variety of applied problems in fields related to computer science, including programming, software and hardware, data structures and parallel programming.

<u>Assessment Plan</u>
To assess our concentration outcomes, we will:
1) Administer comprehensive final exams in key courses in the concentration
2) Assign applied programs in select courses, including CPSC 200 (Object Oriented Programming) and CPSC 300 (Data Structures and Algorithms), testing mastery of key concepts
3) Evaluate student responses from terminal course questionnaires to be given in select courses

<u>Results</u>
The outcomes and assessment plan for this major probably needs to be updated.

1) The department administered the same exam given to the AMTH graduates to the AMCS graduates. See results for the AMTH program.

3) The graduates were surveyed before graduating. The AMCS seniors had the following two comments: they liked and wanted to thank the faculty and they also wanted a larger selection of computer science classes.

Program outcomes will be shared and discussed among the math faculty where, afterwards, adjustments may be made.

The department's TracDat results have been included in the appendix. Admittedly, the math department has rarely inputted data into TracDat. As a way of reversing the trend, Holly Price has been given the role of Assessment Coordinator with a quarter release time. The department has already discussed multiple times the urgent need for assessment and the ways to do it. Prof. Price suggested the creation of master course documents for each course where each document will contain the course's learning outcomes, content, and assessment plan. Late in spring 2016, the math department worked hard in creating many preliminary master course documents. Master course documents for MATH 010, 110, 115, and 414 have already been approved by the department for use. The plan is that the rest of the documents will be approved early this fall so that they can be used to assess courses beginning this fall.

Program Profile

Applications, Admits, and Enrolled*

Actuarial Science

	Applications	Admitted	Enrolled
2011	-	-	-
2012	-	-	-
2013	-	-	-
2014	7	7	5
2015	13	12	4

Applied Mathematics

	Applications	Admitted	Enrolled
2011	14	12	2
2012	10	6	1
2013	9	8	3
2014	27	25	5
2015	11	9	3

Applied Mathematics with Computer Science concentration

	Applications	Admitted	Enrolled
2011	7	5	3
2012	7	5	0
2013	9	7	2
2014	18	14	4
2015	43	38	10

Pre-Engineering

	Applications	Admitted	Enrolled
2011	17	10	3
2012	7	3	1
2013	3	2	2
2014	21	13	1
2015	10	8	2

Computer Science Certificate

	Applications	Admitted	Enrolled
2011	0	0	0
2012	1	0	0
2013	0	0	0
2014	0	0	0
2015	6	0	0

* No data available from IR&T for math or computer science minors

The number of applications for the ACSC major has grown in the last two years but since the program only started in 2014, it is too early to see a pattern. The number of applications for the AMTH major remains steady except for a blip in 2014. The largest increase is in the AMCS major which may be due to the current strong demand in computer science positions in the job market. The number of applications for PENG has fluctuated somewhat wildly but the number enrolled has been steady.

Likewise, the number of applicants enrolled has remained steady in the AMTH programs but there has been a large increase in the enrollment in the AMCS program.

On Campus and Total Enrollment Headcounts*

	Actuarial Sci.	Applied Math	Computer Sci.	Pre-Engr.	Math Minor	CS Minor	CS Certificate **
2011	0	18	7	5	8	6	0
2012	0	14	5	4	5	13	0
2013	0	11	9	3	6	13	0
2014	8	17	12	2	10	16	0
2015	22	13	19	5	11	11	0

***Count only done in the fall. Two in spring 2015 and two in spring 2016.*

* off-campus and on-line enrollment is zero

The total enrollment in AMTH and PENG has remained steady. The enrollment in AMCS has been increasing. The increasing numbers in the ACSC program is partly due to students voluntarily transferring from the now-closed Applied Mathematics Actuarial Science Concentration. The numbers in the minors remain steady.

Student Credit Hours

MATH Prefix Courses

	Summer	Fall	Spring	F & Sp
2011	879	9660	7347	17007
2012	697	9261	7177	16438
2013	814	8902	6693	15595
2014	878	8878	6532	15410

CPSC Prefix Courses

	Summer	Fall	Spring	F & Sp
2011	0	247	168	415
2012	0	152	228	380
2013	0	133	212	345
2014	0	220	232	452

MATH and CPSC Prefix Courses

	Summer	Fall	Spring	F & Sp
2011	879	9907	7515	17422
2012	697	9413	7405	16818
2013	814	9035	6905	15940
2014	878	9098	6764	15862

University

	Summer	Fall	Spring	F & Sp
2011	38713.0	167064.5	155866.0	322930.5
2012	35023.0	168457.0	157083.0	325540.0
2013	34135.5	167183.5	157302.0	324485.5
2014	33743.5	166453.0	157633.5	324086.5

The number of MATH prefix credits has fallen at an average rate of approximately 3.2% per year. University-wide, the number of credits taken has varied very little. One reason for the drop in math credits could be that the number of transfer credits has increased where students have taken math courses at a community college where the tuition is lower.

The number of CPSC prefix credits has increased at a rate of approximately 2.9% per year. This is consistent with the increase in the number of enrolled AMCS majors.

Productivity (Student Credit Hours/Full-Time Equated Faculty)

MATH Courses

	Summer	Fall	Spring	F & Sp
2011	220.30	338.10	297.90	633.94
2012	182.46	328.49	287.08	618.05
2013	195.67	354.68	309.05	667.09
2014	234.13	361.12	243.11	598.99

CPSC Courses

	Summer	Fall	Spring	F & Sp
2011	0	185.25	288.00	433.04
2012	0	218.09	228.00	447.86
2013	0	220.66	213.42	432.31
2014	0	315.65	232.00	532.71

MATH and CPSC Courses

	Summer	Fall	Spring	F & Sp
2011	220.30	331.29	292.79	627.01
2012	182.46	325.82	284.81	612.79
2013	195.67	351.53	304.86	659.34
2014	234.13	359.86	242.71	596.87

University Courses

	Summer	Fall	Spring	F & Sp
2011	150.30	232.91	221.49	454.51
2012	147.68	234.53	227.86	462.53
2013	141.26	238.18	230.82	469.11
2014	143.74	236.02	224.22	460.26

University-wide, productivity has remained steady. The productivity for the MATH courses has fallen approximately 5% from 2011 to 2014 but it is unclear as to whether this is a trend given the large increase in 2013. Note that even though the math department's productivity has slightly declined, it is still 30% higher (598.99/460.26 = 1.30) than the University's average. The productivity for the CPSC courses has increased 23% from 2011 to 2014 which may indicate a need to support the increasing demand.

Residency Status

Actuarial Science

	Resident	Nonresident
2011-2012	-	-
2012-2013	-	-
2013-2014	-	-
2014-2015	7	1
2015-2016	20	2

Applied Mathematics

	Resident	Nonresident
2011-2012	16	2
2012-2013	12	2
2013-2014	11	0
2014-2015	17	0
2015-2016	13	0

Applied Mathematics with Computer Science concentration

	Resident	Nonresident
2011-2012	6	1
2012-2013	4	1
2013-2014	9	0
2014-2015	12	0
2015-2016	19	0

Pre-Engineering

	Resident	Nonresident
2011-2012	5	0
2012-2013	4	0
2013-2014	3	0
2014-2015	2	0
2015-2016	5	0

The vast majority of the math students are from in-state. This would follow the University as a whole and is not expected to change due to our being a university that primarily caters to the local area.

Mean Age, GPA, and ACT of Enrolled Students

Actuarial Science

	Age	GPA	ACT
2011-2012	-	-	-
2012-2013	-	-	-
2013-2014	-	-	-
2014-2015	18	3.22	26.57
2015-2016	19	3.35	26.05

Applied Mathematics

	Age	GPA	ACT
2011-2012	21	2.96	23.31
2012-2013	21	3.01	26.21
2013-2014	20	3.17	25.36
2014-2015	21	3.29	25.80
2015-2016	21	3.50	26.15

Applied Mathematics with Computer Science concentration

	Age	GPA	ACT
2011-2012	21	3.27	24.67
2012-2013	27	3.38	26.50
2013-2014	22	3.19	27.20
2014-2015	20	3.44	25.10
2015-2016	20	3.19	25.35

Pre-Engineering

	Age	GPA	ACT
2011-2012	18	3.91	27.20
2012-2013	19	3.75	27.25
2013-2014	19	3.59	24.33
2014-2015	19	3.86	28.50
2015-2016	19	2.88	22.80

The mean age of the students indicates that the students are traditional student (an exception is 2012-2013 AMCS). It is difficult to tell whether there are trends due to the relatively small size of the programs. There does not seem to be a trend in mean GPAs or ACT scores except in AMTH where the mean GPAs may be increasing.

Gender

Actuarial Science

	Male	Female
2011-2012	-	-
2012-2013	-	-
2013-2014	-	-
2014-2015	4	4
2015-2016	12	10

Applied Mathematics

	Male	Female
2011-2012	8	10
2012-2013	6	8
2013-2014	5	6
2014-2015	9	8
2015-2016	8	5

Applied Mathematics with Computer Science concentration

	Male	Female
2011-2012	7	0
2012-2013	5	0
2013-2014	9	0
2014-2015	12	0
2015-2016	19	0

Pre-Engineering

	Male	Female
2011-2012	5	0
2012-2013	3	1
2013-2014	3	0
2014-2015	2	0
2015-2016	3	2

The female to male ratio is roughly 1 to 1 in ACSC and AMTH but much lower in AMCS and PENG. These low ratios in computer science and engineering are typical nationwide. There are efforts, nationwide, to increase the number of women in these fields.

Ethnicity

Actuarial Science

	Unknown	Black	Hispanic	Native	Asian	White	Hawaiian	Multi	Foreign
2011-2012	-	-	-	-	-	-	-	-	-
2012-2013	-	-	-	-	-	-	-	-	-
2013-2014	-	-	-	-	-	-	-	-	-
2014-2015	0	0	0	0	0	7	0	0	1
2015-2016	0	1	0	0	0	20	0	0	1

Applied Mathematics

	Unknown	Black	Hispanic	Native	Asian	White	Hawaiian	Multi	Foreign
2011-2012	2	1	0	0	0	14	0	0	1
2012-2013	1	0	0	0	0	13	0	0	0
2013-2014	1	0	1	0	0	8	0	1	0
2014-2015	0	0	0	0	1	16	0	0	0
2015-2016	1	0	0	0	1	11	0	0	0

Applied Mathematics with Computer Science concentration

	Unknown	Black	Hispanic	Native	Asian	White	Hawaiian	Multi	Foreign
2011-2012	0	0	0	0	0	6	0	0	1
2012-2013	0	0	0	0	0	4	0	0	1
2013-2014	0	0	0	0	0	9	0	0	0
2014-2015	0	0	1	0	0	11	0	0	0
2015-2016	0	0	2	0	0	17	0	0	0

Pre-Engineering

	Unknown	Black	Hispanic	Native	Asian	White	Hawaiian	Multi	Foreign
2011-2012	0	0	0	0	0	5	0	0	0
2012-2013	0	0	0	0	0	4	0	0	0
2013-2014	0	0	0	0	0	3	0	0	0
2014-2015	0	0	0	0	0	2	0	0	0
2015-2016	0	0	0	0	0	5	0	0	0

The programs are predominantly white. This is common in the STEM fields. National efforts are in place to try to increase the number of underrepresented minorities in these fields.

Full or Part-Time Student Status

Actuarial Science

	Full-Time	Part-Time
2011-2012	-	-
2012-2013	-	-
2013-2014	-	-
2014-2015	8	0
2015-2016	20	2

Applied Mathematics

	Full-Time	Part-Time
2011-2012	15	3
2012-2013	14	0
2013-2014	10	1
2014-2015	15	2
2015-2016	9	4

Applied Mathematics with Computer Science concentration

	Full-Time	Part-Time
2011-2012	7	0
2012-2013	3	2
2013-2014	8	1
2014-2015	11	1
2015-2016	17	2

Pre-Engineering

	Full-Time	Part-Time
2011-2012	5	0
2012-2013	4	0
2013-2014	3	0
2014-2015	2	0
2015-2016	5	0

The majority of the students are full-time. The few that the program coordinator is aware of are part-time due to work commitments. No action is needed.

First Year Retention

Actuarial Science

	N	First Year Retention %
2011-2012	-	-
2012-2013	-	-
2013-2014	-	-
2014-2015	5	80

Applied Mathematics

	N	First Year Retention %
2011-2012	2	50
2012-2013	1	100
2013-2014	3	100
2014-2015	3	67

Applied Mathematics with Computer Science concentration

	N	First Year Retention %
2011-2012	2	0
2012-2013	0	-
2013-2014	2	100
2014-2015	3	100

Pre-Engineering

	N	First Year Retention %
2011-2012	3	33
2012-2013	1	0
2013-2014	2	100
2014-2015	1	0

Due to the small numbers, the retention rates may greatly vary. No trend is discernable. No action is needed.

Program Graduates (On Campus and Total)*

Actuarial Science

	Program Graduates
2010-2011	-
2011-2012	-
2012-2013	-
2013-2014	-
2014-2015	-

Applied Mathematics

	Program Graduates
2010-2011	2
2011-2012	7
2012-2013	4
2013-2014	1
2014-2015	5

Applied Mathematics with Computer Science concentration

	Program Graduates
2010-2011	1
2011-2012	2
2012-2013	2
2013-2014	3
2014-2015	2

Pre-Engineering

	Program Graduates
2010-2011	0
2011-2012	0
2012-2013	0
2013-2014	0
2014-2015	0

Computer Science Certificate

	Program Graduates
2010-2011	0
2011-2012	0
2012-2013	0
2013-2014	0
2014-2015	4

* All graduates are on-campus

The number of graduates in the ACSC program is zero in those years reported since the program only started in fall 2014. However, there were four ACSC graduates in spring 2016. The number of graduates in AMTH and AMCS has been fairly consistent.

The number of graduates in PENG is zero because the latest trend is for students to transfer from that program to either AMTH, ACSC, or AMCS after their TIP aid runs out. Therefore, presently, PENG is a feeder program for the other math programs. The reason why student do this is that most if not all of the students in the PENG program are TIP (Tuition Incentive Program) students. TIP students are eligible for finance aid only if their primary major is an associate degree or a certificate and not a bachelor degree. The PENG students are generally attracted to mathematical fields. After they run out of TIP aid, most of the students work towards one of the B.S. degrees offered in the math department. The department has had PENG students transfer to engineering programs but the numbers are small.

Six Year Full-Time FTIAC Graduation Rate

*Actuarial Science**

Applied Mathematics

Entering Fall Term	N	Percent Graduated
2005	1	0
2007	2	50
2009	1	0
2010	2	50

Applied Mathematics with Computer Science Concentration

Entering Fall Term	N	Percent Graduated
2005	2	50
2007	1	100
2008	1	0
2009	1	0
2010	0	-

Pre-Engineering

Entering Fall Term	N	Percent Graduated
2005	1	0
2007	1	100
2008	2	50
2009	2	0
2010	2	50

* Program started in fall 2014

No trend is discernable due to the small numbers.

Graduate Average GPA and ACT

*Actuarial Science**

Applied Mathematics

	GPA	ACT
2010-2011	3.61	25.50
2011-2012	3.39	21.67
2012-2013	3.04	23.50
2013-2014	3.63	30.00
2014-2015	3.52	25.00

Applied Mathematics with Computer Science concentration

	GPA	ACT
2010-2011	3.42	28
2011-2012	3.88	27
2012-2013	3.46	26
2013-2014	3.31	26.5
2014-2015	3.32	27

*Pre-Engineering***

* Program started in fall 2014
** No data available

There is no discernable trend for the GPA or ACT.

State and National Examinations
The math department does not have data on state or national exams.

Program Value Beyond Productivity and Enrollment Numbers

The math program is an excellent value for the University beyond enrollment numbers.

Many of our courses in the program are service courses for other programs outside of the math department. Examples are Math 251, which is a requirement for some of the biology related majors, MATH 220, 230, 322, and 330 which are requirements in the Surveying Engineering program, MATH 220, 230, 320, 322, 324, 325, 420 which are requirements for the Mathematics Education program etc. In addition, faculty also teach general education courses.

Because our degrees are in demand because of their high starting salaries, our programs can be used as a recruiting tool for FTIACs, external transfers, and internal transfers who love mathematics.

Some of the other benefits are that the faculty give seminars that are open to the public, faculty publish math articles and give presentations which helps advertise Ferris State University, two of the faculty are advisors for registered student organizations and some of the faculty have helped at K-12 events. Finally math faculty have a knowledge of higher education and industry that is passed on to students.

Program Flexibility and Access

	Off-Campus Courses (Northern Michigan)	Concurrent Enrollment	Fully On-Line Course	Number of Students taking an Independent Study Course
Fall 2010	220			1
Spring 2011	230, 320		325, 420	
Summer 2011				1
Fall 2011	220, 322		314, 324	
Spring 2012	230, 320		325, 328	5
Summer 2012				
Fall 2012	320		322, 324	
Spring 2013	330		325, 420	
Summer 2013				
Fall 2013		230	324	6
Spring 2014		220, 320	325, 328	2
Summer 2014				2
Fall 2014		230	325	4
Spring 2015		220, 320		1
Summer 2015				
Fall 2015		230		2
Spring 2016		220, 320		4
Summer 2016			251	4

Most of the math and computer courses for the majors are only offered on the Big Rapids campus.

The calculus sequence is currently being offered as a concurrent enrollment at Rockford Public School.

The number of off-campus students declined to point that it was not efficient enough continue offering online courses. In addition, Math 324 and 325 were discontinued as online courses when modifications such as group work and activities were made to the courses for the math education program. These modifications made it difficult to offer the courses as online courses.

The courses being offered in Northern Michigan were at Traverse City West High School and the Manufacturing Technology Academy. The courses at the high school were discontinued when the high school switched to taking the courses from Northern Michigan Community College because of their lower tuition. The courses were discontinued at the Manufacturing Technology Academy when the enrollment was too low to offer the courses.

The math faculty have accommodated a handful of students in the last few years who wanted to go further in math by teaching MATH 397 or 497 undergraduate research in math. The courses that have been taught in either MATH 397 or 497 are as follows: Topology, Advanced Calculus II, Real analysis, Partial Differential Equations, Measure Theory, Machine Learning, Complex Analysis, Operations Research, Mathematical Biology, Applied Math Chemical Engineers, Fundamental Concepts in Math, Mathematical Biology 2, Computational Math, Parallel Programming Systems Administration, and College Geometry. As of now, faculty do not receive any compensation for teaching Math 397 or 497. A suggestion would be for the Dean's office to look into compensating faculty willing to do independent studies especially if upper-level courses are closed or not offered due to low or anticipated low enrollment respectively.

Visibility and Distinctiveness

Our main competitors in the western Michigan area are Central Michigan University (CMU), Grand Valley State University (GVSU), and Western Michigan University (WMU).

Our B.S. majors are unique and compare well with our nearby competitors.

Based upon feedback from students, having strong computer skills is something that companies look for in potential employees in the technical field. Our AMTH degree requires a minimum of two computer science courses and students are encouraged to take more computer courses with options of earning a computer science certificate or minor. WMU only requires a single computer science class in their mathematics major with applied mathematics option. CMU does not have a computer science course requirement in their applied mathematics program. GVSU does not have an applied mathematics program.

Actuarial scientists move up the career ladder in part by passing actuarial exams. It is an advantage for actuarial students to have passed one or two of these exams when applying for actuarial positions. Our Actuarial Science Program has a preparatory course for the Probability exam and a preparatory course for the Financial Mathematics. CMU and WMU offer a preparatory course for the Probability exam but not for the Financial Mathematics exam. GVSU does not have an actuarial science degree.

Because the AMCS degree has a stronger mathematical core than traditional computer science degrees, graduates are not limited to coding but have the ability to do more theoretical work in computer science. For instance, we require the three more upper-level math courses than GVSU and CMU does and four more upper-level math courses than WMU does. Anecdotally, some of the AMCS alumni have commented to me that their colleagues at work have problems with basic math skills that they handle easily.

In addition, Ferris strongly emphasizes teaching with less research requirements than at the other institutions.

Our main competitor in western Michigan for the Pre-Engineering degree is Grand Rapids Community College (GRCC). GRCC requires a second semester in chemistry, a statics course and a dynamics course. We require two computer science courses while GRCC does not require any. In addition, statics and dynamics are courses usually taken in civil, mechanical, or aerospace engineering. Our curriculum doesn't presuppose that the student will enter these specific engineering fields however we do assume that being able to program is an important skill in all engineering fields.

A premier applied math program is at Stony Brook University. According to a USA today ranked its program 3rd in the nation after Brown University and Harvard University. This program has many research opportunities for its undergraduates and has access to supercomputers for research. Its faculty members are researchers. Stony Brook is a member of the Association of American Universities. Ferris' applied math department would need similar resources and change its focus from teaching to research to math this premier program.

Demand

The following information is from the Occupational Outlook Handbook from the U.S. Bureau of Labor website www.bls.gov:

	2015 Median Annual Pay	Job Growth Outlook 2014-24	Typical entry-level education
Actuary	$97,070	18% (Much faster than average)	Bachelor's degree
Mathematicians (Includes Applied Mathematicians)	$111,110	21% (Much faster than average)	Master's degree
Computer Programmer*	$79,530	(-8%) (Decline)	Bachelor's degree
Software Developer*	$100,690	17% (Much faster than average)	Bachelor's degree
Aerospace Engineer	$107,830	(-2%) (Decline)	Bachelor's degree
Biomedical Engineer	$86,220	23% (Much faster than average)	Bachelor's degree
Chemical Engineer	$97,360	2% (Slower than average)	Bachelor's degree
Civil Engineer	$82,220	8% (As fast as average)	Bachelor's degree
Computer Hardware Engineer	$111,730	3% (Slower than average)	Bachelor's degree
Electrical and Electronics Engineer	$95,230	0% (Little or no change)	Bachelor's degree
Environmental Engineer	$84,560	12% (Faster than average)	Bachelor's degree
Industrial Engineer	$83,470	1% (Little or no change)	Bachelor's degree
Materials Engineer	$91,310	1% (Little or no change)	Bachelor's degree
Mechanical Engineer	$83,590	5% (As fast as average)	Bachelor's degree
Petroleum Engineer	$129,990	10% (Faster than average)	Bachelor's degree

*The distinction between the two computer careers is, according to the Occupational Outlook Handbook, as follows:

Computer programmers write and test code that allows computer applications and software programs to function properly. They turn the program designs created by software developers and engineers into instructions that a computer can follow.

Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or another device. Others develop the underlying systems that run the devices or that control networks.

In general, the salaries are high and the demand is increasing for all of the majors. The one major exception is that the demand for computer programmers is predicted to decrease due to jobs being farmed out overseas. However, the demand for software developers is predicted to grow at a fast rate.

Note that in the surveys, students and alumni would recommend our program to other people. Companies have contacted faculty such as Jim Nystrom asking if there are students that we can recommend for their job openings. Actuarial companies are inviting us to open houses to network with future graduates.

Student Achievement

When the last math department academic program review was done in 2009 there were no registered student organizations (RSO) connected with the math department. Since then, the following three math RSO's have been reactivated or started: The Math and Actuarial Science Club (Reactivated 2009), Pi Mu Epsilon (Started 2012), and Gamma Iota Sigma (Reactivated 2013).

The RSOs were activated to help build community among the math students and to promote research and professionalism.

The Math and Actuarial Science Club currently has approximately 15 active members. The number of members has been roughly the same for the last few years. The club has been very active with activities such math movie nights, game nights, Pi Day Celebration, Chicago trips, math alumni dinners, and t-shirt fund raising. The club provides free weekly math tutoring sessions in FLITE available to all Ferris students and has done other service activities such as volunteering for Mathcounts and The Big Event.

Pi Mu Epsilon (PME) is the National Math Honor Society. It was founded in 1914 at Syracuse University and Ferris is one of the 12 chapters in Michigan. According to its website, it is "dedicated to the promotion of mathematics and recognition of students who successfully pursue mathematical understanding." Membership is by invitation only. The criteria for membership at Ferris is that the student be an AMTH or ACSC major with a minimum 3.5 math GPA, a minimum 3.3 overall GPA, and have taken at least two upper level Ferris math courses. Currently, there are nine members. The number of members since 2012 has ranged from eight to thirteen. Members have given presentations at department seminars and posters at the College of Arts and Sciences Student Awards Ceremonies. At the beginning of this month, two members gave a joint presentation at the PME Annual Conference in Columbus, OH. The presentations and posters are not necessarily of original research but may be, according to the PME website, an "exploration of a topic beyond which is traditionally covered in an undergraduate class."

Gamma Iota Sigma (GIS) is the International Risk Management, Insurance and Actuarial Science Collegiate Fraternity. According to its website, "the purpose of this fraternity is to promote, encourage, and sustain student interest in insurance, risk management, and actuarial science as professions; to encourage the high moral and scholastic attainments of its members; and to facilitate interaction of educational institutions and industry through networking and by fostering research activities, scholarship, and improved public relations." The RSO has been growing since its reactivation and presently has approximately 20 members. They regularly go to the GIS annual conferences as well as bring in speakers to talk about the actuarial science and insurance fields. The members are also active in community service by visiting a local nursing home and by participating in Rake and Run, The Big Event, and Relay for Life.
In addition to the activities above, the math department sponsors students who want to participate in the Math Autumn Take Home (MATH) Challenge on the first Saturday of November. At the competition, teams of students from Universities and Colleges from across the state, and several from out of state, work on a ten-problem math exam for three hours at their respective school. Last year, the math department sponsored three teams. The teams placed, respectably, in the third quartile.

Another activity that the math department sponsors each year, depending on the proximity of the test center, is the Lower Michigan Math Competition. The format of this test is similar to the MATH Challenge except that all students take the test at a common location.
Last year, the Ferris team placed 9th out of 25 teams.

Finally, the math department also sponsors transportation for students to go to the Michigan Undergraduate Mathematics Conference. This conference is special in that the talks are mostly given by undergraduate students for undergraduate students.

None of the current executive board members of Student Government are math majors. It is not known how many math majors are in the general assembly or were executive board or general assembly members of Student Government in the last few years.

Approximately a quarter of the math majors are presently in the Honors Program.

It is not known what the average number of hours a typical math student is employed. However the math coordinator does not know of any of his math advisees working an unusually high number of hours. Some of the math students work as tutors in the Academic Support Center or as SLA (Structured Learning Assistance) Facilitators. However, these students are usually academically strong students who can handle the workload as well as the classwork. The University recommendations is that students should work no more than 10 hour per week.

Some of the presentations and posters that students have done in the last five years are as follows:

- Pi: The Constant that Never Ends (*Megan Kuk)*
- Interesting e (*Timothy Reynhout)*
- Multi-Agent Random Walk (*Timothy Reynhout)*
- Redrawing Escher's Circle Limit (*Nathaniel Rademacher)*
- Fourier Series and Engineering (*Noah Reyburn)*
- Effectiveness of Online Homework (*Elizabeth Gowell)*
- Finding Near Optimal Hamiltonian Circuits with Ant Colony Algorithms (*Benjamin Piering)*
- Fibonacci: It's as Easy as 1, 1, 2, 3 (*Megan Kuk and Marilyn Markel)*
- Moneyball (*Nate Dykstra and Brooke Hanson)*
- Discrete Dynamical Systems and Chaos (*Steven Crow and Tyler George)*
- Online Versus Traditional Math Courses (*Liz Schroeder)*
- The Raindrop Function: Looks can be Deceiving (*Mickelle Bradley and Jaime Mullen)*
- E-ergodicity and Speedups of Dynamical Systems (*Tyler George)*
- Databall (*Nathan Klingel)*
- Can Basketball Players Actually be "On Fire"? (*Andrew Elenbaas)*
- The Risk on Procrastination (*Kaylene Candela)*
- A Sex-Age, Density-Dependent Matrix Model for White-Tailed Deer Populations Incorporating Annual Harvest *(Allie Wicklund)*

Some of the more notable awards are as follows:

Jason Vander Laan: 2015 Division II Conference Commissioners Association "National Scholar-Athlete of the Year", Harlon Hill Trophy (2014, 2015)
Tyler George: Best Symposium Award (Honors Program 2014)
Megan Kuk: Torchbearer Award (2013)

Employability of Graduates

Of the 46 graduates in the math department in the last six or seven years, 24 (52%) of the alumni were contacted and surveyed.

	n	Employed full time in field of study within one year of graduation	Employed full time outside field of study within one year of graduation	Accepted to Graduate/Professional school within one year of graduation	Unemployed	Median Annual Salary for 2013 and later graduates
ACSC	3	2	1	0	0	$50,000 to $59,000
AMCS	11	8	0	2	1*	$50,000 to $59,000
AMTH	10	3	1	6	0	$50,000 to $59,000

* Graduated 12/15. Started job search after graduation.

All but one of the graduates are either employed full time or in graduate school. Those who are employed and gave us their salary range have a median salary of $50,000 to $59,000 (coincidentally, the same starting salary for a Ph.D. faculty member in the math department) and were able to find employment within one year of graduation. Of the employed graduates, 87% (13/15) found employment within their field of study. From this data, the indication is that the math graduates can quickly find good paying jobs within their fields.

Alumni, advisory board members, and employer surveys indicate that the math department is adequately preparing graduates for careers within their field of study.

Faculty Composition and Engagement

In the 2015/2016 academic year, there were 16 tenured or tenure-line (T/TL) faculty. The T/TL faculty are as follows:

Tenured and Tenured-Line Faculty	Highest Degree Earned	Tenure Status	Rank	Average Semester Load (FTE) for F13 - S16*
Brigance, Sandra	Ph.D.	Tenured	Associate	1.04
Burns, David	Ph.D.	Tenured	Full	1.00
Dekker, Michael	Ph.D.	Tenured	Full	1.00

Jiao, Hengli	Ph.D.	Tenured	Full	1.22
McClendon, David	Ph.D.	Tenure-Line	Associate	1.06
Militzer Benander, Erin	Ph.D.	Tenure-Line	Assistant	1.00
Mukundan, Lakshmi	Ph.D.	Tenured	Full	1.00
Nystrom, James	Ph.D.	Tenured	Associate	1.00
Piercey, Victor	Ph.D.	Tenure-Line	Associate	1.00
Price, Holly	M.S.	Tenured	Associate	1.00
Siddikov, Bakhodirzhon	Ph.D.	Tenured	Full	1.00
Sun, Kent	Ph.D.	Tenured	Full	1.00
Tripp, Joseph	Ph.D.	Tenured	Full	1.00
Trouba, Jerome	Ph.D.	Tenured	Associate	1.10
Venkatesh, Anil	Ph.D.	Tenure-Line	Assistant	1.00
Walker, Shaw	M.S.	Tenured	Associate	1.00

* These were the only semesters where the data was available from the math office

Many of the T/TL faculty have the ability to teach many of the courses within the programs. As a result, the department has a scheduling committee that determines the method for determining who teaches which course. Therefore, it is difficult to answer how many T/TL faculty teach within the program. For instance, a faculty member may choose to teach only non-programmatic math/computer courses one semester and then programmatic math/computer courses then next semester. However, all of the T/TL faculty are capable of teaching most of the math courses within the programs.

The majority of the courses offered in the math department are non-programmatic courses (e.g. general education courses, math education courses, other service courses). As a result, the majority of a T/TL faculty's load is typically non-programmatic courses. For example, in academic year 2015-2016, of the 409 credits taught by the T-TL faculty, only 117 of the credits (28.6%) were programmatic credits.

Most of the programmatic math/computer science courses are taught face-to-face in Big Rapids. None of the T/TL faculty have taught the majority of their loads online except for Sandra Brigance who in fall 2014 and fall 2015 taught the majority of her loads online.

Kent Sun has a ¼ release time for the math coordinator position since fall 2013.

Holly Price and Jerome Trouba each have a ¼ release time for special projects since spring 2016.

In the 2015/2016 academic year, there were 13 adjunct faculty. The adjunct faculty are as follows:

Adjunct Faculty	Highest Degree Earned	Average Semester Load (FTE) for F13 - S16 *
Baxter, Mary	B.S.	1.13
Cavner Williams, Lauren	M.S.	1.17
Foos, Scott	M.E.	0.51
Forbes, Laura	M.Ed.	1.01
Gibson, Megan	Ph.D.	1.05
Hanna, Harvey	M.A.	1.20
Main, Kenneth	M.A.	0.63
McCullen, Matthew	M.A.	0.70
Milligan, Cynthia	M.S.	1.15
Routley, Alice	M.Ed.	0.38
Shetty, Dharma	M.A.	1.03
Walling, Jean	M.S.	1.12
Watters, JB	M.Ed.	0.33

* These were the only semesters where the data was available from the math office

Harvey Hanna and Scott Foos have taught courses within the program. The courses that they teach are MATH 251(Statistics for the Life Sciences) and 220 (Calculus I) and, on one occasion, MATH 328 (Discrete Mathematics). In fall 2013 and spring 2014, adjuncts taught CPSC 130 and CPSC 330 because these were computer courses that very few of the faculty could teach. Jim Nystrom, who usually teaches the courses, was on sabbatical that year.

Most of the adjunct faculty teach the majority of their load on the Big Rapids campus. The exception would be Megan Gibson who teaches Elementary Education and Math Education courses in Lansing and Grand Rapids. Harvey Hanna taught a few courses within the programs (perhaps not the majority of his load) in Northern Michigan but the last semester that occurred was Spring, 2013.

None of the adjunct faculty have taught the majority of their load fully online since at least fall 2010.

At this time, the number of faculty members is sufficient to cover our courses. However, the percentage of adjunct faculty (13/29 = 45%) seems to be very high. In addition, student comments and advisory board comments suggest that additional upper-level and computer courses be offered. A suggestion would be to convert some of the adjunct faculty lines to tenure-lines.

The curriculum vitae of all of the T/TL and adjunct faculty are included in the appendix.

Service

A sampling of the service of the T/TL faculty

Sandra Brigance
- Departmental
  - Elementary Education Departmental Committee Chair
  - Mathematics Department Assessment Committee
  - Mathematics Department Scheduling Committee
  - Mathematics Secondary Teaching and Revision Task Committee
  - Mathematics Department Assessment Coordinator
  - Tenure Committee
- University
  - 27th Annual Equity within the Classroom Conference Planning Committee
  - Academic Affairs Assessment Committee

David Burns
- Department
  - Theoretical Departmental Division
  - Applied Math Departmental Division
- University
  - Professional Development Committee
  - Library/Historical/Archival Committee

Michael Dekker
- Department
  - Scheduling Committee Chair
  - Tenure Committee
  - Two presentations at the Mathematics Department Colloquium
  - Faculty representative at the Lower Michigan Math Competition
- College
  - Special Grants Committee Chair

Hengli Jiao
- Department
  - Tenure Committee
  - Applied Division Committee
  - Core Course Committee
- College
  - College Academic Standards and Policies
  - Academic Program Review committee
  - College Promotion Committee
- University
  - Academic Senate

David McClendon

Department

Hiring Committee, Mathematics tenure-track search.
Assessment Committee
Core and Theoretical Division Committee
Conducted workshop on the use of Mathematica
Organized and conducted summer study sessions for the Actuarial Exams
Committee member in developing new actuarial science major

College

Planning Committee

University

Academic Affairs Assessment Committee
Professional Development Committee
Risk Management and Insurance Program Advisory Board
Faculty Advisor, Gamma Iota Sigma

Erin Militzer

Department

Faculty Search Committee
Scheduling Committee
Assessment Committee
Algebra Committee
General Education Committee

College

Diversity Committee

Lakshmi Mukundan

Department

Tenure Committee
Faculty Search Committee
Planning Committee
Development Committee
Mathematics Education Committee
Service Committee
Applied Committee

James Nystrom

Department

Computer Science Division Chair
Scheduling committee
Department head search committee

College

Academic Standards and Policies Chair

University

Member of the faculty senate
Arts and Lectures Committee
Academic Policy and Standards

Victor Piercey
- Department
  - Actuarial Science Program Modifications
  - Organizer of Mathematics Department Reading Group on Inquiry-Based Learning
  - Faculty Mentor
  - Search Committee Member
- College
  - Dean Search Committee
- University
  - Quantitative Literacy Subcommittee of the General Education Committee
  - Curriculum Proposal creator and Champion of MATH 109 and MATH 114
  - Member of the faculty senate

Holly Price
- Department
  - Tenure Committee
  - Math Coordinator: Curriculum Review
  - Assessment committee
  - Faculty search committee
  - Actuarial Science Program Development committee
  - Algebra Division committee

Bahodir Siddikov
- Department
  - Tenure Committee
  - Applied Mathematics Development committee
  - Curriculum committee
  - Core Division committee
  - Applied Division committee
- College
  - Dean Search committee
  - General Education committee
  - Graduate Education committee

Kent Sun
- Department
  - Tenure Committee
  - Faculty search committee
  - Faculty Advisor, Math and Actuarial Science Club
  - Faculty Advisor, Pi Mu Epsilon
- College
  - Promotion and Merit
- University
  - Student Fees and Tuition
  - Academic Senate

Joseph Tripp
- Department
  - Tenure Committee
  - Scheduling Committee
  - Faculty Search Committee
  - General Education Task Force
- College
  - Sabbatical Leave Committee
- University
  - General Education Quantitative Literacy Subcommittee
  - Student Assessment Instrument Task Force
  - Professional Development Committee
  - Honors Outstanding Scholar Committee

Jerome Trouba
- Department
  - Tenure Committee
  - Faculty Search Committee
  - Faculty Development Committee
  - Planning Committee
- College
  - Assessment Committee
- University
  - Faculty Research Committee

Anil Venkatesh
- Department
  - Faculty representative at the Lower Michigan Math Competition
  - Scheduling Committee
  - Core Department Division
- College
  - MAA Michigan Section Meeting Planning Committee
- University
  - Super STEM Saturday Committee
  - Academic Interdisciplinary Task Force

Shaw Walker
- Department
  - Pre-Engineering AA Program Review Committee
  - Sabbatical Leave Committee
  - Computer Science Division
  - Technology Service Course Division
  - Statistics Division
  - Applied Mathematics Division
  - Tenure Committee

Research and Grants
Some of the research of the T/TL faculty

Sandra Brigance published her dissertation and presented it at a conference. She has published an article on leadership in online learning in higher education.

David Burns reviewed over a hundred articles on graph theory.

Michael Dekker has directed multiple independent studies.

Hengli Jiao published presented his work on Nonlinear Wave Equations at Michigan State.
He has also won two grants from the Office of Academic Senate, a Dean's Initiative Grant, and a half million dollar grant from the National Science Foundation.

David McClendon published two articles on Ergodic theory and dynamical systems.
He has also directed 10 student research projects and independent studies.

Erin Militzer published a textbook on basic statistics. She also has a paper accepted and submitted another one for review.

James Nystrom gave a presentation on brain emulations in Stockholm, Sweden. He has also directed two student research projects.

Victor Piercey has published seven papers on teaching and has given many presentations.

Bahodir Siddikov has published a paper on the use of cubic splines for modeling heat capacity.
He has given talks at several worldwide conferences.

Kent Sun directed six student presentations on the history of math and sports data analytics.

Joseph Tripp has done research on the role of students' dispositions in the way they engage with mathematics problem solving. He has also given four presentations on teaching scholarship.

Jerome Trouba was a coauthor on a paper on instructional delivery. He has also given a presentation on modeling and one on the comparison of student learning using various homework systems. He has directed multiple independent studies.

Anil Venkatesh has given several presentations. He has also worked with several students on independent studies.

Continuing Education
Sandra Brigance earned her Ph.D. in Education in 2014
Erin Militzer completed training as a certified Math Intel Instructor

Stakeholder Perception

IDEA and SAI forms are not supplied here due to privacy concerns. The forms are available for the department head to review. He has the option of addressing them in private with the relevant faculty member.

The students, alumni, advisory board, and, employers and advisors were surveyed. The surveys' details and comments are in the "Perceptions of Overall Quality" section.

As part of the survey, they were asked to comment about their perceptions of the program. The students were satisfied with the teaching in the program, strongly agreed that advising was effective, and were also satisfied with their mathematical education at Ferris. A number of students wrote in the comment section that they were happy/unhappy with certain faculty but in general most students were satisfied with the level of teaching and advising.

The alumni were satisfied with their math/computer science education, agreed that the academic rigor of the courses adequately prepared them for work/graduate school and would recommend the Ferris Math program to prospective students. They made fewer comments about particular faculty than the students did.

The advisory board said that the academic rigor of the math/computer courses adequately prepared students for the job market and that they have a positive impression of graduates of the math program. They did not comment specifically about particular instructors.

The employee supervisors and graduate advisors said that the academic rigor of the Ferris math/computer courses has adequately prepared students for work/graduate school and that they have a positive impression of the math/computer program at Ferris. They did not comment specifically about particular instructors.

The results of this APR (including the results of the surveys) will be discussed at a future meeting of the math faculty as a way of addressing the evaluations' trends.

Program Policies and Procedures

The department allocates faculty development money the beginning of each fall. As a way of promoting engagement, additional funding is allocated if a faculty intends to present at a conference. In addition, if a faculty returns unused funds then that money is first redistributed to the faculty who need more funds to cover their costs of attending a conference etc. The department also has discretionary funds that the department head may use to promote improvements in pedagogy and research.

The math department has a very long tradition of not limiting which faculty and how many faculty may serve on a committee, if possible; basically, any T/TL faculty may serve on any committee. One exception is the tenure committee which is composed of only tenured members. If the number of members on a committee is limited e.g. college-wide committees, then the interested members will usually negotiate a friendly compromise or if that fails, the department will conduct a secret ballot. Usually at the August or September department meeting, committee assignments are filled fairly easily.

Student advising within the programs is done by faculty who regularly teach in the programs. The program coordinator coordinates the efforts with the other advisors. For instance, the actuarial science advisors and the coordinator met with Michele Albright, Coordinator of Career Services, to discuss which minors would best compliment the Actuarial Science major. Based upon the student surveys, students strongly agree that their academic advisors do an effective job of advising them.

The most recent minimum qualifications for a tenure-line faculty within the program is a Ph.D. (by time of appointment) in pure or applied mathematics, or a Ph.D. in mathematics education with master's equivalent mathematics background and evidence of potential for effective and innovative instructional practice.

Holly Price and Shaw Walker, who are now tenured faculty members, were hired when the requirements did not include a Ph.D. The job market has changed to the point where our recent searches indicate that a sufficient number of candidates with Ph.D.'s is available to increase the educational requirement to a Ph.D.

The minimum qualifications for an adjunct position is a B.S. in Mathematics Education or Mathematics related degree and experience teaching high school or college math.

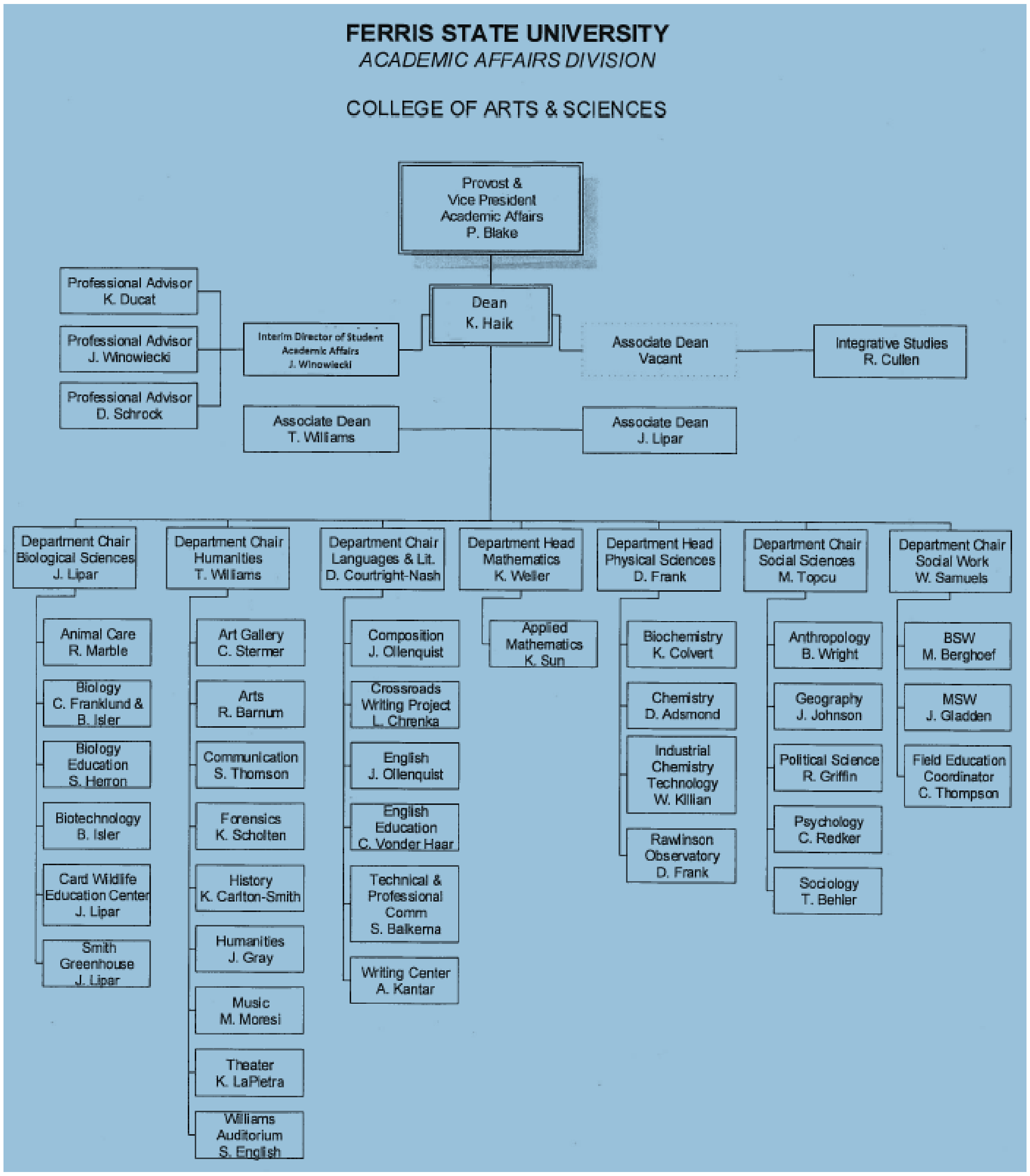
Hiring and Retention

The department has been able to hire and retain quality T/TL faculty members. As can be seen from their curricula vitae, faculty are active in teaching, research, and committee work. In addition, faculty members are regularly promoted or earn merit. No tenured-track faculty has been denied tenure in at least 16 years. In general, the math department does not have a problem in retaining faculty members with only two T/TL faculty voluntarily leaving in the last 16 years.

The department has been able to hire and retain quality adjuncts for most positions. An exception is the difficulty in finding a quality adjunct to teach computer science courses.

Program Administration and Support

The organization chart is given below



The administrative positions with program oversight are:

Name	Title	Highest Degree Earned	Experience in Position
Dr. James Nystrom	Program Coordinator (Computer Conc.)	Ph.D.	8 Years
Dr. Kent Sun	Program Coordinator (Applied Mathematics)	Ph.D.	3 Years
Dr. Kirk Weller	Department Head	Ph.D.	8 Years
Dr. Kristi Haik	Dean	Ph.D.	1 Month

James Nystrom, because of his expertise in computer science, advises the AMCS majors, minors, and certificate students. In addition, he does their degree audits and graduation clearances.

Kent Sun has 0.25 FTE release time. He oversees all of the students in the math department and has coordinator duties such as doing the degree audits and graduation clearances of the other students as well as doing this review.

Kirk Weller has been assigned as the Interim Associate Provost as well as the math department head for the last two academic years. From fall 2013 to spring 2014, he was assigned as the Interim Department Head for the Social Science Department as well as the math department head.

Because of Dr. Weller's additional duties, he divides his time between the math department and the provost's office. When he is not in his math office, he can be reached by phone or email. In addition, he attends the monthly departmental meetings where departmental issues are discussed.

Communications between the department and administration can be improved. For instance, for the last three years the department did not know until faculty week, what the department head's duties would be for the academic year. Unfortunately, this year may be the same story again. In addition, there was no discussion or solicitation of the faculty's opinion on what administrative structure would work best for the department.

The support staff position is:

Name	Title
Ms. Amy Truong	Department Secretary

Ms. Truong performs her duties efficiently and with alacrity and laser precision.

Support Services

In general, the support services have been…supportive. The program coordinator has not heard of any major concerns from the faculty. The services listed below are used more often by the math faculty.

Faculty Center for Teaching and Learning

Faculty have attended their workshops on teaching and learning, attained help with blackboard, and received Timme Travel grants as part of their services.

Academic Support Center
Math tutors are in high demand at the center. Math faculty are often asked to recommend tutors and SLA (Structured Learning Assistance) facilitators. Math faculty also send students to the Center to be tutored.

Institutional Research and Testing
Faculty send students to IRT for CLEP or COMPASS testing. The program coordinator has gone there for advice on doing the surveys for this academic program review.

Educational Counseling and Disability Service
Faculty regularly work with the Service to help students with disabilities.

Facilities and Equipment

Classroom Facilities	
Lecture Rooms	STR 108, 120, 137, 202, 204, 206 and 212. SCI 136
Computer Labs	STR 105 and 109. ASC 1008

Faculty members have computers with black and white printers in their offices and computers in the classrooms. Faculty also have access to shared network drives and color printers. Ferris has a high speed network and wired connections in all of the offices and classrooms as well as wireless networking in most of the outdoor spaces, academic spaces, and office locations.

Lecture rooms are sufficient. Access to computer lab space, however, is limited and has been a problem in the recent past when a second section of CPSC 200 was needed but additional computer lab space was not available to hold the second section at a different time.

Another issue is the increasing difficulty in finding space for adjunct faculty. Presently, adjunct faculty are in cubicles and sharing office space. However, with the addition of faculty in growing programs such as social work, there is increasing pressure to find office space for future faculty.

According to Dr. James Nystrom, "The Applied Mathematics Computer Science (AMCS) program utilizes the personal computer labs at Ferris State University (FSU) and occasionally also uses a Linux server for course instruction and programming assignments. The use of Linux servers in the AMCS program adds to the educational experience of FSU students, as Linux is a preferred platform for application development in industry and academia. Thus, if possible, it is advantageous to the AMCS program that a Linux server is available in the department for instruction.

The Linux servers used by the AMCS program over the past 8 years have all been rented servers (or cloud servers), and each has been administered by either a department faculty member or by a student. As will become clear, it is not the server cost itself which is problematic, but the organization and/or cost of the system administration. To wit, the server cost is either a one-time expense, or a small monthly charge in the case of a cloud server. However, to have continued access to a Linux server, the department needs to have the system administrator role institutionalized in some manner. Options for system administration of a Linux server include: (1) Contracting with FSU IT services for part-time system administration, (2) Contracting with an outside agency for system administration, (3) Continue to use students with the necessary skills for system administration, or (4) Assign a faculty/staff member the duties of system administration.

Continued issues associated with the system administration of a Linux server has recently led to changes in the AMCS curriculum such that a main course which uses such a server, CPSC 330 - Parallel Programming, has been dropped from the required courses of the degree, and is now set as an elective."

We are asking for funding to purchase a server and to hire a service to maintain it as a long term solution.

Perceptions of Overall Quality

Student Perceptions

Students with a math major were asked the following questions:

Please answer each question as follows:
Q1) The available computer hardware/software is adequate for my learning
Q2) My academic advisor does an effective job of advising me
Q3) Opportunities are provided for related work or internship experiences
Q4) Opportunities are provided for research experiences
Q5) I am satisfied with the teaching in the program
Q6) I am satisfied with my mathematics education at Ferris State University

They were asked to respond with:
Strongly agree (5)
Agree (4)
Neutral (3)
Disagree (2)
Strongly disagree (1)

Twenty-nine students responded. The median scores were as follows:

n	Q1	Q2	Q3	Q4	Q5	Q6
29	4	5	3	3	4	4

The following open-ended questions were asked:

Q7) Are there any courses that you would like to take but are not offered?

Q8) What was the most positive experience that you had as a student in the math department?
Q9) What was the most negative experience that you had as a student in the math department?
Q10) Do you have any concerns about the math program and any suggestions for improvement?
Q11) Please feel free to make any comments, good or bad, concerning your major and/or the department.

The responses for question 7 were as follows:

1) No

2) I would like more stats classes, like bringing back probability and so on

3) Haven't got to that level of math yet. When I do get to higher level courses, maybe just more options

4) R or SAS programming languages. Classes for C and/or MFE exams? Some kind of class explaining how we will apply actuarial concepts in a future job

5) CPSC 150 programming in basic. CPSC 244 Science Programming with Fortran Scientific computing

6) Not that I can think of

7) Operations research beyond the intro class. Biomathematics

8) I've heard that the "R" programming language is quite useful for actuarial science, but is somewhat neglected here, so if that's true, I'd love to learn more about it.

9) Robotics. Coding Animations

10) I have only take one math class so far, but so far I like the course

11) A course that teaches students the basics of computers so that when something goes wrong you can fix it without going to TAC. It's good to have a full/all around knowledge of the machine you are working with. A coding class I'd like to learn all about coding and decoding in detail

12) No

13) Some of the higher level course weren't offer while I was here (and capable to take them) but other than that, no.

14) No

15) Something to do with mathematics and sports

16) No

17) Advanced differential equations, partial diff equations, topology (a real course-not an independent Study), complex analysis, Fourier Transforms

18) Algorithms, Programming language concepts, more CPSC-related courses in general

19) Advance Calculus…It is offered but I do not have the proper pre-requisites until the next time it is offered. I'll be graduated by then.

20) I haven't found one yet

21) Math and finance, more complex than business classes

22) I'm sure there are, but I haven't done much looking around. Higher levels of some classes that are already taught (like differential equations) would be nice

23) Not currently, no

The only semi-consistent response seems to be more programming courses.

The responses for question 8 were as follows:

1) Math 251. Stats for Life sciences. It was a really hard class but the teacher gave homework that helped show what I needed to work on. All materials were present and it was up to me to access them to better my work.

2) Meeting Dr. Militzer

3) My advisors are always very helpful and informative. I also feel that they actually want to do the job that they're doing

4) I had calculus 2 with prof. McClendon and he is one of the best professors I've had in the math department yet. His teaching methods go really in depth which is what is needed for tougher up math classes

5) Helpfulness of Professors

6) All McClendon classes. Most professors are very approachable and flexible

7) Having a professor that was willing to spend over an hour outside of class to help fix a problem bug. It is important to have professors who genuinely care and want to help as much as possible.

8) Calculus 2 (Math 230). At the beginning of the F14 semester. I thought I wouldn't pass the class ~6 weeks in. I had an 'aha' moment and absolutely loved math after that. I still do even with math 320 on my plate

9) Close bonding with faculty and classmates, challenging yet rewarding classes

10) Any class with Dr. Tripp! He's an awesome professor, he cares so much, and I learned a lot in his classes

11) Learning C++ w/Professor Walker

12) How helpful my advisor is in picking my classes!

13) My advisor is awesome and so helpful and I love the math club and Pi Mu Epsilon. I feel more involved and like being surrounded by people who have the same/similar goals as me.

14) Seeing that our professors truly care about us and are willing to help us whenever it's needed

15) I would say all of the staff is dedicated to trying to make the student understand/interested in Math

16) I have had many great teachers including: Dr. Trouba, Dr. Nystrom, Mr. Walker and Dr. Dekker. In my experience, most professors have been very interested in students' learning

17) I am definitely able to challenge myself

18) Teacher help when needed

19) Classes with McClendon

20) Math 322 in spring 2014. Was taught in a very engaging way. Very challenging yet fair. Pushed me to achieve more as a student

21) Dr. McClendon Calculus II

22) Figuring out how to use a computer program in a lower level class that is similar to what I will be using in the future

23) When I was helped to switch into the department. Everyone was extremely helpful

24) Chicago was fun and being part of the professional math fraternities

25) I enjoyed independent studies because I was able to go at my own pace and be challenged.

26) I've only been in the program for a year and I like the fact that the professors and advisors will give you their opinions on the subject matter.

27) Does not apply

The responses for question 9 were as follows:

1) Calculus 3. The practice tests were really easy then you got blind-sided on the tests with material that was poorly covered in class.

2) My advisor makes me not want to be in math

3) Getting into math classes during registration time was quite difficult. These are my major classes! So, not taking them at a specific time could hurt me in the long run. But there is no help for getting into these classes.

4) I honestly feel like most of the math professors are not adequate enough. Some of them really don't care for their students. I feel like they should be helping us pass, not watching us fail

5) Have not had really any

6) Some classes are pretty disorganized when taught by a professor for the first time. I feel like certain classes didn't teach me as much as they were intended to. CPSC 130 at 8 a.m.

7) Put into a course that I was not ready for. Proved to be very challenging.

8) I had to withdraw from Math 322. It was hard to do, but I simply couldn't learn the material from the teacher that was teaching the class at the time

9) Lack of further research, lack of accommodation for disability

10) I'm currently taking calculus II with ..., and he's a great guy, but I feel like he's focused towards engineering majors, which is fine most of the time but I'm fearful I'm not learning as much because of it.

11) Withdrawing…

12) I just feel there are not a lot of math classes or choices for classes.

13) Being forced to take a class with a bad professor. When a class is only offered every other year I have no choice on when or with who I take the class with. Then I also worry if I'll get to register in time to get some classes

14) Taking 2 courses from…. It was hell. Had to teach myself everything

15) I would say that sometimes, I felt that some professor[s] only had one teaching style which was not compatible with all learners and it made things more difficult

16) When I took CPSC 130, Dr. Nystrom was on sabbatical so we had a different professor. I feel like I learned nothing of value in the entire 15 weeks.

17) Calculus 3.

18) Ferris very strict in requirements for applied math. Can't mix w/classical at all. Some courses feel like grad school while others feel like 13th grade (depending on the instructor). Also feel that courses not offered at all or infrequently. Ferris argues it is university but acts like community college.

19) Math 340, I was looking forward to applications which is what we are taught but the homework consist of a lot of theory which isn't always covered.

20) CPSC 130 (fall 2013) and Math 328 (spring 2014). Both classes were extremely unorganized and very poorly taught, learned very little in those courses.

21) Calculus III … or online linear algebra

22) There's so much information to learn in one semester that sometimes it all seems rushed and I don't completely understand it.

23) I haven't had a negative experience yet. Only been in the program one semester

24) I feel as if it could be more challenging for some professors, felt as if some courses were not hard enough

25) Boredom in classes that seemed slowed down for underperforming students. There are some classes where attendance became a challenge because I felt there were better ways that I could spend my time

26) I don't like the limited availability of courses. I have to graduate a year later due to courses not offered every semester

27) Does not apply

Many of the comments for questions 8 and 9 consist of how individual courses are run. Faculty have different teaching philosophies which means that courses will differ. It is expected that not all courses will be liked or disliked by all students.

The responses for question 10 were as follows:

1) Tell us what we can do with it other than teach, research for the government or actuarial science

2) I think that since our program is so rigorous, there should be a tutor in the tutoring center specifically for us. (Most tutors in the center don't do our level math)

3) Classes are not offered often enough (some are like every few semesters)

4) Evaluate professors and their teaching methods? I feel like a lot goes unnoticed while many students struggle. Also, more available tutors for the higher up classes?

5) Not really

6) Find/offer more internship/job opportunities. Same for research opportunities. If they exist, make them more advertised.

7) Several required math courses are only offered once a year or once every other year. They should be offered more frequently.

8) Not really

9) Add a Biomathematics program

10) I expressed most of my concern under #9 and #11

11) Varying demographics among students

12) A lot of math classes are every day. I feel like some of my classes might clash, I don't have any choices for other math classes

13) Review the teacher more often. There are some that are so bad you don't learn from them. Just because they know the material doesn't mean they can teach it.

14) Hire professors that can relate to student learning and can help us succeed.

15) Required classes should be offered more often

16) More upper level math courses

17) A suggestion would be to maybe have SLA classes for higher level math courses.

18) Please see other comments. No hardware available. No software use in classes like math lab/mathematics. Advises me but not in how much information they passes to help w/roadblocks. Think that related work or internship experiences are lacking, outside of going to auto owners.

19) Lack of framework for actuarial science. Students are left on their own to find out about how the exams work and when to take them. There is no focus on insurance related information that is necessary background information for actuaries. It would be great to see a programming class specifically for actuarial science, perhaps SAS

20) Few choices for CPSC electives. Infrequent and often unreliable course offerings, often time conflicts between courses, which is problematic when some are only offered fall/spring only or every two years. One notable complaint is that math 320 was not offered 3 consecutive semesters

21) Do not ever, ever, ever have a 300+ math class taught online only. I didn't learn a single thing from Linear Algebra even though my grade indicates I did

22) I think that there should be some way for students to connect with people in the same major not just in the math department

23) I know scheduling is difficult but I am worried about 8 am calculus class.

24) If we use maple in a course, have more computers to use it

25) I would suggest classes for the actuarial students to learn either SAS or R or both and maybe projects using them

26) I would like to see each course offered every semester.

27) Nope

The responses for question 11 were as follows:

1) My advisor hasn't really talked to me about my major of about what life will be like in the career.

2) I also think we need some advantage when it comes to picking major classes

3) I understand that math is not an easy subject to go into, but I feel like the department and its professors should be more on the same basis with how they're going about things. Like some classes allow calculators while others don't, some classes allow equation sheets during tests and others don't. It's difficult and frustrating to keep going back and forth when math is already difficult to begin with. Personally, I know I'm capable of doing these classes but it's just hard when info is thrown at me and the professors expect me to understand it right away. Everyone has their own pace.

4) Good job adding 450 and 451. Not to sound greedy, but it would be nice to have classes for C and/or MFE exams.

5) High level computer science courses need to be offered more frequently. Would be nice to have a few more computer science courses offered. The whole department has brilliant professors who want to push and see the students succeed.

6) All of the professors I've had so far (barring math 322) have gone above and beyond to ensure student fully understand the material. They're all so passionate both about mathematics and teaching. The amount of knowledge they have is staggering as well. If I ever teach students in a college setting (which I would like to do) I hope I can live up to them.

7) Most of my professors were wonderful to work with, but there's one that I feel does not maintain the same rapport with students, cannot teach at the undergraduate level properly, and should get help from other professors to learn to teach at the appropriate level...

8) I'm super concerned about having to take a class with …. I've heard lots of concerning stories.

9) Why does Ferris not have a major for strict Computer Science/software Engineering?

10) Maybe more options for internships for math majors. Don't feel like math majors are common here.

11) I feel like I have no wiggle room with my class. If I want to graduate on time I have to take every class when it is offered and I can't take some other classes that interest me without falling behind.

12) Overall, I am very pleased with my math education from Ferris State

13) Please see other comments. No research experiences are advertised at least. Feel different teachers have different levels of rigor (way different). Can have a hard time if not had hard professor in earlier courses. Feel that department not serious about education of students. Courses are only offered every other year and many gateway classes only offered once per year, i.e. CPSC 200, math 340, etc.

14) The CPSC professors are very good, with the exception of when Dr. Nystrom was on sabbatical. Strongest section of department.

15) I think the math department needs to check in on some of their teachers. Professor … is the worst experience with math I have ever had.

16) Again, I don't like it when a class feels dumbed down because getting an A doesn't really mean much. It saddens me when I can call my math classes my "easy A's." I commend the professors who do try to challenge their students (even if it might scare the students at times) because I know they do it because they care.

17) None

Several student asks for courses to be offered more often. The department has had problems offering more courses for a number of years now due to budget cutback with the Dean's office which resulted in pressure to cancel or not offer classes with traditionally low enrollments. Whether this can be relaxed in the future in a question for the Dean's office.

Alumni Perceptions

The alumni were asked the following questions about how well the program prepared them for either work or graduate school.

Please indicate how strongly you agree with the following:
Q1) My degree prepared me for work/graduate school
Q2) I have adequate oral communication skills for work/graduate school
Q3) I have adequate written communication skills for work/graduate school
Q4) I have adequate modeling, simulation, and technical skills for work/graduate school
Q5) I have adequate critical thinking skills for work/graduate school
Q6) The academic rigor of the Ferris math/computer courses adequately prepared me for work/graduate school
Q7) Overall, I am satisfied with the mathematics/computer science education I received at Ferris
Q8) I would recommend the Ferris Math program to prospective students

They were asked to respond with:
Strongly agree (4)
Agree (3)
Disagree (2)
Strongly disagree (1)

The median scores were as follows:

	n	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
ACSC	**3**	4	4	4	3	4	4	4	4
AMCS	**11**	3	3	3	3	4	4	3	3
AMTH	**10**	3	3	3	3	4	3	3	3

Based upon the median scores, the alumni perception is that the math program adequately prepared the graduates for a career or graduate school.

The following open-ended questions were asked:

Q9) Are there any changes to the program that you would recommend?
Q10) Please use this space to elaborate on any of the answers that you were provided or to make additional comments.

The responses for question 9 were as follows:

1) Add real analysis I and II

2) Need to toughen courses to prepare for graduate school.

3) Math and CS courses should go into more depth. Be more detailed.

4) Offer more courses in CS

5) Need better instructors i.e. more knowledgeable and demanding. Someone with a natural interest and a passion for the subject. Some instructors got by being friendly. 70% of the time.

6) Look into Math biology direction. Need more courses like topology, advanced Linear Algebra, 2nd semester advanced calculus.

7) Maybe emphasize theorems. Take an analysis course.

8) The overall structure is well thought out.

9) Not really. Require more CS.

10) [Add an] applied statistic courses. Big data.

11) More projects in math/computer aspects

12) Finance minor encouraged. Helped with FM test. Finance 322, 323 helpful before taking financial math

13) Recommend long term group projects

14) Want secondary course on hardware and a course on operating systems. Should require differential equations. Look to the future of computing not just the past.

15) Like to have Computer science degree but math degree doesn't hurt.

16) Should have a few more computer science classes to take

17) Include a few more math/computer courses. Make them required. Getting computer lab for computer science students will attract students.

18) Have a database course.

Several responses to question 9 expressed a desire that more courses be offered. As mentioned in the response to the student survey, the department has had problems offering more courses due to requirements in course efficiency.

The responses for question 10 were as follows:

1) Abstract Algebra and Linear Algebra good but missing topics

2) Profs. Dekker, Trouba, McCullough made things interesting. GRE was tough.

3) Combine programs with other colleges. Take more electives

4) Parking is terrible

5) Was prepared for profession school because she did group work in the program. Maybe add a business class. Different components to run a business.

6) I enjoyed some of the opportunities in tutoring. It helped to explain things.

7) CPSC course with Fortran was obsolete. Would like to have seen Latex and Math lab workshops. Loved time at Ferris. Living the dream.

8) Learning how to apply the math to my field. More my stumbling block.

9) Actuarial science is a wide subject. Haven't done Math part in work yet. So far has done lots of coding.

10) Some of the classes were difficult and not related to my work but when I passed them it gave me confidence to handle the future.

11) Computer science is more valuable than the department puts on it. Having more knowledge would be nice. Recommending students take it earlier and more and more valuable.

12) Computer science classes did a lot of the same thing. Didn't expand into different areas. Just did C++ and Visual Studio. Database and SQL is asked for.

13) Wanted more variety of courses to choose from. Loved going through program. Enjoyed all of the classes. Dr. Nystrom was an outstanding professor and advisor for me. His classes were ridiculously hard sometimes, but those were classes that I took the most away from. .. Anyways that type of education is what drove me to want to learn and grow as a student (and as a person).

The comments didn’t seem to have a common suggestion.

Advisory Board Perceptions

Advisory board members were asked the following questions:

Please answer each question as follows:

Q1) The math programs are in line with the mission, vision, and core values of Ferris State University (See the next page for the mission, vision, and core values of the University).

Q2) The math programs are in line with the mission, purpose, and goals of the College of Arts and Sciences (See the last page for the mission, purpose, and goals of the College of Arts and Sciences).

Q3) Graduates of the Mathematics program at Ferris have adequate mathematical training/knowledge.

Q4) Graduates of the Mathematics program at Ferris have adequate communication skills

Q5) Graduates of the Mathematics program at Ferris have adequate modeling, simulation, and technical skills

Q6) Graduates of the Mathematics program at Ferris have adequate critical thinking skills.

Q7) The academic rigor of the math/cpsc courses adequately prepare students in the job market

Q8) Graduates of the Mathematics program at Ferris are taking the kinds of classes that are necessary for the job market

Q9) The department does a good job in assessing how well the programs are doing

Q10) Overall, I have a positive impression of graduates of the mathematics program at Ferris

They were asked to respond with:

Strongly agree (5)
Agree (4)
Neutral (3)
Disagree (2)
Strongly disagree (1)

The five board members responded. The median scores were as follows:

n	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
5	4	5	5	4	4	5	4	4	4	4

Our non-Ferris faculty board members and their open-ended comments are as follows:

Steven Butt, Ph.D. – Chair of the Department of Industrial and Entrepreneurial Engineering and Engineering Management, Western Michigan University (WMU). Director’s Award for Teaching Excellence, University of Auckland 1994. Tau Beta Pi, Outstanding Faculty Award, WMU College of Engineering and Applied Sciences 2000.

Steve Butt's comments: I have been impressed with graduates from the mathematics program. They are prepared for graduate education as well as industry. I have had the opportunity to mentor Ferris graduates at both the Masters and Ph.D. level in engineering and the students have performed at the top of their peer groups. In the pre-engineering program, I would encourage students to take probability and upper level statistics courses for those students interested in industrial, civil and chemical engineering. These courses could be taken as electives.

Megan Kuk M.S. – Ph.D. candidate in the Department of Industrial and Entrepreneurial Engineering and Engineering Management, Western Michigan University. Outstanding Mathematics Student, Ferris State University 2013.

Megan Kuk's comments: none given

Jennifer McGinnis FSA, MAA, CERA – Senior Vice President, Swiss Re America Holding Corporation. Elected board member of the Society of Actuaries. Outstanding Mathematics Student, Ferris State University 2004.

Jennifer McGinnis's comments: The program is strengthened through the inclusion of the Computer Science Certificate and Pre-engineering AS, as well as raising Actuarial Science from a concentration to a major. It is not immediately clear to me why Applied Math and Computer Science majors should be excluded from earning the Computer Science certificate*, as it could boost their resumes as they look for work/internships while completing their studies. If these exclusions remain, it seems that the Actuarial Science majors should also be excluded for consistency.

*note: I spoke with Jennifer and explained to her that the Applied Math majors may earn a computer science certificate but that a Applied Math Computer Science concentration major may not since the certificates requirements is a subset of the major's requirements.

Kavan Story– Supervisor at Occupational Research and Assessment. Big Rapids, MI. Outstanding Mathematics Graduate, Ferris State University 2007.

Kavan Story's comments: Overall I believe it is a great program. Some classes have been added since I was a student which I think helps make it better from when I originally went through. I have gone through the Computer Science Major, Minor, and Certificate.
There have been some changes since I was a student and you have added some classes that I think improve the program a lot.

One class I took that I would recommend trying to incorporate somehow is CPSP 390 Comp Number Theory and Cryptology. I took this with Dr. Lee who is no longer there but I think having some form of cryptology course is very useful in the computer industry since security is so important.

I am not sure what course it is but some of the former students I have worked with talked about a Python course that was offered. We do mostly web-based programming where I work and a lot of systems are moving to the Internet so that is a useful language to know. Also, the guys that I have worked with that took that course produced very clean code. I am not sure if that is because of the strict syntax forced by Python or because they were more organized than the ones that did not take it. Another two courses I found very useful were Operations Research (Math 360) and Computer Simulation (CPSC 320). Both course focused on critical thinking to solve problems that are easy to relate to the real world. Another recommendation I have to try to get students to learn about computers and not just coding. We have had a few students come in that do not know much about the computer itself. In a small business environment, I have to work as the IT person and the programmer so having knowledge about hardware and the configuration of a computer (or server) is very useful. Many of the programmers I know and have dealt with also are the system administrators unless they are working in very large companies.

In addition to Mr. Story being an AMCS graduate, several AMCS students had internships under him so he is familiar with the AMCS program. In response to his questions, Python is the language used in CPSC 130, a required course for all of the math majors, Operations research (MATH 360) and Computer Simulations have been offered only one every two years due to low enrollments, and it is possible to advise students to take electives in computer hardware.

Alan Tucker, Ph.D. – Distinguished Teaching Professor, Department Applied Mathematics, Stony Brook University. Editor-in-chief, Applied Mathematics Letters. Editorial Board, Mathematical and Computer Modeling. Fellow, American Mathematical Society, 2011. Fellow, American Association for the Advancement of Science, 2009. PBS/Annenberg Foundation Award for Innovative Programs using Technology, 1997. Trevor Evans Award, Mathematical Association of America, 1996. Meritorious Service Award, Mathematical Association of America, 2005. National Award for Distinguished Teaching of Mathematics, Mathematics Association of America, 1994.
Author of the following books: Applied Combinatorics, A Unified Introduction to Linear Algebra: Models, Methods, and Theory, Linear Algebra, Functioning in the Real World, Principles and Practices of Mathematics.

Alan Tucker's comments: Math 416 needs to be replaced by a data analysis course. The stats for Life Science Course is inadequate preparation for the market place. Further the Actuarial Science Major needs a (regression/time series based) data analysis course for the VEE Applied Statistics requirement

It may be possible to replace MATH 416 with a data analysis course and to add a regression/time series course since those courses would be a requirement for only the ACSC students. The Statistics for Life Sciences Course (MATH 251) is more difficult to modify due to the time needed to emphasis the biological applications.

Employee Supervisor and Graduate Advisor Perceptions

Employee supervisors and Graduate advisor were asked the following questions about how well the program prepared their Ferris graduate for either work or graduate school.

Please indicate how strongly you agree with the following questions. Each question begins with: Graduates of the Mathematics program at Ferris:
Q1) Have adequate mathematical training/knowledge
Q2) Have adequate oral communication skills
Q3) Have adequate written communication skills
Q4) Have adequate modeling, simulation, and technical skills
Q5) Have adequate critical thinking skills

Please indicate how strongly you agree with the following:
Q6) The academic rigor of the Ferris math/computer courses has adequately prepared students for work/graduate school
Q7) I have a positive impression of the math/computer program at Ferris

They were asked to respond with:
Strongly agree (4)
Agree (3)
Disagree (2)
Strongly disagree (1)

Fourteen supervisors and advisors were surveyed. Due to the relatively small number of surveys, the major categories were combined. The median scores were as follows:

n	Q1	Q2	Q3	Q4	Q5	Q6	Q7
14	4	4	4	3	3.5	3.5	4

Based upon the median scores, the supervisor/advisor perception is that the math program adequately prepared the graduates for work or graduate school.

The following open-ended questions were asked:

Q8) In what area(s) was the graduate best prepared for the job?
Q9) In what area(s) was the graduate least prepared for the job?
Q10) Would you hire another of our math graduates? Please elaborate on why/why not.
Q11) Please use this space to elaborate on any of the answers that you were provided or to make additional comments.

The responses are grouped by supervisor/advisor:

1) A8) Analytical, motivated, patience, ability to restate his answers.
   A9) Recent hire. No negatives yet
   A10) Hired 1 of 4 interviewees. Against hiring more due to others being low quality.
   A11) Disappointed with other Ferris interviewees but happy with Ferris hire

2) A8) Ability to pass exams. Math background
   A9) Not having an internship
   A10) Would consider it because the student hired passed [actuarial] exams so our program was good enough to prepare him.
   A11) None. Did not supervise student for long

3) A8) Ability to deal with software and software development. Learning new things.
   A9) Being a coordinator. Being able to manage and coordinate people
   A10) Yes, the student is a good troubleshooter
   A11) He never seemed to struggle with math

4) A8) No comment
   A9) No comment
   A10) Yes, at this point. There's no reason not to.
   A11) Pretty happy with his preparedness. Nothing to complain about.

5) A8) Theoretical computer science side
   A9) Embedded systems
   A10) Sure
   A11) First Ferris hire. He's only been here for a short time but impressed with education so far.

6) A8) Math methods, techniques, and programming
   A9) Applications of math
   A10) Yes, well-prepared, great attitude, hard-working, dependable
   A11) Matt didn't take courses with him. Pleased with him. Lucky to have him.

7) A8) Algebra
   A9) Analysis. He struggled with it.
   A10) Yes, he has a good foundation and was willing to work hard. Good attitude
   A11) Would have done better in graduate school if he was stronger in analysis.

8) A8) Critical Thinking
   A9) No comment
   A10) Yes
   A11) No comment

9) A8) Has the technical skills to understand details
A9) Database skills
A10) Yes. His performance is fine.
A11) Got a good developer

10) A8) Problem solving and being proactive
A9) Communications can be improved
A10) Yes
A11) Great employee. Hard working.

11) A8) Course background
A9) Not prepared for the workload
A10) Yes
A11) Has a good math background. He wouldn't have expected us to teach him Mathematica or Sage.

12) A8) Trouble-shooting, Problem solving, diagnosis
A9) No comment
A10) Yes, as long as the person has Blake's work ethics and adaptability
A11) Pleased with his education.

13) A8) Integration into team and teamwork got him the job
A9) In the specific technology. Oracle software.
A10) Yes, because of critical thinking and organized thinking skills.
A11) His team told him to hire the Ferris applicant. He's stepping into database administration role. Self-motivated. Produces results.

14) A8) Strong in every aspect
A9) No comment
A10) Yes.
A11) Knows the student well

Almost all of the employers/advisors would consider hiring/advising future Ferris Math Graduates. The other responses didn't have a strong concensus.

Faculty Perceptions

Tenure and tenure-track faculty were asked the following questions:

Please answer each question as follows:
Q1) The math programs are in line with the mission, vision, and core values of Ferris State University (See the next page for the mission, vision, and core values of the University).
Q2) The math programs are in line with the mission, purpose, and goals of the College of Arts and Sciences (See the last page for the mission, purpose, and goals of the College of Arts and Sciences).

Q3) Adequate funds are provided by the University to support our programs.
Q4) The math advisors do an effective job in advising students
Q5) The academic rigor of the math/computer courses adequately prepares students in the job market
Q6) Computer hardware is adequate for the needs of the programs.
Q7) The department does a good job in assessing how well the programs are doing
Q8) The department does a good job in anticipating future needs of our programs.

They were asked to respond with:

Strongly agree (5)
Agree (4)
Neutral (3)
Disagree (2)
Strongly disagree (1)
No opinion (0)

Of the sixteen faculty members, 88% (14/16) responded. The median scores were as follows:

n	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
14	4	4	3.5	4	4	4	3	4

Based upon the survey response, the faculty perception is that the programs, in general, are doing well. The question on how well the programs are being assessed had a neutral median response perhaps due to our only recently assessing courses and programs.

The following open-ended question was asked:

Q9) Do you have any concerns about the math programs and any suggestions for improvement?

For question 9, the responses were as follows:

1) Would like traditionally low-enrolled courses to run more often.

2) The department maintains too great an emphasis on the math education curriculum with fully 1/3 of the T/TT faculty in support of that program; the department relies too much on adjunct teaching and has not done enough to recruit faculty for the applied math degrees it offers.

3) Minimum 2.0 grade [should be] required in any core course required for the program

4) We are weak in teaching communication skills. Generally speaking, I feel we need to increase the rigor in our upper-level (by this I mean 300+) courses. Many of my students have expressed a desire to be challenged more with more difficult content. The linear algebra course

is a particular weakness. Because it serves not only applied math/CS/Act. Sci. majors but students in CET, math education students, it needs to be too many things to too many different people and serves none of them ideally. The program would benefit from having a "capstone" "topics in math" course on the books where whoever the instructor is can cover an advanced area in depth, (even if this course only runs once per two years, say). One year ... could do complex analysis, next year PDEs, next time game theory, or number theory etc.

5) Not at this time as I [am] still learning.

The desire/need for a capstone course and the other comments will be discussed in a future meeting with the faculty.

<u>Perceptions from Dharma Shetty (From a telephone conversation with her)</u>
<u>PRP member with Special Interest in the Program</u>
She gives a rating of 90 because of the following reasons:
1) The department meets the mission statement
2) Based upon the test scores we are comparable with other programs
3) She was an SLA instructor with three different students and she experience similar feedback as the student feedback. Student feedback was good.
4) 14 out of 16 students found a job
5) Faculty were nice when willing to do independent study without compensation
6) Student involvement with RSO give them an opportunity to compete and to give back to society (e.g. tutoring).

Improvements would be:
1) Offer more upper-level classes so students can graduate on time
2) Have a standard test for lower level classes so that students going into higher level classes are comparable to each other
3) Offer more computer science classes
4) Hire more faculty

<u>Perceptions from Chuck Drake (PRP Faculty Member from Outside the College)</u>
Overall rating 95/100
Math plays a vital role in providing quantitative and reasoning skills need professionally and personally for all students. Faculty are exceptionally well qualified.
The math programs are very sound in the broad background provided by Applied Math as well as the more specialized programs in actuarial science and computer science. Alumni have done well. There is sound evidence of indirect assessment through surveys of alumni and advisory board members. Areas to improve include further development of program specific assessment and continued efforts to seek outside input to the programs.

Perceptions from Kent Sun (Program Coordinator)
I give a rating of 85 because we do care about student learning and most of us will go out of our way to help them. In the end, I'm very happy that our graduates are finding good jobs in a short period of time. The employers are happy with the quality of our graduates. Our students have done well on a standardized exam. The department has three new RSOs. We are a credit to the University. However, the elephant in the room is that we need to improve our assessment. We can't determine what works unless we standardize our tests. Otherwise we're shooting in the dark.

Implementation of Findings

1) The department can send email to students, alumni, faculty, employers, and board members as to responses to common questions.

2) The department will meet to discuss issues that have arisen from the APR and the discuss ways of improving the program. Future meetings with other stakeholders may be possible.

3) Improvements in how the department does assessment will continue.

Appendix A

ID: Name:

ACTUARIAL SCIENCE
BACHELOR OF SCIENCE

FERRIS STATE UNIVERSITY

Program Coordinator: Dr. Kent Sun
PHONE: (231) 591-2579 OFFICE: ASC 2026 E-MAIL: KentSun@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.

Graduation Requirements **ACSC-BS-AS**:

1. 2.0 CUMULATIVE grade point average in all courses.
2. 2.5 grade average for all MATH and CPSC course work in major.
3. 120 minimum semester credits including general education requirements.
4. Residency requirement: 30 minimum FSU semester credits.
5. Minimum of 40 credits numbered 300 or higher.
6. Students may earn only one B.S. degree in Mathematics from Ferris State University.

Number of 300+ Credits: ______

Program requirements: effective for students entering Actuarial Science Fall Semester 2016

Note: Students pursuing an Actuarial Science major and a Computer Science minor are allowed an eight credit overlap from CPSC 130 and CPSC 200. This major/minor combination is highly marketable.

REQUIRED		COURSE TITLE – FOR PREREQUISITES NOT INDICATED, SEE FSU CATALOG COURSE DESCRIPTIONS Prerequisites must be achieved with a grade of "C-" or better*		FSU S.H.	GRADE
REQUIRED CORE: minimum 32 credits					
CPSC	130	Programming and Problem Solving	(MATH 116 or MATH 120 or by placement)	4	
CPSC	200	Object Oriented Programming	((MATH 126 or 130) and CPSC 130)	4	
MATH	220	Analytical Geometry & Calculus 1	(MATH 130 or by placement)*	4	
MATH	230	Analytical Geometry & Calculus 2	(MATH 220)*	4	
MATH	251	Statistics for the Life Sciences	(MATH 130)*	3	
MATH	320	Analytical Geometry & Calculus 3	(MATH 230)*	4	
MATH	322	Linear Algebra	(MATH 230)*	3	
MATH	330	Differential Equations	(MATH 230)*	3	
MATH	340	Numerical Analysis	(CPSC 130 and MATH 230)*	3	
SPECIFIC ACTUARIAL SCIENCE REQUIREMENTS: minimum 26 credits					
MATH	414	Mathematical Statistics 1	(MATH 251 and MATH 320)*	4	
MATH	416	Mathematical Statistics 2	(MATH 414)*	4	
MATH	417	Problem Solving Strategies in Probability Theory	(MATH 414)*	3	
MATH	450	Theory of Interest	(MATH 251 and MATH 320)*	3	
MATH	451	Problem Solving Strategies in Interest Theory	(MATH 450)*	3	
ECON	221	Principles of Macroeconomics	(MATH 110)*	3	
ECON	222	Principles of Microeconomics	(ECON 221)	3	
		Directed Elective		3	
ELECTIVES: to the minimum 120 required for this degree.					

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	Credits
ENGL 150		3
ENGL 250		3
ENGL 311 or 321 or 323 or 325		3
COMM 105 or 121		3
TOTAL		
B. SCIENTIFIC UNDERSTANDING 7 Sem Credits		
Only approved "Z" courses may count toward this category (one must be a lab course).		
Course	Grade	Credits
Lab		
TOTAL		
C. QUANTITATIVE SKILLS		
This requirement is satisfied through the major requirements.		
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	Credits
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 (Foundations course, 200+ course and 6 credits are achieved in the major)		
Course	Grade	Credits
(Second subject area)		
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 strategy to begin program requirements. In order to complete this program in a four year plan, students must average 16-17 credit hours per semester. Students MUST consult their faculty advisor to develop a course sequence plan appropriate to their academic development and educational plans.

FIRST YEAR Fall Semester		FIRST YEAR Spring Semester	
MATH by placement	3-5	Choose one: COMM 105 or COMM 121	3
ENGL 150 English 1	3	MATH by placement	3-5
Cultural Enrichment elective	3-4	Principles of Microeconomics	3
Social Awareness elective	3	CPSC 130 Programming and Problem Solving	4
Principles of Macroeconomics	3	Choose one: Cultural Enrich. or Social Awareness	3
	15-18		16-18

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.

ID: Name:

APPLIED MATHEMATICS

BACHELOR OF SCIENCE IN APPLIED MATHEMATICS

FERRIS STATE UNIVERSITY

Program Coordinator: Dr. Kent Sun

PHONE: (231) 591-2579 OFFICE: ASC 2026 E-MAIL: KentSun@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.

Graduation Requirements **AMTH-BS-AS**:

1. 2.0 CUMULATIVE grade point average in all courses.
2. 2.5 grade average for all MATH and CPSC course work in major.
3. 120 minimum semester credits including general education requirements.
4. Residency requirement: 30 minimum FSU semester credits.
5. Minimum of 40 credits numbered 300 or higher.
6. Students may earn only one B.S. degree in Mathematics from Ferris State University.

Number of 300+ Credits: ______

Program requirements: effective for students entering Actuarial Science Fall Semester 2016

Note: Students pursuing an Applied Mathematics major and a Computer Science minor are allowed an eight credit overlap from CPSC 130 and CPSC 200. This major/minor combination is highly marketable.

REQUIRED		COURSE TITLE – FOR PREREQUISITES NOT INDICATED, SEE FSU CATALOG COURSE DESCRIPTIONS Prerequisites must be achieved with a grade of "C-" or better*		FSU S.H.	GRADE
REQUIRED CORE: minimum 32 credits					
CPSC	130	Programming and Problem Solving	(MATH 116 or MATH 120 or by placement)	4	
CPSC	200	Object Oriented Programming	((MATH 126 or 130) and CPSC 130)	4	
MATH	220	Analytical Geometry & Calculus 1	(MATH 130 or by placement)*	4	
MATH	230	Analytical Geometry & Calculus 2	(MATH 220)*	4	
MATH	251	Statistics for the Life Sciences	(MATH 130)*	3	
MATH	320	Analytical Geometry & Calculus 3	(MATH 230)*	4	
MATH	322	Linear Algebra	(MATH 230)*	3	
MATH	330	Differential Equations	(MATH 230)*	3	
MATH	340	Numerical Analysis	(CPSC 130 and MATH 230)*	3	
APPLIED MATHEMATICS CONCENTRATION REQUIREMENTS: minimum 18 credits					
MATH	324	Fundamental Concepts in Mathematics	(MATH 230)*	3	
		MATH OR CPSC ELECTIVE (select from: CPSC 300, CPSC 320, CPSC 330, CPSC 340, MATH 328, MATH 360, MATH 414, MATH 416, MATH 420, MATH 430, MATH 440)		3 or 4	
		MATH OR CPSC ELECTIVE (from list above)		3 or 4	
		MATH OR CPSC ELECTIVE (from list above)		3 or 4	
		MATH OR CPSC ELECTIVE (from list above)		3 or 4	
		MATH OR CPSC ELECTIVE (from list above)		3 or 4	
ELECTIVES: to the minimum 120 required for this degree.					

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	Credits
ENGL 150		3
ENGL 250		3
ENGL 311 or 321 or 323 or 325		3
COMM 105 or 121		3
TOTAL		

B. SCIENTIFIC UNDERSTANDING — 7 Sem Credits

Only approved "Z" courses may count toward this category (one must be a lab course).

Course	Grade	Credits
Lab		
TOTAL		

C. QUANTITATIVE SKILLS

This requirement is satisfied through the major requirements.

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	Credits
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	Credits
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 strategy to begin program requirements. In order to complete this program in a four year plan, students must average 16-17 credit hours per semester. Students MUST consult their faculty advisor to develop a course sequence plan appropriate to their academic development and educational plans.

FIRST YEAR Fall Semester		FIRST YEAR Spring Semester	
MATH by placement	3-5	Choose one: COMM 105 or COMM 121	3
ENGL 150 English 1	3	MATH by placement	3-4
Cultural Enrichment elective	3-4	CPSC 200 Object Oriented Programming	4
Social Awareness elective	3	Social Awareness	3
CPSC 130 Programming and Problem Solving	4	Choose one: Cultural Enrich. or Social Awareness	3
	16-19		16-17

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.

Approved

PROPOSED

COMPUTER SCIENCE

BACHELOR OF SCIENCE IN APPLIED MATHEMATICS

FERRIS STATE UNIVERSITY

PROGRAM COORDINATOR: Dr. James Nystrom

PHONE: (231) 591-5864 OFFICE: ASC 2056 E-MAIL: nystroj@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.

Graduation Requirements AMCS-BS-AS:

1. Minimum 2.0 CUMULATIVE grade point average in all courses
2. 2.5 grade point average for all MATH and CPSC course work in major
3. 120 minimum semester credits including general education requirements
4. Residency requirement: 30 minimum FSU semester credits
5. Minimum of 40 credits numbered 300 or higher
6. Students may earn only one B.S. degree in Mathematics from Ferris State University.

Number of 300+ Credits: ________

Program requirements: for students entering Computer Science Fall Semester 2016

REQUIRED		COURSE TITLE – FOR PREREQUISITES NOT INDICATED, SEE FSU CATALOG COURSE DESCRIPTIONS Prerequisites must be achieved with a grade of "C-" or better*		FSU S.H.	GRADE
APPLIED MATHEMATICS CORE: 32 credits					
CPSC	130	Programming and Problem Solving	(MATH 116 or MATH 120 or by placement)	4	
CPSC	200	Object Oriented Programming	((MATH 126 or MATH 130) and CPSC 130)	4	
MATH	220	Analytical Geometry & Calculus 1	(MATH 130 or by placement)*	4	
MATH	230	Analytical Geometry & Calculus 2	(MATH 220)*	4	
MATH	251	Statistics for the Life Sciences	(MATH 130)*	3	
MATH	320	Analytical Geometry & Calculus 3	(MATH 230)*	4	
MATH	322	Linear Algebra	(MATH 230)*	3	
MATH	330	Differential Equations	(MATH 230)*	3	
MATH	340	Numerical Analysis	(MATH 230 and (CPSC 130 or CPSC 200))*	3	
COMPUTER SCIENCE CONCENTRATION REQUIREMENTS: 17-19 credits					
CPSC	300	Data Structures and Algorithms	(CPSC 200)*	4	
CPSC	340	Computer Organization	(CPSC 130 or CPSC 200 or ECNS 311)*	4	
MATH	328	Discrete Structures	(MATH 216 or MATH 220)*	3	
CPSC		Pick from: CPSC 320, CPSC 330, CPSC 442		3-4	
CPSC, ECNS, or MATH		Pick from: CPSC 320, CPSC 326, CPSC 330, CPSC 442, ECNS 323, MATH 360, MATH 440		3-4	
ELECTIVES: to the minimum 120 credits required for this program.					

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 ([illegible] Sem Credits)

Course	Grade	Credits
ENGL 150		3
ENGL 250		3
ENGL 311 or 321 or 323 or 325		3
COMM 105 or 121		3
	TOTAL	

B. SCIENTIFIC UNDERSTANDING ([illegible] Sem Credits)

Only approved "Z" courses may count toward this category (one must be a lab course).

Course	Grade	Credits
Lab		
	TOTAL	

C. QUANTITATIVE SKILLS [illegible]

This requirement is achieved in the major requirements.

D. CULTURAL ENRICHMENT ([illegible]) 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	Credits
200+ level		
	TOTAL	

E. SOCIAL AWARENESS ([illegible]) 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	Credits
Foundation		
200+ level		
	TOTAL	

F. GLOBAL CONSCIOUSNESS [illegible]

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 [illegible]

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 strategy to begin program requirements. In order to complete this program in four years, students must average 16 – 17 credit hours per semester. Students MUST consult their faculty advisor to develop a course sequence plan appropriate to their academic development and educational plans.

FIRST YEAR Fall Semester		FIRST YEAR Spring Semester	
MATH by placement	3-4	Choose one: COMM 105 or COMM 121	3
ENGL 150 English 1	3	MATH by placement	3-4
Cultural Enrichment elective	3-4	Scientific Understanding elective	3-5
Social Awareness elective	3	CPSC 130 or CPSC 200	4
CPSC 130 or elective	3-4	Choose one: Cultural Enrich. or Social Awareness	3
	15-18		16-19

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.

PRE-ENGINEERING

FERRIS STATE UNIVERSITY

ADVISOR: Dr. Kent Sun PHONE: (231) 591-2579 OFFICE: ASC 2026 E-MAIL: KentSun@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.

The following program is designed to provide students with either of the following options:

1. A student may elect to transfer to a college which offers an engineering program in a variety of areas: electrical, mechanical, aeronautical, industrial, computer, and civil. The student should make contact with an advisor at the engineering college he/she plans to attend in order to effectively plan the pre-engineering program. Some engineering college course recommendations for specific universities are available through your FSU pre-engineering advisor.
2. A student may elect to remain at Ferris and enroll in the appropriate track of Applied Mathematics.

Students could qualify for the Associate in Science degree upon completion of this program and the FSU general education requirements. For Associate in Science graduation details, see the Pre Science program check sheet.

Courses recommended for students entering Pre Engineering Fall Semester 2015 PENG-AS-AS

		COURSE TITLE – FOR COURSE PREREQUISITES NOT INDICATED, SEE FSU CATALOG COURSE DESCRIPTIONS		FSU S.H.	GRADE
Recommended Courses			Prerequisites		
ENGL	150	English 1	(by placement)	3	
ENGL	250	English 2	(ENGL 150)	3	
COMM	105 or 121	Interpersonal Communications Fundamentals of Public Speaking		3	
CHEM	121	General Chemistry 1	(MATH 115 and prior CHEM)	5	
CPSC	200	Object Oriented Programming (C++)	(MATH 130)	4	
MATH	220	Analytical Geometry & Calculus 1	(MATH 130)	4	
MATH	230	Analytical Geometry & Calculus 2	(MATH 220)	4	
MATH	320	Analytical Geometry & Calculus 3	(MATH 230)	4	
MATH	322	Linear Algebra	(MATH 220)	3	
MATH	330	Differential Equations	(MATH 230)	3	
PHYS	241	General Physics 1	(MATH 220 min "C-")	5	
PHYS	242	General Physics 2	(Min "C-" in MATH 230 and PHYS 241)	5	
		Cultural Enrichment Elective		3	
		Cultural Enrichment Elective (200 level or higher)		3	
		Cultural Enrichment Elective (Global)		3	
		Social Awareness Elective		3	
		Social Awareness Elective		3	
		Social Awareness Elective (200 level or higher)		3	

SAMPLE COURSE SEQUENCE: The following chart depicts one method to begin the course work requirement. In order to complete this program in two years, students must average 16 – 18 credit hours per semester. Students MUST consult their faculty advisor to develop a course sequence plan appropriate to their academic development and educational plans.

FIRST YEAR Fall Semester		**FIRST YEAR Winter Semester**	
MATH (by placement) see note 1	5	Choose one:	
ENGL 150 or COMM 105 or 121	3	COMM 105 or COMM 121 or ENGL 150	3
Cultural Enrichment elective	3-4	MATH	5
Chemistry or Physics	5	Chemistry or Physics	5
	16-17	Choose one: Cultural Enrich. or Social Awareness	3-4
			16-17
SECOND YEAR Fall Semester		**SECOND YEAR Winter Semester**	

GENERAL EDUCATION REQUIREMENTS

Courses which qualify in the 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

Race/Ethnicity/Gender: For an associate, bachelor, or PharmD. Degree at Ferris State University, students must select one course from either the cultural enrichment or social awareness categories that fulfills the General Education REG content requirement. Courses that satisfy this requirement are listed in the general education section of the FSU catalog.

Global: For a bachelor degree at Ferris State University, students must select one course that fulfills the General Education Global content requirement. Courses that satisfy this requirement are listed in the general education section of the FSU catalog.

NOTE : If your MATH development requires coursework prerequisite to MATH 220, additional time will be required to complete this program.

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,

MATHEMATICS MINOR (Fall 2016)

FERRIS STATE UNIVERSITY - COLLEGE OF ARTS AND SCIENCES

ADVISOR: Dr. Kent Sun
PHONE: (231) 591-2579 E-MAIL: sunk@ferris.edu ASC 2031

Why Choose the Mathematics Minor?

Real life problem solving on the job is often mathematically based. The Mathematics minor provides the opportunity for students to develop the logical thinking and problem solving abilities many employers are seeking. When coupled with a technical or scientific baccalaureate it provides the mathematical maturity needed to succeed in the highly competitive employment world of today. It also prepares students for graduate study in mathematically intense graduate programs such as physics, engineering, statistics, operations research or mathematics.

Admission Requirements

This Mathematics minor is open to any student admitted to Ferris State and pursuing a baccalaureate degree except for a baccalaureate with a mathematics major. The minor is designed to complement any Ferris major program. Students should choose courses carefully to avoid excessive overlap with their major or second minor. A maximum of 1/3 of the credits, but no more than 7 credits, in a minor may overlap with the student's major. Students may use only one-third of the credits in a minor that overlap with the student's major. Students may apply 6 credit hours of overlap between minors.

Graduation Requirements

An academic minor may only be awarded upon completion of a baccalaureate degree at Ferris State. This minor requires a minimum of 21 credits with a minimum 2.5 grade average in these courses. Also, 50% of the credits for a minor must be taught by Ferris State University.

Required Courses:		
MATH 220	Analytic Geometry and Calculus 1	4
MATH 230	Analytic Geometry and Calculus 2	4
MATH 320	Analytic Geometry and Calculus 3	4
MATH 322	Linear Algebra	3
Choose two:		
MATH 324	Fundamental Concepts in Mathematics	3
MATH 328	Discrete Structures	3
MATH 330	Differential Equations	3
MATH 340	Numerical Methods	3
MATH 360	Operations Research	3
MATH 414	Mathematical Statistics 1	3
MATH 416	Mathematical Statistics 2	3
MATH 420	Introduction to Abstract Algebra	3
MATH 430	Advanced Calculus	3
MATH 440	Mathematics Modeling	3

MINOR IN MATHEMATICS

NAME______________________________ STUDENT NUMBER ________________

STUDENT'S COLLEGE: ____________ B.S./B.A. PROGRAM: __________________

Procedures for declaring a minor: The student will meet with the minor advisor to create a plan for completion of the minor, sign Section A and receive a copy of the form. The minor advisor will route the form through the department office and the Dean's Office. The student is not enrolled in the minor until the Dean's Office submits the form to Records.

Procedures upon completion of a minor: The student will notify the minor advisor when requirements are complete. The department and the advisor will verify that the student has completed the minor, sign Section B and forward the form with copies of any approved substitutions or exceptions forms to the Dean's Office for signature. The Dean's Office will send a copy to Records for posting the completion of the minor.

SECTION A — DECLARATION OF MINOR

General Requirements:

1) At least 50% of the credits of the minor must be numbered 300 or higher
2) At least 50% of the credits of the minor must be Ferris State University credits
3) This minor requires a minimum of 21 credits
4) This minor requires a minimum GPA of 2.5 in these courses.
5) Minor requirements must be completed prior to or at the time of the awarding of a baccalaureate or higher degree.
6) A maximum of 1/3 of the credits, but no more than 7 credits, in a minor may overlap with the student's major*.
7) Students may apply 6 credit hours of overlap between minors**.

Required Courses	Credit Hours	Grade	Semester Completed
MATH 220	4		
MATH 230	4		
MATH 320	4		
MATH 322	3		
Directed Elective 1	3-4		
Directed Elective 2	3-4		

Signatures		Date
Student		
Advisor		
Department		

SECTION B — MINOR COMPLETE

Routing (FOLLOWING COMPLETION OF THE REQUIRED COURSES FOR THE MINOR)		Date
Department		
CAS Dean	☐ MyDegree Verified	
Registrar		

DECLARATION SENT TO RECORDS ____________ COMPLETION SENT TO RECORDS ____________

*Approved by the Academic Senate, January 14, 2014

** Approved by the Academic Senate, April 19, 2001

PROPOSED ← Approved

COMPUTER SCIENCE MINOR

FERRIS STATE UNIVERSITY - COLLEGE OF ARTS AND SCIENCES

ADVISOR: Dr. James Nystrom

PHONE: (231) 591-5864 E-MAIL: nystroj@ferris.edu Campus Address: ASC 2056

Why Choose the Computer Science Minor?

A minor in Computer Science will significantly enhance the employability of a graduate from any program at Ferris. Computer skills are among the most important skills an employer is looking for in employees today. It can serve to enhance the expertise of the student in their major field and also serve as an excellent preparation for entry-level positions in the computing field.

Through the course work of the Computer Science minor, students will be provided the opportunity to learn computer science applications such as programming language, computer architecture, microprocessor-controlled equipment and local area networks.

Admission Requirements

This Computer Science minor is open to any student admitted to Ferris State and pursuing a baccalaureate degree except those pursuing the Applied Mathematics Computer Science option. The minor is designed to complement any Ferris major program. Students should choose courses carefully to avoid excessive overlap with their major or second minor. A maximum of 1/3 of the credits, but no more than 7 credits, in a minor may overlap with the student's major.

Graduation Requirements

An academic minor may only be awarded upon completion of a baccalaureate degree at Ferris State. This minor requires a minimum of 18 credits and a minimum grade average of 2.5 in these courses. Also, 50% of the credits for a minor must be taught by Ferris State University.

Required Courses:		
CPSC 200	Object Oriented Programming	4
CPSC 300	Data Structures and Algorithms	4
CPSC 340	Computer Organization	4
MATH 328	Discrete Structures	3
Elective - Select 1		
CPSC 320	Computer Simulations	3
CPSC 326	Computer Graphics	3
CPSC 330	Parallel Programming	4
CPSC 442	Programming Language Concepts	3
ECNS 323	Real Time Operating Systems	4

PROPOSED ← Approved

COLLEGE OF ARTS AND SCIENCES - ACADEMIC MINOR CLEARANCE FORM

MINOR IN COMPUTER SCIENCE

NAME________________________________STUDENT NUMBER ________________

STUDENT'S COLLEGE: ______________ B.S./B.A. PROGRAM: ____________________

Procedures for declaring a minor: The student will meet with the minor advisor to create a plan for completion of the minor, sign Section A and receive a copy of the form. The minor advisor will route the form through the department office and the Dean's Office. The student is not enrolled in the minor until the Dean's Office submits the form to Records.

Procedures upon completion of a minor: The student will notify the minor advisor when requirements are complete. The department and the advisor will verify that the student has completed the minor, sign Section B and forward the form with copies of any approved substitutions or exceptions forms to the Dean's Office for signature. The Dean's Office will send a copy to Records for posting the completion of the minor.

SECTION A DECLARATION OF MINOR

General Requirements:

1) At least 50% of the credits of the minor must be numbered 300 or higher
2) At least 50% of the credits of the minor must be Ferris State University credits
3) This minor requires a minimum of 18 credits
4) This minor requires a minimum GPA of 2.5 in these courses.
5) Minor requirements must be completed prior to or at the time of the awarding of a baccalaureate or higher degree.
6) A maximum of 1/3 of the credits, but no more than 7 credits, in a minor may overlap with the student's major*.
7) Students may apply 6 credit hours of overlap between minors**.

Required Courses	Credit Hours	Grade	Semester Completed
CPSC 200	4		
CPSC 300	4		
CPSC 340	4		
MATH 328	3		
Directed Elective 1	3-4		

Signatures		Date
Student		
Advisor		
Department		

SECTION B MINOR COMPLETE

Routing (FOLLOWING COMPLETION OF THE REQUIRED COURSES FOR THE MINOR)		Date
Department		
CAS Dean	☐ MyDegree Verified	
Registrar		

DECLARATION SENT TO RECORDS ____________ COMPLETION SENT TO RECORDS ____________

*Approved by the Academic Senate, January 14, 2014
** Approved by the Academic Senate, April 19, 2001

COLLEGE OF ARTS AND SCIENCES - CERTIFICATE CLEARANCE FORM

COMPUTER SCIENCE CERTIFICATE (FALL 2016)

NAME_______________________________________STUDENT NUMBER ____________________

STUDENT'S COLLEGE: ________________

FOR MORE INFORMATION CONTACT: DR. JAMES NYSTROM ASC 2056 PHONE: 591-5864

WHY CHOOSE A COMPUTER SCIENCE CERTIFICATE

A certificate in Computer Science will significantly enhance the employability of a graduate from any program at Ferris. Computer skills are among the most important skills an employer is looking for in employees today. It can serve to enhance the expertise of the student in their major field and also serve as an excellent preparation for entry level positions in the computing field.

ADMISSION REQUIREMENTS

This Computer Science certificate is open to any student admitted to Ferris State and pursuing a baccalaureate degree, except those pursuing the Applied Mathematics/Computer Science concentration. The certificate is designed to compliment any Ferris major program.

GRADUATION REQUIREMENTS

You will receive this certificate after completion of the requirements with a minimum 2.5 grade point in these courses. No more than 50% of the credits in this certificate may be transferred from another institution.

SECTION A

General Requirements:

1) This certificate requires a minimum of 12 credits
2) This certificate requires a minimum GPA of 2.5 in these courses.

Required Courses	Credit Hours	Grade	Semester Completed
CPSC 130	4		
CPSC 200	4		
CPSC 300	4		

Signatures		Date
Student		
Advisor		
Department		

SECTION B

Routing (FOLLOWING COMPLETION OF THE REQUIRED COURSES FOR THE CERTIFICATE)		Date
Department		
CAS Dean		
Registrar		

DECLARATION SENT TO RECORDS ____________ COMPLETION SENT TO RECORDS ____________

Appendix B

Ferris State University

CPSC130 – Programming and Problem Solving

Fall 2015

Instructor	Dr. J.F. (Jim) Nystrom
	nystroj@ferris.edu
Office and Phone	ASC 2056. (231) 591 – 5864
Office Hours	MW 10:00 – 11:00 am, F 10 – 11:59 am, and/or by appointment.
Required Text	John M. Zelle, **1st Edition (<- IMPORTANT)**
	Python Programming: An Introduction to Computer Science
Lecture	TR 9:30 – 10:45 am, F 9:00 – 9:50 am, STR 105

• Course Description

(4 credits) An introduction to programming and problem solving for students with little or no programming background. Topics include program specification and algorithm design, and fundamental programming concepts (including variables, assignment, conditional and iterative control structures, arrays or lists, and functions).

Requires: MATH 116 or MATH 120 or ACT Math 24 or SAT Math 560.

• Learning Outcomes

A student succeeding in this course should be able to:

1. Read a description of a problem, and
    a. Develop an algorithm to solve the problem.
    b. Utilize functions, decision structures and loops to implement the algorithm in a computer program, and
    c. Develop a reasonable suite of examples on which to test the program.

2. Read a simple or moderately complex computer program and trace the overall execution path of the program given different sets of program data: thus demonstrating knowledge of how various programming language constructs (e.g., functions, and conditional and iterative control statements) operate.

3. Identify various issues involved in the solution of problems on a computer: including some hardware issues, issues related to data types (for computing with numbers and strings), and issues related to program execution time.

- ## Grading

The course grade is based on Midterm Examinations, Programming Assignments and Homework, and a Comprehensive Final Exam. The following tables show how the course numerical grade (of 100 total points) is calculated and also how the course letter grade will be assigned.

Calculation of 100 point Numerical Grade

Component	Percent of Numerical Grade
Programs and Homework	20
Midterm Examination I	25
Midterm Examination II	25
Final Exam	30

Calculation of Letter Grade from Numerical Grade

A	>= 92	B	80 – 86	C	70 – 75	D	55 – 65
A-	86 – 92	B-	75 – 80	C-	65 – 70	F	< 55

(Please note that the letter grade assignment is the guaranteed curve. The instructor may or may not lower the grade required for the "A", for instance, at his discretion.)

The Midterm Grade numerical grade calculation will use Homework for 20% and the first Midterm Exam at 80%.

- ## Homework and Programs

The homework consists of program and homework problems (e.g., most likely *Exercises* and *Programming Problems* from the textbook). Each homework set will be assigned in class, and is generally due 1 to 2 weeks after it has been assigned. Each homework set will have a point value assigned, and the overall Homework grade will be the total points earned divided by the total number of points available. There will be some class time devoted to working hands-on with the Python programming language (almost every Friday?).

General Homework Policies:

- It is matter of academic honesty that you do not consult solutions from previous semesters.
- Although you are encouraged to work with other students, your solutions must not be copied from others (or from the internet).
- **No late assignments** will be accepted.

- **Examinations**

There will be two in-class Midterm examinations during the semester (tentatively set for October 8, 2015 and November 19, 2015). The Final Exam is December 14, 2015 from 10 – 11:40 AM. **No make-up exam** for the Midterms will be given. Upon verification of an excused absence, the Final or the other Midterm grade (whichever is lowest) will also count as the grade for a single missed Midterm exam. NOTE: The Midterm and Final Exams may be fairly difficult, meaning that if you do not understand the material very well, you will probably not get a very good score on the exams. Also, the instructor may choose to curve exam grades at his discretion (based on difficulty of the exam and class performance).

- **Attendance**

For this course, while I strongly encourage attendance at each class, *attendance is NOT required*. If you miss a class, it is your responsibility to obtain any notes, handouts, etc., that you missed. (That is, do not ask the instructor for the notes from a class you missed.)

- **Student Conduct**

All students should refrain from cheating, they should not be disruptive in class, and in general should follow the FSU Student Code of Conduct (as outlined in the FSU Student Handbook, available online from the Office of Student Conduct). Failure to follow said code will most certainly result in sanctions in accordance with the aforementioned handbook and any other applicable rules and regulations. See the *COLLEGE OF ARTS AND SCIENCES SYLLABUS ATTACHMENT* for more details about potential consequences of cheating and/or disruptive behavior.

Students should turn cell phones off or to silent while in class; and students should never, ever answer a call in class.

- **Services for Students with Disabilities**

If you need disability accommodations in this class, you should first contact the *Ferris State University Disabilities Service Office (DSO)*. If you suspect that you may need special accommodations, the DSO will review your documentation to determine your eligibility for services or accommodations. It is important that you contact them in a timely fashion as it may take several days to review requests and prepare accommodations.

- **General Advice**

Don't panic. Attend class and be on time. Study hard: keep up with the reading, start early on (and complete) all the assignments, and ask the instructor questions when you have any. Review the College of Arts & Sciences Syllabus Attachment for other helpful and important information.
NOTE: The last day to drop this class is November 5, 2015.

- **Tentative Course Outline for CPSC130 (Fall 2015)**

We will try to cover most of the course textbook this semester, most likely, in the following order:

- Chapter 1: Computers and Programs
- Chapter 2: Writing Simple Programs
- Chapter 3: Computing with Numbers

Midterm Examination (October 8, 2015)

- Chapter 4: Computing with Strings
- Chapter 5: Objects and Graphics
- Chapter 6: Defining Functions

Midterm Examination (November 19, 2015)

- Chapter 7: Decision Structures
- Chapter 8: Loop Structures and Booleans
- Chapter 9: Simulation and Design (time permitting)

Final Exam (December 14, 2015)

CPSC 300: Data Structures and Algorithms

Fall 2014 4.0 units Section 001 MTWR 2:00–2:50 Starr 105

Contact

Instructor:	S. Walker
Email:	walkers@ferris.edu
Phone:	591–2570
Office:	ASC 2060
Office Hours:	Mon–Thu 1:00–1:50, or by appointment

Texts.
1. Main/Savitch, Data Structures and Other Objects Using C++, 4th Edition ©2011 Addison-Wesley
2. Any good book on C++

Prerequisite. Grade of C– or higher in CPSC 200 or equivalent

Course Website. Accessible on FerrisConnect: `fsulearn.ferris.edu`

Course Description. This course covers the specification, design, implementation, use and analysis of fundamental general-purpose data structures in C++. Topics covered include object-oriented design, data abstraction, container classes, recursion, the C++ STL (standard template library), an introduction to asymptotic ("big-O") time analysis of algorithms, searching and sorting.

Important Course Dates

Monday	August 25	First lecture
Thursday	August 28	Last day to drop without receiving a "W" grade
Monday	September 1	Labor Day (academic holiday)
Monday	October 20	Midterm grades posted
Thursday	October 30	Last day to withdraw from the course
Wednesday	November 26	Thanksgiving recess (12:00 PM)
Thursday	November 27	Thanksgiving (academic holiday)
Thursday	December 4	Last lecture
Monday	December 15	Final grades posted

Grading

		87–89	B+	77–79	C+	67–69	D+
93–100	A	83–86	B	73–76	C	63–66	D
90–92	A–	80–82	B–	70–72	C–	60–62	D–

Table 1: Grading scale

Assignments

There will be several programming projects assigned during the semester which must be done in C++. Assignments are posted on the course website and are due in class on the date due. No late homework will be accepted.

Assignment Grading

The functionality of your programs will be graded according to the following scale:

✓+ A submission that satisfies all of the requirements for the assignment—a job well done.

✓ A submission that meets the requirements for the assignment, possibly with a few small problems.

✓– A submission that has problems or errors serious enough to fall short of the assignment requirements.

– A submission that has extremely serious problems and/or is an incomplete attempt, but nonetheless shows some effort and understanding.

– – A submission that shows little effort and does not represent passing work.

0 A missing or late assignment. Also, your code must at least compile in order to be graded, so code that doesn't compile receives a score of zero.

You will be expected to produce elegant, well-decomposed, commented solutions as taught in CPSC 200. Your grade for functionality will be adjusted up or down based on your programming style (clarity, organization, decomposition, commenting, etc.). Exceptionally good style can raise your grade, and poor style can lower it. (For example, your submission might rate a ✓+ for functionality, but if your program is poorly written, your overall grade might be a ✓ or even lower.)

Academic Integrity

The policy on homework collaboration in CPSC 300 is embodied in the following rule:

Discuss ideas together, but do the coding on your own.

You are *strongly encouraged* to ask others—the instructor, or other students—for hints and debugging help, or to talk generally about course concepts, problem-solving strategies, program structure, and the high-level design of a solution. However, **you may not share actual program code with other students**. In particular:

- You may not copy another student's code, or give your code to another student who asks you for it.
- You may not look at another person's code on a printout or screen before submitting your own work.
- You may not copy code from other sources (e.g. the Internet) or examine program code from prior semesters.
- You may not work together with another person, devising one solution between the two of you.
- You must be prepared to explain any program code that you submit.

Course Objectives

Upon successful completion of this course, students will have demonstrated the ability to:

1. Analyze worst-case, average-case, and best-case running times of algorithms and C++ functions using asymptotic analysis. Compare the asymptotic behaviors of polynomial, exponential, and logarithmic functions and algorithms.
2. Understand fundamental data structures and the analyses of operations performed on them. As time allows, topics will include container classes, vectors, linked lists, stacks, queues, priority queues, trees, hash tables.
3. Use appropriate algorithms and associated data structures to solve complex problems.
4. Design and implement new data structures using existing ones.
5. Apply standard library data structures in software design.
6. Explain the major algorithms for searching and sorting. Describe and compare the run-time analyses of these algorithms.
7. Understand and apply recursion in problem solving.
8. Understand and apply advanced features of the C++ programming language. As time allows, topics will include data abstraction and encapsulation, information hiding, operator overloading, dynamic memory allocation, template functions, template classes, iterators, inheritance, exception handling.

CPSC 320: Computer Simulation

Fall 2015 3.0 units Section 001 TR 12:00–1:15 Starr 105

Contact

Instructor:	S. Walker
Email:	`walkers@ferris.edu`
Phone:	591–2570
Office:	ASC 2060
Office Hours:	Mon/Wed 11:00–11:50, Tue/Thu 10:00–10:50, or by appointment

Prerequisites. MATH 216/220, MATH 251, CPSC 200

Course Website. Accessible on Blackboard: `fsulearn.ferris.edu`

Grading. Weekly assignments (75%), Term project (25%)

Course Description. This course provides an introduction to computer simulation and stochastic modeling. Topics covered include random number generators; techniques for generation of probability distributions and random variates; design, statistical analysis, and evaluation of computer models of queueing in inventory and scheduling; discrete-event and Monte Carlo simulation; variance reduction techniques.

References

1. Haigh, *Probability Models*, Springer
2. Law, *Simulation Modeling and Analysis*, 5th Edition, McGraw-Hill
3. Leemis/Park, *Discrete-Event Simulation: A First Course*, Prentice Hall
4. Ripley, *Stochastic Simulation*, Wiley
5. Ross, *Introduction to Probability Models*, 9th Edition, Academic Press
6. Ross, *Simulation*, 5th Edition, Academic Press
7. Ross, *Stochastic Processes*, 2nd Edition, Wiley
8. Rubinstein, *Simulation and the Monte Carlo Method*, Wiley
9. Shedler, *Regenerative Stochastic Simulation*, Academic Press
10. Taylor/Karlin, *An Introduction to Stochastic Modeling*, 3rd Edition, Academic Press

CPSC 200: Object Oriented Programming

Spring 2016   4.0 units   Section 001   MTWR 12:00–12:50   Starr 105

Contact

Instructor:	S. Walker
Email:	walkers@ferris.edu (9:00–5:00 weekdays)
Phone:	591–2570
Office:	ASC 2060
Office Hours:	Mon/Wed 10:00–10:50, Mon–Thu 4:00–4:50, or by appointment

Text. W. Savitch, Absolute C++, 6th Edition ©2016 Pearson

Topics. Selected material from Chapters 1–18

Course Website. Accessible on Blackboard: fsulearn.ferris.edu

Course Description. An introductory course in computer programming and software engineering using the object oriented programming language C++. Emphasis on language syntax, algorithm development, procedural problem solving, program design and development, basic data types, control structures and functions, arrays and pointers, recursion, introduction to C++ classes, and elementary data structures.

Course Prerequisites

The enforced prerequisites for this course are CPSC 130 and MATH 126/130, or consent of the instructor. The only other requirement is the understanding that CPSC 200 will most likely be one of the more time-consuming courses you will take. The course requires no previous experience with C++ but does require considerable dedication and hard work.

Grading

Your course grade will be based on:

Assignments	40%
Midterm Exams (2)	20% each
Final Exam	20%

Table 1: Grade weights

The above scores will be scaled to a total of 100 points, and your grade will be computed using the following *approximate* scale:

		87–89	B+	77–79	C+	67–69	D+
93–100	A	83–86	B	73–76	C	63–66	D
90–92	A−	80–82	B−	70–72	C−	60–62	D−

Table 2: Grading scale

However, final grades will be determined from a curve taking into account such additional factors as class participation and preparation, effort, attitude, etc.

In order to receive a passing grade, you must complete satisfactory work in all areas. In particular, if you do not cumulatively pass the three exams (i.e. your three exam scores combined do not represent passing work), you will not pass the course regardless of your performance on the assignments. You should note that your assignments contribute significantly to your final grade, so be sure to invest adequate time in the homework. You really do learn all of the material while sitting in front of the computer completing the assignments. Since so much of your time will be spent on these assignments, they count for a significant portion of your grade.

NOTE: As a general rule, grades are computed uniformly in university courses; consequently, no "extra credit" points or assignments will be given in this class. My intention in grading is to be as fair as possible—the instructor's responding to individual appeals for leniency or special consideration would be inherently unfair to other students and simply will not be done. If you need some minimum grade in this course, then you must earn it.

Important Course Dates

Monday	January 11	First lecture
Thursday	January 14	Last day to drop without receiving a "W" grade
Monday	January 18	MLK Day (academic holiday)
Thursday	February 11	**Midterm 1**
Monday	March 7	Midterm grades posted
Monday–Thursday	March 7–10	Spring recess
Wednesday	March 23	**Midterm 2**
Wednesday	March 23	Last day to withdraw from the course
Thursday	March 24	Easter recess
Thursday	April 28	Last lecture
Tuesday	May 3	**Final Exam 12:00–1:40 PM**
Monday	May 9	Final grades posted

Course Objectives

- Understand and apply basic C++ data types, operators, expressions, and control structures such as sequence, selection, and iteration
- Use a C++ compiler and predefined code libraries
- Design and implement C++ functions, demonstrating an understanding of the call-by-value and call-by-reference mechanisms
- Understand and use simple data structures such as strings, arrays, and vectors
- Understand and use file I/O, separate compilation, and C++ namespaces
- Design and implement C++ classes
- Understand and implement recursive C++ functions
- Identify and debug syntax, logic, and run-time errors in a C++ program
- Develop good programming style and structure, including the principles of problem decomposition and top-down design, to produce readable code that is easy to maintain

Homework

- There will be several programming projects during the semester (one due approximately every 1–2 weeks). Each project will be assigned at least one week prior to the due date.
- Homework is due at the beginning of class on the date due. Late homework will not be accepted.
- Assignments are posted on the course website (accessible on Blackboard).
- Assignments may be updated during the week—check the course website.
- All submitted homework must follow the guidelines in the CPSC 200 Homework Instructions handout, distributed in class and available on the course website. Make sure that you read and thoroughly understand these instructions before beginning work on the programming projects.

Examinations

- There will be two midterm exams and a final exam. Dates and times are listed above.
- All exams, including the final, must be taken during the scheduled time for your course section. You are expected to schedule events such as trips, vacations, work, or job interviews to avoid conflicts with the exam dates.
- Make-up exams will not be given for any reason, and a score of zero will be received for any missed exams. However, unforeseen *excused* absences for midterm exams may be covered by adding the corresponding portion of a student's grade to his/her final exam score, for a maximum of one missed exam.
- The only acceptable excuses for missing an exam on the scheduled date and time are:
  - Documented medical problems: present a statement signed by a physician stating (a) the extent to which your medical condition prevented you from attending the exam, and (b) the time period the statement covers.
  - Personal emergencies: funerals, accidents, etc. (Confirmation will be required.)
  - Documented University activities: class trips, etc.

  In the event of other activities that you believe you are required to attend, check with the instructor in advance, as soon as you know of the conflict.
- No calculators, computers, or other electronic devices will be permitted.

Computing Facilities

There are PCs available in FLITE equipped with Microsoft Visual C++, an industry standard development system that we will use in CPSC 200. Approximately 100 workstations are located in the Information Commons area on the first floor, and additional machines are available on the second and third floors. NOTE: A number of machines on the second floor are reserved for use by students in the College of Arts and Sciences. Inquire at the South Service Desk for the location of these machines.

Ferris has purchased a campus-wide site license for VC++, so the compiler should also be available in all residence hall computer labs. The software media may also be purchased from Student Technology Services (located in the West Building) for installation on personal machines on or off campus. Alternately, a student version of the compiler (Visual Studio Express) may be downloaded from Microsoft. A link to the software can be found on the course website.

Attendance

Generally, attending lectures will be essential to your success in the course. Therefore, while class attendance will not directly affect your course grade, you should make every effort to attend. University regulations allow penalties for absences at the discretion of the instructor, and poor attendance *will* be a factor in determining grades in borderline cases. Students are responsible for all course announcements, lectures, notes, assignments, and tests, whether or not they were announced during an absence. In addition, material that is not covered in the textbook will often be presented in class; you are responsible for this material, so skip the lectures at your own risk. When feasible and useful, materials such as handouts and examples will be posted on the course website. In general, this material will not be comprehensible without the lecture; it will be provided to supplement, not replace, the lecture presentation.

Tips for Success in CPSC 200

- Do not expect to master the material only by attending the lectures. You will need to read the relevant sections in the text, review your class notes, work through examples, etc.
- Always come to class.
- Ask questions if you are confused; don't just suffer silently.
- Come to office hours if you need extra help.
- Don't fall behind. The pace of this course makes it very difficult to catch up. Begin the programming assignments as soon as we have covered the necessary material in class—they will take more time than you expect.
- Don't become overly frustrated with C++. The smallest typo can cause compilation errors. Programming takes a lot of time and requires a great deal of patience.

Academic Integrity

For the record, the University policy concerning academic dishonesty will be enforced (see the FSU Student Handbook), and incidents of misconduct will be forwarded to the Office of Student Judicial Services. A student guilty of cheating or plagiarism will receive a grade of F for the *entire course*, and other possible sanctions include suspension or dismissal from the University. We will discuss in class what is (and what is not) considered cheating in this course, and these guidelines are also covered in the Homework Instructions handout.

Classroom Expectations

- Arrive on time for class.
- Avoid non-class related discussions during class time. Treat fellow students with respect.
- Actively participate in the class. Ask questions when something is unclear.
- No food is allowed in class. Drinks *are* allowed.
- Turn off and stow all electronic devices before entering the classroom.

Amendments

The instructor reserves the right to make changes or corrections to the syllabus should the need arise. Any changes to the syllabus will be announced in class.*

*This document is also available in electronic form (PDF format) on the course website.

Ferris State University
CPSC330 – Parallel Programming
Spring 2016

Instructor	Dr. J.F. (Jim) Nystrom nystroj@ferris.edu
Office and Phone	ASC 2056, (231) 591 – 5864
Office Hours	TR 3 – 5 pm. and/or by appointment.
Required Text	G.R. Andrews, *Foundations of Multithreaded, Parallel and Distr. Programming*
Recommended Text	G.R. Andrews and R.A. Olsson, *The SR Programming Language*
Lecture	TR 9:30 – 10:45 pm. STR 204 F 8:00 – 8:50 am, STR 105

- ## Course Description

(4 credits) Introduction to the parallel computing landscape and a parallel programming language. Overview of processes, synchronization, and the use and implementation of semaphores. Introduction to distributed programming techniques (including message passing, RPC and rendezvous), process interaction paradigms and scientific computing (including heartbeat algorithms, pipeline algorithms, broadcast algorithms, grid computations and particle computations).
Requires: MATH 216 or MATH 220: and CPSC 200 or ECNS 311.

- ## Learning Outcomes

A student succeeding in this course should be able to:

1. Enumerate and describe the concepts involved in the construction of parallel programs. For example, the student should be able to explain how deadlock, livelock, and incorrect results may arise from the uncontrolled concurrent execution of programs accessing shared resources and/or cooperating to accomplish a scientific computation. The student should also be able to detect situations that may lead to these problems in actual code.

2. The student should be able to select appropriate mechanisms and apply them to the solution of problems in concurrent and distributed systems. Thus the student should have learned how to design, prototype, and test effective solutions to parallel programming problems.

• Grading

The course grade is based on Midterm Examinations, Programming Assignments and Homework, and a Comprehensive Final Exam. The following tables show how the course numerical grade (of 100 total points) is calculated and also how the course letter grade will be assigned.

Calculation of 100 point Numerical Grade

Component	Percent of Numerical Grade
Programs and Homework	16
Quizzes	10
Midterm Examination I	24
Midterm Examination II	24
Final Exam	26

Calculation of Letter Grade from Numerical Grade

A	>= 92	B	80 – 86	C	70 – 75	D	55 – 65
A-	86 – 92	B-	75 – 80	C-	65 – 70	F	< 55

(Please note that the letter grade assignment is the guaranteed curve. The instructor may or may not lower the grade required for the "A", for instance, at his discretion.)

The Midterm Grade numerical grade calculation will use Homework for 16%, a quiz for 10%, and the first Midterm Exam at 74%.

• Homework and Programs

The homework consists of program and homework problems (e.g., most likely *Exercises* and *Programming Problems* from the textbook). Each homework set will be assigned in class, and is generally due 1 to 2 weeks after it has been assigned. Each homework set will have a point value assigned, and the overall Homework grade will be the total points earned divided by the total number of points available. There will be some class time devoted to working hands-on with the SR programming language (almost every Friday?).

General Homework Policies:

- It is matter of academic honesty that you do not consult solutions from previous semesters.
- Although you are encouraged to work with other students, your solutions must not be copied from others (or from the internet).
- **No late assignments** will be accepted.

- **Examinations**

There will be two in-class Midterm examinations during the semester (tentatively set for February 18, 2016 and April 14, 2016). The Final Exam is May 2, 2016 from 10 – 11:40 AM. **No make-up exam** for the Midterms will be given. Upon verification of an excused absence, the Final or the other Midterm grade (whichever is lowest) will also count as the grade for a single missed Midterm exam. NOTE: The Midterm and Final Exams may be fairly difficult, meaning that if you do not understand the material very well, you will probably not get a very good score on the exams. Also, the instructor may choose to curve exam grades at his discretion (based on difficulty of the exam and class performance).

- **Quizzes**

There will be two in-class Quizzes during the semester (tentatively set for February 5, 2016 and April 1, 2016). **No make-up quiz** for the quizzes will be given. Upon verification of an excused absence, the Final, a Midterm grade, or the other quiz (whichever is lowest) will also count (with a percent of points available calculation) as the grade for a single missed quiz

- **Student Conduct**

All students should refrain from cheating, they should not be disruptive in class, and in general should follow the FSU Student Code of Conduct (as outlined in the FSU Student Handbook, available online from the Office of Student Conduct). Failure to follow said code will most certainly result in sanctions in accordance with the aforementioned handbook and any other applicable rules and regulations. See the *COLLEGE OF ARTS AND SCIENCES SYLLABUS ATTACHMENT* for more details about potential consequences of cheating and/or disruptive behavior.

Students should turn cell phones off or to silent while in class; and students should never, ever answer a call in class.

- **Attendance**

For this course, while I strongly encourage attendance at each class, *attendance is NOT required.* If you miss a class, it is your responsibility to obtain any notes, handouts, etc., that you missed. (That is, do not ask the instructor for the notes from a class you missed.)

- **Services for Students with Disabilities**

If you need disability accommodations in this class, you should first contact the *Ferris State University Disabilities Service Office (DSO).* If you suspect that you may need special accommodations, the DSO will review your documentation to determine your eligibility for services or accommodations. It is important that you contact them in a timely fashion as it may take several days to review requests and prepare accommodations.

- **General Advice**

Don't panic. Attend class and be on time. Study hard: keep up with the reading, start early on (and complete) all the assignments, and ask the instructor questions when you have any. Review the College of Arts & Sciences Syllabus Attachment for other helpful and important information. **NOTE**: The last day to drop this class is March 23, 2016.

- **Tentative Course Outline for CPSC330 (Spring 2016)**

- The Concurrent Computing Landscape (Chapter 1 and notes)
  - H/W and S/W for Concurrent Computation (sections 1, 2 and 3)
  - Concurrent Matrix Multiplication and the SR Language (sections 4, 8, 9 and notes)
  - Producers and Consumers, Clients and Servers (sections 6 and 7)
- Processes and Synchronization (Chapters 2 and 3)
  - States, Actions and Parallelization (Chapter 2: sections 1 and 2)
  - Atomicity and Await (Chapter 2: section 4)
  - Safety and Liveness Properties (Chapter 2: section 8)
  - Barrier Synchronization (Chapter 3: section 4)

Midterm Examination (October 4, 2011)

- Semaphores (Chapter 4 and Chapter 6 section 3)
  - Syntax, Semantics and Implementation (sections 1 and Chapter 6 section 3)
  - Basic problems: Barriers, Producers and Consumers, Bounded Buffers (section 2)
  - Readers/Writers and the Technique of Passing the Baton (section 4)
  - Case Study: Pthreads (section 6)
- Message Passing (Chapter 7)
  - Asynchronous Message Passing (section 1)
  - Filters, Clients and Servers, Interacting Peers (sections 2, 3.3 and 4)
  - Synchronous Message Passing (section 5)
- RPC and Rendezvous (Chapter 8)
  - Remote Procedure Call, Applications (section 1)
  - Rendezvous, Applications (section 2)
  - Case Study: SR Language (sections 3 and 7)
  - Readers/Writers Revisited (section 4)

Midterm Examination (November 10, 2011)

- Process Interaction Paradigms and Scientific Computing (Chapters 9 and 11)
- Languages, Compilers, Libraries, and Tools (time permitting)

Final Exam (December 13, 2011)

Ferris State University

CPSC340 – Computer Organization

Spring 2015

Instructor	Dr. J.F. (Jim) Nystrom nystroj@ferris.edu
Office and Phone	ASC 2056, (231) 591 – 5864
Office Hours	WF 12 – 2:0 pm, and/or by appointment.
Required Text	A.S. Tanenbaum, 6th Edition, *Structured Computer Organization*
Lecture	TR 9:30 – 10:45 am, STR 204, F 8:00 – 8:50 am, STR 105

- ### Course Description (*Updated Description*)

(4 credits) Digital logic and digital systems, machine-level representation of data, assembly-level machine organization and instruction sets, memory system organization, Input/Output and interrupts, multiprocessing and an introduction to systems software.
Requires: CPSC 130 or CPSC 200 or ECNS 311.

- ### Learning Outcomes

A student succeeding in this course should be able to:

- Demonstrate knowledge and understanding of the binary number system. Design and minimize logic circuits involving digital logic gates, and design finite-state machines using JK flip-flops.
- Demonstrate knowledge and understanding of the modern memory hierarchy (involving disk, RAM, cache, and registers); and segmented memory systems.
- Demonstrate knowledge and understanding of a processor microarchitecture, and the need for (and use of) microcode.
- Demonstrate knowledge and understanding of the basic planning, coding and validating of assembly language level programs.
- Demonstrate knowledge and understanding of operating system fundamentals, including virtual memory and memory management, file management, process management, and the system call interface.

- ## Grading

The course grade is based on Midterm Examinations, Lab Assignments and Homework, and a Comprehensive Final Exam. The following tables show how the course numerical grade (of 100 total points) is calculated and also how the course letter grade will be assigned.

Calculation of 100 point Numerical Grade

Component	Percent of Numerical Grade
Labs and Homework	20
Midterm Examination I	25
Midterm Examination II	25
Final Exam	30

Calculation of Letter Grade from Numerical Grade

A	>= 92	B	80 – 86	C	70 – 75	D	55 – 65
A-	86 – 92	B-	75 – 80	C-	65 – 70	F	< 55

(Please note that the letter grade assignment is the guaranteed curve. The instructor may or may not lower the grade required for the "A", for instance, at his discretion.) The Midterm Grade numerical grade calculation will use Homework for 20% and the first Midterm Exam at 80%.

- ## Homework and Lab Assignments

The homework consists of labs, program and homework problems. Each homework set will be assigned in class, and is generally due 1 to 2 weeks after it has been assigned. Each homework set will have a point value assigned, and the overall Homework grade will be the total points earned divided by the total number of points available. There will be some class time during the Friday lab time devoted to working hands-on with various simulators and/or logic design tools.

General Homework Policies:

- It is matter of academic honesty that you do not consult solutions from previous semesters.
- Although you are encouraged to work with other students, your solutions must not be copied from others (or from the internet).
- **No late assignments** will be accepted.

- ## Examinations

There will be two in-class Midterm examinations during the semester (tentatively set for February 26, 2015, and April 23, 2015). The Final Exam is Monday, May 4, 2015 from 10 – 11:40 am. **No make-up exam** for the Midterms will be given. Upon verification of an excused absence, the Final or the other Midterm (whichever is lowest) will also count as the grade for a single missed Midterm exam. NOTE: The Midterm and Final Exams may be fairly difficult, meaning that if you do not understand the material very well, you will probably not get a very good score on the exams. Also, the instructor may choose to curve exam grades at his discretion (based on the difficulty of the exam and class performance).

- ## Student Conduct

All students should refrain from cheating, they should not be disruptive in class, and in general should follow the FSU Student Code of Conduct (as outlined in the FSU Student Handbook, available online from the Office of Student Conduct). Failure to follow said code will most certainly result in sanctions in accordance with the aforementioned handbook and any other applicable rules and regulations. Students should also pay attention to the rules in the *COLLEGE OF ARTS AND SCIENCES SYLLABUS ATTACHMENT* for more details about potential consequences of cheating and/or disruptive behavior.

Students should turn cell phones off or to silent while in class; and students should never, ever answer a call in class.

- ## Services for Students with Disabilities

If you need disability accommodations in this class, you should first contact the *Ferris State University Disabilities Service Office (DSO)*. If you suspect that you may need special accommodations, the DSO will review your documentation to determine your eligibility for services or accommodations. It is important that you contact them in a timely fashion as it may take several days to review requests and prepare accommodations.

- ## Attendance

For this course, while I strongly encourage attendance at each class, *attendance is NOT required*. If you miss a class, it is your responsibility to obtain any notes, handouts, etc., that you missed. (That is, do not ask the instructor for the notes from a class you missed.)

- ## General Advice

Don't panic. Attend class and be on time. Study hard: keep up with the reading, start early on (and complete) all the assignments, and ask the instructor questions when you have any. Review the College of Arts & Sciences Syllabus Attachment for other helpful and important information. **NOTE**: The last day to drop this class is March 26, 2015.

- **Tentative Course Outline for CPSC340 (Spring 2015)**

We will try to cover most of the course textbook this semester, most likely, in the following order:

- Computer systems organization and digital logic
  - Introduction (Chapter 1)
  - Binary numbers (Appendix A)
  - Computer systems (Chapter 2)
  - The digital logic level (Chapter 3)

Midterm Examination (February 26, 2015)

- Instruction set architecture and assembly language
  - The microarchitecture level (Chapter 4)
  - The instruction set (Chapter 5)
  - The assembly language level (Chapter 7) (if time permits)

Midterm Examination (April 23, 2015)

- The operating system (Chapter 6) (if time permits)

Final Exam (May 4, 2015)

MATH 220.005 (Analytical Geometry & Calculus I)
4 credits, spring 2016
M-R 3:00-3:50 p.m. (Starr 137)

Professor Kent Sun, Ph.D.
Office ASC 2026
Phone: 231-591-2579
Email: kentsun@ferris.edu

Course Description

The first of a three-semester sequence in analytical geometry and calculus. Topics include: the limit, continuity, the derivative, differentiation of algebraic and transcendental functionswith applications, implicit differentiation, and introduction to integration with applications.

Course Material and Test Schedule

Chapter 1 Limits and their Properties (omit formal definition of limit)
- 1.1 A Preview of Calculus
- 1.2 Finding Limits Graphically and Numerically
- 1.3 Evaluating Limits Analytically
- 1.4 Continuity and One-Sided Limits
- 1.5 Infinite Limits

(Exam I)

Chapter 2 Differentiation (all sections)
- 2.1 The Derivative and the Tangent Line Problem
- 2.2 Basic Differentiation Rules and Rates of Change
- 2.3 Product and Quotient Rules and Higher-Order Derivatives
- 2.4 The Chain Rule
- 2.5 Implicit Differentiation
- 2.6 Related Rates

(Cumulative exam II)

Chapter 3 Applications of Differentiation
- 3.1 Extrema on an Interval
- 3.2 Rolle's Theorem and the Mean Value Theorem
- 3.3 Increasing and Decreasing Functions and the First Derivative Test
- 3.4 Concavity and the Second Derivative Test
- 3.5 Limits at Infinity
- 3.6 A Summary of Curve Sketching
- 3.7 Optimization Problems
- 3.8 Newton's Method (optional)
- 3.9 Differentials

(Cumulative exam III)

Chapter 4 Integration
- 4.1 Antiderivatives and Indefinite Integration
- 4.2 Area
- 4.3 Riemann Sums and Definite Integrals
- 4.4 The Fundamental Theorem of Calculus
- 4.5 Integration by Substitution

(Cumulative exam IV)

Chapter 5 Logarithmic, Exponential, and other Transcendental Functions
- 5.1 The Natural Logarithmic Function: Differentiation
- 5.2 The Natural Logarithmic Function: Integration
- 5.3 Inverse Functions
- 5.4 Exponential Functions: Differentiation and Integration
- 5.5 Bases Other Than e and Applications

(A Cumulative final exam is scheduled for Monday, May 2nd from 2-3:40 p.m.)

Course Calendar

Quiz dates and homework due dates will be assigned when the necessary material is covered or nearly covered. I will post these on the calendar feature of Blackboard.

Course Objective

To learn the basics concepts in differential and integral calculus.

Learning Outcomes

1) Estimate a limit using a numerical and graphical approach.
2) Evaluate a limit using properties of limits.
3) Determine the continuity of functions
4) Determine the derivatives of functions using the definition of the derivative and rules of differentiation.
5) Determine derivatives using implicit differentiation.
6) Determine for a function:
   a) Intervals of increase/decrease and concavity.
   b) Relative extrema using derivative tests and inflection points
   c) Use these concepts to sketch the graph
7) Determine the absolute extrema of a function on a closed interval.
8) Solve optimization problems.
9) Determine the antiderivatives of functions using various integration techniques.
10) Evaluate the definite integrals by using their properties
11) Use the Fundamental Theorem of Calculus to compute definite integrals.
12) Find area using definite integrals
13) Approximate definite integrals using numerical methods.
14) Determine the derivatives of functions using logarithmic differentiation

Prerequisite

Math 126 or Math 130 with grade of C- or better, or 26 ACT or 590 SAT

Textbooks and Notes

Required: Enhanced WebAssign or Calculus, 10th edition, Larson and Edwards; Brooks/Cole,
Optional: Student solution manual

A copy of the student solution manual is on two-hour reserve in FLITE.

I will hand out notes. The notes do not replace reading the book.

Office Hours

Tuesday, Thursday 1:00 – 3:00 p.m. (ASC 2026)

You may also make an appointment to see me. But please be aware that if you make an appointment to see me outside of my normal office hours and do not show up without canceling ahead of time then afterwards I will only consent to see you during my normal office hours or if I am in my office and not busy.

You may also simply stop by my office and I will answer questions if I am not busy. Normally, I spend a great deal of time in or near my office. However, I suggest calling ahead of time to check if I am in my office.

If more than one student shows up during an office hour then I will take turns answering questions. Therefore, do not wait for me outside my office door if I am with a student but make your presence known. If I need to speak with a student on a one-to-one basis because of a sensitive issue such as grades or advising then I will let you know.

Grading Policy

Course Grades

93% to 100%	= A	78% to 80%	= B-	61% to 64%	= D+
87% to 92%	= A-	74% to 77%	= C+	58% to 60%	= D
84% to 86%	= B+	71% to 73%	= C	55% to 57%	= D-
81% to 83%	= B	65% to 70%	= C-	54% and below	= F

Quizzes (The points of the quizzes will vary and be worth up to 10 pointseach)
I will add points to the total of the quiz points earned to roughly simulate dropping the two lowest quiz grades.
5 points/homework (At least the two lowest HW grades will be dropped)
100 points/exam (Not the cumulative final. The lowest grade will be weighed half as much as the other exams)
150 points Cumulative final exam.

If your answer on an assignment, quiz, or exam is wrong, partial credit may be given if correct intermediate steps are shown. However, if your answer is right but the intermediate steps are wrong or nonexistent, full credit and perhaps even partial credit may not be given. The reason for grading in such a manner is that I need to see if your logic is correct. It is possible to make several mistakes and still get the "correct" answer.

Whatever you write down on an assignment, quiz, or exam wil be graded. Therefore, erase or neatly cross out whatever is not part of your solution i.e. do not use your assignment, quiz, or exam as scratch paper. It is to your advantage to make your solutions legible and easy to follow since partial credit grading is subjective.

To be consistent in assigning partial credit, I usually grade one or two questions at a time. Partial credit grading is a time-consuming task; I will try to return your test or quiz as soon as possible but sometimes I may need more time.

Your final course grade depends on many factors. It may depend on how many courses and which courses you are taking, whether you work during the semester, whether you have other responsibilities or are having personal problems, if you are repeating the course, if you have a weak/strong mathematical background, etc. You may spend very little time studying for this course but do well on the exams or spend a lot of time studying for this course but do poorly on the exams. When I assign your grade, however, I have to ignore all of these factors. Your grade is based upon my opinion on how much you know (which is based upon how well you do on homework, projects, quizzes, and exams) and not on how hard you tried. I respect a student who tries his/her best. Your grade is not necessarily an indication of whether you tried your best

You, however, are the person most responsible for your learning and your future.

Quizzes and Exams

Quizzes and exams are cumulative. The reason for this is that it has been scientifically shown that repeatedly reviewing material helps transfer information from working memory to long term memory which is one definition of learning. However, USUALLY most of the material on each exam (not quiz) will be on topics covered after the previous exam. Therefore, when preparing for an exam, I strongly suggest that you study the latest material before reviewing earlier material.

If you have an excused absence then you may make up your exam after you return but ther may be a five point deduction for each day or portion of the day after the exam was given in class.

I may allow you to take an exam before the regularly scheduled day depending on the excuse. If you do not have an excused absence then you will not be allowed to make up an exam. You are required to make up an exam as soon as possible consistent with your excuse.

Quiz dates are announced. In general, quizzes may not be made up unless there is a University excused absence such as an Athletic event or a conference.
Quizzes are usually short and are given at the beginning or end of the class period as determined by me. For example, I may give a quiz at the end of the class period that may be on thatday's lecture.

Keep your quizzes and exams until the end of the semester in case there is a dispute on the grade.

If you arrive late then you will not be given any extra timefor quizzes or exams.

Homework

Homework will be collected at the beginning of class. If you are late for class then you wll be allowed to turn in the homework as soon as you enter the class (or if there is a quiz, directly after the quiz). **Late homework will not be accepted whether or not there is an excused absence**. If you do not intend on attending class to hand in your homework then you may have someone else hand it in by the end of class or you may email a scan of the homework to me as long as the email has a time-stamp no later than the end of the class period. The scan must be legible, of course.

Not all homework problems will be graded. In addition, the homework will be graded roughly. The reason for this is that it is virtually impossible to grade all of the homework problems due to time constraints. The problems that will be graded are chosen by me before I look at how well you did on the homework. You must show your work Remove messy fringes. Staple papers together on the top, left-hand corner (do not bend a corner or tear the paper to attach pages together). Problems should be done in order. Write neatly. On the top right-hand corner print your name, the HW number, the date, and your section number. **Each separate infraction will result in a deduction of one point for a maximum of two points/HW assignment.**

Please keep your homework until the end of the semester in case there is a dispute on the grade.

Blackboard

I will use it to post the syllabus, announcements, Tegrity lectures, important dates, and other relevant material for the course.

Grade of Incomplete (I)

Receiving a **grade of incomplete** (I) in a course indicates that you have successfully completed a major portion of the course requirements, and you should not re-register for the course. The grade of "I" is a temporary designation that is assigned for illness, injury, birth of a child, death of a family member, jury duty or other necessary absences, generally beyond the control of the student, which prevents you from completing the course requirements.

Completion of at least 75% of course work at passing levels is required before an (I) grade may be assigned. In this course, this means that you must satisfactorily complete all work up to and including the chapter 4 exam.
You must make arrangements with me to complete all required work by the close of the following semester, excluding summer. I may require you to sign an agreement stipulating assignments and deadlines that must be met. Once you complete the course requiements I will submit a grade change form to the dean's office for approval and processing.

Incomplete grades that are not made up within the following semester, excluding summer semester, are changed to the grade of "F", unless I submit a written authorization for a time extension.

Student Conduct and Cheating and Academic Dishonesty Policy

The University expects you to conduct yourself with dignity and respect when you are with other students and faculty. Improper conduct includes talking in class, criticizing unconstructively, or simply being rude. You are considered to be and expected to act like adults and will be held to that standard. I will do all that I can to preserve the integrity of the learning atmosphere. If you disrupt this learning atmosphere I reserve the right to ask you to leave the classroom.

It is honorable to try your best but still not do well in the course. It is not honorable to commit academic dishonesty. Cheating on a homework, quiz, or exam will result in a zero on the homework, quiz, or exam and referral to The Office of Student Conduct for the first incident and possibly failure of the course depending on my judgment. A second incident of cheating will automatically result in the failure of the course. Signing someone else in on the attendance sheet is also considered an instance of cheating.
A student who has been found to be in violation of academic misconductwill be referred to The Office of Student Conduct and may receive a failing grade in the course and any of the disciplinary sanctions outlined in the Board of Trustees policy of student responsibilities, including suspension or dismissal from the university.

The University encourages a mature attitude toward learning and sound academic morale, and discourages illegitimate aids in examinations, laboratory work and homework assignments. Cheating, plagiarism and other forms of academic dishonesty including the acquisition,without permission, of tests and other academic material belonging to a member of the University community, and the sale and/or distribution of such material are in violation of University policy and subject to disciplinary action.

"Cheating" includes, but is not limited to: (1) use of any unauthorized assistance in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying outother assignments; or (3) the acquisition, without permission, of tests or other academic material belonging to a member of the University faculty or staff.

I consider gaining or giving information about an earlier given exam or quiz this semester as a form of cheating. For example, if student A takes a test at 11:00 AM and tells student B who has to take a similar exam at 1:00 PM what problems were on the morning exam then both students are guilty of cheating even if the exams are not exactly the same orthe students are from different sections.

I consider lying to me as a type of cheating. For instance, claiming that you were too ill to take a test but going to classes before and after a scheduled test is an instance of cheating.

"Plagiarism" includes, but is not limited to, the use by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Attendance Policy

You are allowed 4 unexcused absences without a penalty. Each additional unexcused absence will lower your final average by one percent.

However, it's not a good idea to miss class, even if you have unexcused absences left "to burn" because it will be difficult to catch up.

If you want to claim an excused absence then you must turn in an Excused Absence Form to me within a week, if possible as determined by me, of your absence otherwise I will consider your absence to be unexcused.

Coming in late to class disturbs the learning atmosphere. You are allowed one late absence without penalty. Future late arrivals will incur a ½ absence if 0-15 minutes late and a full absence if more than 15 minutes late. Leaving class early will incur a ½ absence unless I am informed in advance and I consider it to be a valid excuse or if your leaving is considered to be an emergency.

Signing someone else in will result in a 3% penalty for both the absent student and the signer and is considered to be an instance of cheating.

Whether or not your absence was unexcused or excused, you are responsible for learning the material reviewed in the class as well as being aware of the quiz dates or other administrative details that were announced in the class. Please ask your classmates for this information and class notes.
The following are excused absences:

1. Medical emergency (your own). A doctor's appointment by itself is not considered to be a medical emergency. You must provide a written excuse from a doctor and permission for me to discuss with your doctor, if necessary, whether this was a medical emergency that prevented you from taking your regularly scheduled exam.
2. Medical emergency (a family member).
3. Death in the family or a very close friend
4. Jury duty/or being subpoenaed for court testimony
5. University excused activity such as being on an athletic team and having to play away.
6. Military service
7. Wedding of a relative or friend. You are excused from the exam only if it is extremely difficult for you to take the exam and still make the wedding. For example, if your exam is in the morning and the wedding is at night in Grand Rapids then you are still expected to sit for the exam. You are only excused for one wedding per semester.
8. If you have a job scheduled during the exam (not quiz) period where it is impossible for you to find a replacement.
9. Inclement weather in which local police agencies suggest that it is dangerous to drive (this only applies to commuters who do not live near campus and not to students returning to campus after being away for the weekend)
10. Other issues not listed that I feel are beyond your control.

The following excuses are examples of unexcused absences and do not constitute a complete list:

1. Transportation problems (except for #8 from the previous section)
2. Oversleeping
3. Day care problems
4. Being in jail
5. An job interview
6. Escorting a sick student to the infirmary unless no one else is available to help
7. A friend's wedding (except for #7 from the previous section)
8. A doctor's appointment for a non-emergency. Difficulty in finding an alternate appointment does not excuse your absence.
9. Going on vacation with your family and/or friends

Student Participation

I will call on people to answer questions in class. If I specifically call on a student then please let that student attempt to answer the question. If you have a question, then please raise your hand. If I don't respond to you immediately it is because I want to finish whatever concept I am trying to cover. I want to involve everyone in class.

I will not answer every question in class. If the answer to your question is found in the syllabus then I will tell you that it is in the syllabus. You are responsible for knowing the syllabus. If your question requires a time-consuming answer or if it is not pertinent to the topic then I may answer your question after class or during office hours. I may not answer your question or only give you a hint if I feel that you would benefit by rereading the book and/or thinking a little longer then trying to answer your own question. The literature on pedagogy states that the more that you do yourself, the better the chance is that you will understand, remember, and use the concept in the future.

Calculator and Cheat Sheet Policy

Graphing calculators are not allowed on quizzes and exams. Non-programmable, scientific calculators are allowed on quizzes and exams, however you need to show your work even if calculators are allowed i.e. you need to show me that you would be able to do the calculations by hand if you were given enough time. Assume that scientific calculators are allowed on a quiz or exam unless I specify otherwise. You may not borrow a calculator from another student during an exam unless that student does not need to use the calculator any longer during the exam. I reserve the right to check that your calculator's memory register is cleared before exams.

You may not use your own cheat sheet. I may give you a cheat sheet for certain quizzes or exams. I will announce when this will be the case.

Cell Phone Policy

Turn-off your cell phones when you are in the class. Cell phones going off disturb the learning atmosphere in the class.

Miscellaneous

Q1. Who is the instructor?

A1. I am a transplant from the Northeast. I grew up in New York, New Jersey,and Connecticut so I say "soda" not "pop" and I don't hunt. I have a BS and MS in Electrical Engineering and I worked as an engineer for 5 years on Long Island, NY. I have a Ph.D. in Applied Mathematics and Statistics from SUNY at Stony Brook. I have done postdoctoral work in biostatistics at the University of North Carolina at Chapel Hill. This is my 16th year teaching at Ferris.

Q2. Why study calculus?

A2. To study calculus is particularly important if you are majoring in a scientific or business related field because with it, you can solve more realistic and complicated problems in a simpler manner. Calculus, in addition, is generally considered to be the gateway to higher mathematics.

Q3. Why study math when the people in your field tell you that you don't need it?

A3. To study mathematics is to learn to think clearly. Abraham Lincoln studied Euclid's Elements (geometry) as a lawyer because he thought that it was an excellent way to train himself to think logically.

Trying to decide what skills you'll need in the future is like trying to hit a moving target: you have to aim where the target will be and not where it is now. The problem isthat you won't know where the "target" will be. If you can think logically then you will be better prepared to deal with the unknown when the future does come.

At the Academic Honors Convocation in March, 2001, the guest speaker and FSU alumnus (class of '90) Ms. Carrie Cusack said that she wished that she took more courses outside of her major (CIS). She said that she now knows that to do her job well requires a whole range of skills and that the courses outside of her major were just as important as those within her major. In particular, she wished that she studied harder in statistic (a branch of mathematics) class.

Q4. What kind of student participation is expected?

A5. I will call on people to answer questions in class. If I specifically call on a student then please let that student attempt to answer the question. If you have a question, then please raise your hand. If I don't respond to you immediately it's because I want to finish whatever concept I am trying to cover. My goal is to involve everyone in class.

Q5. Will I slow down?

A6. Only if you have specific questions on the material. College classes move much faster than high school classes. Eventually you will get use to the pace.

Q6. Is it necessary to read the book?

A7. Yes. You can't possibly record everything that I say in class and it's helpful to be able to reread a chapter until a concept is clear. I may gloss over a topic that I consider to be easy to understand if you read the book. <u>You are responsible for the material in the book as well as lecture material</u>.

Q7. What is my teaching philosophy?

A8. The quotes below summarize the heart of my teaching philosophy.

Two Quotes

"If you resolutely determined to make a lawyer [or anything else] of yourself, the thing is more than half done already…Get the books, and read and study till you understand them in their principle features…Always bear in mind that your own resolution to succeed, is more important than any other one thing."

Abraham Lincoln
Letter to Isham Reavis, Esq.
November, 1855

"The unexamined life is not worth living."

Socrates (469 – 399 B.C.)

HW For Math 220 (Analytical Geometry and Calculus I)
Calculus with Analytic Geometry (10th Edition) by Larson and Edwards

The problems listed below are suggested. Skip the problems that you already know how to solve. Do only enough problems until you're proficient in solving them. Ignore the parts that ask you to use a graphing calculator.

HW #	Section	Page	Responsible for these problems
Chapter 1	**Limits and Their Properties**		
1)	1.1	47	1-5a, 6, 7, 9, 10
2)	1.2	55	1-28, 33-50 (find L), 57- 60, 63, 64, 67-72
3)	1.3	67	5-74, 83-90, 101-104, 115-120
4)	1.4	79	1-72, 87-90, 95-100, 103-106, 109-113, 118, 119, 121
5)	1.5	88	1-48, 53-56, 58, 61, 62, 63a, 64-68
6)	Review	91	All however, not responsible for graphing
Chapter 2	**Differentiation**		
7)	2.1	103	1-24, 33-48, 53-56, 75-80, 93-96
8)	2.2	114	1-68, 77-79, 87-102, 105, 106, 115-117
9)	2.3	125	1-54, 59-62, 69-80, 83-86, 90, 99-106, 111-116, 127, 129-134
10)	2.4	136	1-34, 43-94, 102-108, 116, 125-128
11)	2.5	145	1-16, 21-42, 45-50, 55, 57, 58, 74
12)	2.6	153	1-9, 11-47
13)	Review	157	All however, not responsible for graphing
Chapter 3	**Applications of Differentiation**		
14)	3.1	167	1-40, 59-66
15)	3.2	174	1-22, 27-34, 37-46, 51, 52, 58-60, 73-79
16)	3.3	183	1-48, 55-62, 73-75, 79, 81-86, 91-96
17)	3.4	192	1-42, 53-56, 60-63, 65, 67, 74-78
18)	3.5	202	1-6, 13-38, 43-48, 59-74, 86, 87, 103, 104
19)	3.6	212	1-24, 55-60
20)	3.7	220	2-23, 25-27, 29-42, 44, 45, 47
21)	3.9	236	1-20, 25-31, 33-42, 47-50
Chapter 4	**Integration**		
22)	4.1	251	1-32, 35-42
23)	4.2	263	1-6, 13-20
24)	4.3	273	13-44, 59-64
25)	4.4	288	5-56, 61-63
26)	4.5	301	1-30, 33-54, 69-74

Chapter 5 Logarithmic, Exponential, and Other Transcendental Functions

29)	5.1	325	19-34, 41-64, 73-78
30)	5.2	334	1-40, 63-66
31)	5.3	343	1a-8a, 9-12, 35-46, 63-74
32)	5.4	352	33-54, 63-64, 91-118
33)	5.5	362	37-58, 63-66, 71-82

I reserve the right to make needed and appropriate adjustments in this syllabus.

MATH 230.001 (Analytical Geometry & Calculus II)
4 credits, summer 2016
M-R 2:00-4:05 p.m. (STR120)

Kent Sun, Ph.D.
Office ASC 2026

Office Phone: 231-591-2579
Cell Phone: 231-912-9695
Email: kentsun@ferris.edu

Course Description

The second of a three-semester sequence in analytical geometry and calculus. Topics include: applications of integration, integration techniques, indeterminate forms, improper integrals, and infinite series.

Course Material and Test Schedule

Chapter 7 Applications of Integration
- 7.1 Area of a Region Between Two Curves
- 7.2 Volume: The Disk Method
- 7.3 Volume: The Shell Method
- 7.4 Arc Length and Surfaces of Revolution

(Cumulative exam I)

Chapter 8 Integration Techniques, L'Hopital's Rule, and Improper Integrals
- 8.1 Basic Integration Rules
- 8.2 Integration by Parts
- 8.5 Partial Fractions
- 8.7 Indeterminate Forms and L'Hopital's Rule
- 8.8 Improper Integrals

(Cumulative exam II)

Chapter 9 Infinite Series
- 9.1 Sequences
- 9.2 Series and Convergence
- 9.3 The Integral Test and p-series
- 9.4 Comparisons of Series
- 9.5 Alternating Series
- 9.6 The Ratio and Root Tests

(Cumulative exam III)

- 9.7 Taylor Polynomials and Approximations
- 9.8 Power Series
- 9.9 Representation of Functions by Power Series
- 9.10 Taylor and Maclaurin Series

(Cumulative final exam scheduled for Wednesday, Aug. 10th from 2-3:40 p.m.)

Course/Learning Outcomes

1. Compute definite, indefinite and improper integrals using different integration techniques (u-substitutions; parts; partial fractions; etc.)

2. Apply L'Hôpital's Rule to evaluate indeterminate forms

3. Solve problems which apply integrals (area between curves; volume; arc length; surface area; etc.)

4. Determine, with appropriate reasoning, whether an infinite series converges absolutely, converges conditionally or diverges.

5. Find the Taylor series of a function and use that series to solve problems involving polynomial approximation.

Prerequisite

Math 220 with a grade of C- or better, or its equivalent

Textbooks and Notes

Required: Calculus, 10th edition, Larson and Edwards; Brooks/Cole, Cengage and Enhanced Webassign.

The solutions to the odd numbered problems in the textbook can be found online at CalcChat.com

I will hand out notes. The notes do not replace reading the book. You are responsible for reading the book. In particular, pay attention to the examples given in the book.

Office Hours

Monday-Thursday 9:40 – 10:30 a.m. (ASC 2026)

You may also make an appointment to see me. But please be aware that if you make an appointment to see me outside of my normal office hours and do not showup without canceling ahead of time then afterwards I will only consent to see you during my normal office hours or if I am in my office and not busy.
You may also simply stop by my office and I will answer questions if I am not busy. Normally, I spend a great deal of time in or near my office. However, I suggest calling ahead of time to check if I am in my office.

If more than one student shows up during an office hour then I will take turns answering questions. Therefore, do not wait for me outside my office door if I am with a student but make your presence known. If I need to speak with a student on a one-to-one basis because of a sensitive issue such as grades or advising then I will let you know.

Grading Policy

Course Grades

93% to 100%	= A	78% to 80%	= B-	61% to 64%	= D+
87% to 92%	= A-	74% to 77%	= C+	58% to 60%	= D
84% to 86%	= B+	71% to 73%	= C	55% to 57%	= D-
81% to 83%	= B	65% to 70%	= C-	54% and below	= F

75 total points (will be scaled) for the homeworks.
10 points/quiz. I will give announced quizzes as needed.
100 points/exam (The lowest exam grade will be weighed half as much as the other tests)
150 points cumulative final exam.

If your answer on an assignment, quiz, or exam is wrong, partial credit may be given if correct intermediate steps are shown. However, if your answer is right but the intermediate steps are wrong or nonexistent, full credit and perhaps even partial credit may not be given The reason for grading in such a manner is that I need to see if your logic is correct. It is possible to make several mistakes and still get the "correct" answer.

Whatever you write down on an assignment, quiz, or exam will be graded. Therefore, erase or neatly cross out whatever is not part of your solution i.e. do not use your assignment, quiz, or exam as scratch paper. It is to your advantage to make your solutions legible and easy to follow since partial credit grading is subjective.

To be consistent in assigning partial credit, I usually grade one or two questions at a time. Partial credit grading is a time-consuming task; I will try to return your test or quiz as soon as possible but sometimes I may need more time.

Your final course grade depends on many factors. It may depend on how many courses and which courses you are taking, whether you work during the semester, whether you have other responsibilities or are having personal problems, if you are repeating the course, if you have a weak/strong mathematical background, etc. You may spend very little time studying for this course but do well on the exams or spend a lot of time studying for this course but do poorly on the exams. When I assign your grade, however, I have to ignore all of these factors Your grade is based upon my opinion on how much you know (which is based upon how well you do on homework, projects, quizzes, and exams) and not on how hard you tried I respect a student who tries their best. Your grade is not necessarily an indication of whether you tried your best

Quizzes and Exams

Quizzes and exams are cumulative. The reason for this is that it has been scientifically shown that repeatedly reviewing material helps transfer information from working memory to long term memory which is one definition of learning. However, most of the material on each exam/quiz will be on topics covered after the previous exam/quiz. It is even possible that I will not put ANY previous material on an exam/quiz. Therefore, when preparing foran exam/quiz, I strongly suggest that you study the latest material before reviewing earlier material.

If you have an excused absence then you may make up your quiz/exam after you return but there may be a 5% deduction for each day or portion of the day after the quiz/exam was given in class. I may allow you to take the quiz or exam before the regularly scheduled day depending on the excuse. If you do not have an excused absence then you will not be allowed to make up an exam or quiz. You are required to make up an exam as soon as possible consistent with your excuse.

Please keep your quizzes and exams until the end of the semester in case there is a dispute on the grade.

Quizzes are approximately 10 to 25 minutes long and are given at the beginning of the class period.

If you arrive late then you will not be given any extra timefor quizzes or exams.

Homework

Homework will be assigned on Webassign. No late HWs will be accepted The assignments will be posted by 5:30 p.m. and will generally be due by the beginning of the next class.

Blackboard

I will post the syllabus, announcements, and other relevant material on it.

Grade of Incomplete (I)

Receiving a **grade of incomplete** (I) in a course indicates that you have successfully completed a major portion of the course requirements, and you should not re-register for the course. The grade of "I" is a temporary designation that is assigned for illness, injury, birth of a child, death of a family member, jury duty or other necessary absences, generally beyond the control of the student, which prevents you from completing the course requirements.

Completion of at least 75% of course work at passing levels is required before an (I) grade may be assigned. In this course, this means that you must satisfactorily complete all work up to and including the cumulative exam three.

You must make arrangements with me to complete all required work bythe close of the following semester, excluding summer. I may require you to sign an agreement stipulating assignments and deadlines that must be met. Once you complete the course requirements I will submit a grade change form to the dean's office for approval and processing.

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It is honorable to try your best but still not do well in the course. It is not honorable to commit academic dishonesty. Cheating on a homework, quiz, or exam will result in a zero on the homework, quiz, or exam and referral to The Office of Student Conduct for the first incident and possibly failure of the course depending on my judgment. A second incident of cheating will automatically result in the failure of the course. Signing someone else in on the attendance sheet is also considered an instance of cheating.
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I consider lying to me as a type of cheating. For instance, claiming that you were too ill to take a test but going to classes before and after a scheduled test is an instance of cheating.

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Attendance Policy

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However, it's not a good idea to miss class, even if you have unexcused absences left "to burn" because it will be difficult to catch up.

Coming in late to class disturbs the learning atmosphere. You are allowed one late absence without penalty. Future late arrivals will incur a ½ absence if 0-15 minutes late and a full absence if more than 15 minutes late. Leaving class early will incur a ½ absence unless I am informed in advance and I consider it to be a valid excuse or if your leaving is considered to be an emergency.

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Whether or not your absence was unexcused or excused, you are responsible for learning the material reviewed in the class as well as being aware of the quiz dates or other administrative details that were announced in the class. <u>Please ask your classmates for this information and class notes.</u>

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3. Death in the family or a very close friend
4. Jury duty/or being subpoenaed for court testimony
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6. Military service
7. Wedding of a relative or friend. You are excused from the exam only if it is extremely difficult for you to take the exam and still make the wedding. For example, if your exam is in the morning and the wedding is at night in Grand Rapids then you are still expected to sit for the exam. You are only excused for one wedding per semester.
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6. Escorting a sick student to the infirmary unless no one else is available to help
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You may not use your own cheat sheet. I may give you a cheat sheet for certain quizzes or exams. I will announce when this will be the case.

Cell Phone Policy

Turn-off your cell phones when you are in the class. Cell phones going off disturb the learning atmosphere in the class.

Tutors for Hire

1) Sarah, a licensed high school math teacher. Contact information upon request.
2) Roy and Suellen, former math faculty. Contact information upon request.

Miscellaneous

Q1. Who is the instructor?

A1. I am a transplant from the Northeast. I grew up in New York, New Jersey, and Connecticut so I say "soda" not "pop" and I don't hunt. I have a BS and MS in Electrical Engineering and I worked as an engineer for 5 years on Long Island, NY. I have a Ph.D. in Applied Mathematics and Statistics from SUNY at Stony Brook. I have done postdoctoral work in biostatistics at the University of North Carolina at Chapel Hill. I started working at Ferris in 2000.

Q2. Why study calculus?

A2. To study calculus is particularly important if you are majoring in a scientific or business related field because with it, you can solve more realistic and complicated problems in a simpler manner. Calculus, in addition, is generally considered to be the gateway to higher mathematics.

Q3. Why study math when the people in your field tell you that you don't need it?

A3. To study mathematics is to learn to think clearly. Abraham Lincoln studied Euclid's Elements (geometry) as a lawyer because he thought that it was an excellent way to train himself to think logically.

Trying to decide what skills you'll need in the future is like trying to hit a moving target: you have to aim where the target will be and not where it is now. The problem is that you won't know where the "target" will be. If you can think logically then you will be better prepared to deal with the unknown when the future does come.

At the Academic Honors Convocation in March, 2001, the guest speaker and FSU alumnus (class of '90) Ms. Carrie Cusack said that she wished that she took more courses <u>outside of her major</u> (CIS). She said that she now knows that to do her job well requires a <u>whole range of skills</u> and that the courses outside of her major were <u>just as important</u> as those within her major. In particular, she wished that she studied harder in statistic (a branch of mathematics) class.

Q4. I've never done well in math and am terrified of failing this course. What should I do?

A4. Don't miss class. Studies have shown that students who regularly attend class do better than those who don't. In addition, you can't make up quizzes or exams unless you have an <u>excused</u> absence.

Keep up in class. It's much harder to catch up than to keep up. If you don't understand something in class ask me to explain it to you immediately! There's an excellent chance that you're not the only one lost! In general, doing the HW doesn't guarantee that you will understand the material. If you don't feel that you understand the material then try to summarize what you are supposed to know to find out what you don't know.
Do as many <u>challenging</u> problems as possible. Do problems that are not assigned especially if your grasp of the material is shaky.

Go to Academic Support Services (ASC 1017 591-3543) for free tutoring. You will probably need to make an appointment ahead of time. If your grasp of the prerequisites of this course is very poor then consider withdrawing from this course and taking the prerequisite.

Continually review material given earlier in the semester. Because the final exam is cumulative and is a significant factor in your final grade, if you did poorly on certain topics in the past then you will do poorly on that portion of the final exam unless you learn from your mistakes.

Q5. What kind of student participation is expected?
A5. I will call on people to answer questions in class. If I specifically call on a student then please let that student attempt to answer the question. If you have a question, then please raise your hand. If I don't respond to you immediately it's because I want to finish whatever concept I am trying to cover. My goal is to involve everyone in class.

Q6. Will I slow down?
A6. Only if you have specific questions on the material. College classes move much faster than high school classes. Eventually you will get use to the pace.

Q7. Is it necessary to read the book?
A7. Yes. You can't possibly record everything that I say in class and it's helpful to be able to reread a chapter until a concept is clear. I may gloss over a topic that I consider to be easy to understand if you read the book. <u>You are responsible for the material in the book as well as lecture material</u>.

Q8. What is my teaching philosophy?
A8. The quotes below summarize the heart of my teaching philosophy.

Two Quotes

"The great teacher makes a few simple points. The powerful teacher leaves one or two fundamental truths. And the memorable teacher makes the point not by telling but by helping the students discover on their own. Learning takes place through discovery, not when you're told something but when you figure it out fo yourself. All a really fine teacher does is make suggestions, point out problems, above all, ask questions, and more questions, and more questions…

What should you ask of your professors? (1) Don't tell me things; let me find out for myself. (2) But when I need help, give it to me. (3) And when my work is poor, don'ttell me it's good. Many professors would rather be liked than be understood; not a few find it easier to indulge the students than teach them. Don't accept from professors compliments when they owe you criticism. And love them when they're tough. Proverbs says, 'Rebuke a wise person, and you'll be loved, rebuke a fool and you'll be hated.' Show yourselves wise, and you'll get professors who care about what you know.

What should your professors ask of you? (1) Don't ask me to sell you my subject; let meexplain it to you. Once you're in the classroom, relevance is a settled question: this is what you want to know; now let me teach it. (2) Don't stop work in the middle of the semester. It's easy to start with enthusiasm, and it's easy to end with commitment. But in the middle of a course, it's hard to sustain your work; the beginning is out of sight, the end and goal and purpose of the course not yet on the horizon. Do your best when the weather looks bleak. (3) Don't sit back and wait to be told things; stay with me and allow the logic of the course to guide us both; join me, think with me."

Jacob Neusner
Convocation speech to entering freshmen
Elizabethtown College
September 1991

Finally, some advice from a very successful person with only 3 months of formal education:

"If you resolutely determined to make a lawyer [or anything else] of yourself, the thing is more than half done already…Get the books, and read and study till you understand them in their principle features…Always bear in mind that your own resolution to succeed, is more important than any other one thing."

Abraham Lincoln
Letter to Isham Reavis, Esq.
November, 1855

Special note for summer courses

At \$392/credit hour and 24 lectures for the summer session, **<u>each lecture costs you</u>**:

$$\frac{(\$392/credit)(4\ credits)}{24\ lectures} \approx \boxed{\$65.33/lecture}$$

At the Mich. minimum wage of \$8.50/hour, **<u>you work this many hours to pay for one lecture</u>**:

$$\frac{\$65.33/lecture}{\$8.50/hour} \approx \boxed{7.6\ hours/lecture}$$

Assuming that you work 20 hours/week, **<u>you work this many weeks to pay for the course</u>**:

$$\frac{(\$392/credit)(4\ credits)}{(\$8.50/hour)(20\ hours/week)} \approx \boxed{9.22\ weeks}$$

If you take a summer course then take it seriously because if you end up withdrawing from this course then it's like working 20 hours/week for more than 9 weeks for free.

I reserve the right to make needed and appropriate adjustments in this syllabus.

MATH 251.001 (Statistics for the Life Sciences)
3 credits, fall 2014
MWF 10:00-10:50 a.m. (STR 226)

Professor Kent Sun, Ph.D.
Office ASC 2026

Phone: 231-591-2579
Email: kentsun@ferris.edu

Course Description

Math 251 is an introductory course in statistics. Topics include descriptive statistics, probability, and inferential statistics. The course is web-enhanced.

Course Material and Test Schedule

Chapter 1 Introduction to Data Analysis
- 1.1 Introduction
- 1.2 Populations and Samples
- 1.3 Variables or Data Types
- 1.4 Measures of Central Tendency: Mean, Median, and Mode
- 1.5 Measures of Dispersion and Variability
- 1.6 Descriptive Statistics for Frequency Tables or Grouped Data
- 1.7 The Effect of Coding Data
- 1.8 Tables and Graphs
- 1.9 Quartiles and Box Plots
- 1.10 Accuracy, Precision, and the 30-300 Rule

(Exam I)

Chapter 2 Introduction to Probability
- 2.1 Definitions
- 2.2 Use of Permutations and Combinations
- 2.3 Introduction to Set Theory and Venn Diagrams
- 2.4 Axioms and Rules of Probability
- 2.5 Probability Rules and Mendelian Genetics

(Quiz containing material up to and including chapter 2)

Chapter 3 Probability Distributions
- 3.1 Discrete Random Variables
- 3.2 The Binomial Distribution
- 3.3 The Poisson Distribution
- 3.4 Continuous Random Variables
- 3.5 The Normal Distribution
- 3.6 The Standard Normal Distribution

(Cumulative exam II containing material up to and including chapter 3)

Chapter 4 Sampling Distributions
- 4.1 Definitions
- 4.2 Distribution of the Sample Mean
- 4.3 Confidence Intervals for the Population Mean
- 4.4 Confidence Intervals for the Population Variance
- 4.5 Confidence Intervals for a Population Proportion

(Cumulative quiz containing material up to and including section 4.5)

Chapter 5 Introduction to Hypothesis Testing
- 5.1 An Overview: The Famous Cornflakes Example
- 5.2 Typical Steps in a Statistical Test of Hypothesis
- 5.3 Type I versus Type II Errors in Hypothesis Testing
- 5.4 Binomial Examples of Hypothesis Testing

(Cumulative quiz containing material up to and including section 5.4)

Chapter 6 One-Sample Tests of Hypothesis
- 6.1 Hypotheses Involving the Mean μ
- 6.2 Hypotheses Involving the Variance σ^2

(Cumulative exam III containing material up to and including chapter 6)

Chapter 7 Tests of Hypothesis Involving Two Samples
- 7.1 Comparing Two Variances
- 7.2 Testing the Differences between Two Means of Independent Samples
- 7.3 Confidence Intervals for $\mu_1 - \mu_2$
- 7.4 The Difference between Two Means with Paired Data

Chapter 10 Linear Regression and Correlation (If time permits)
- 10.1 Simple Linear Regression
- 10.2 Simple Linear Correlation Analysis

(Cumulative Final exam containing material up to and including chapter 10)
Monday, 12/8/14 from 8:00 – 9:40 p.m. in SCI 126

Course Calendar

Quiz dates and homework due dates will be assigned when the necessary material is covered or nearly covered. I will post these on the calendar feature of FerrisConnect.

There are no classes on Labor Day, Thanksgiving, and the day after Thanksgiving. If the class meets after 12 p.m., then there will not be class the day before Thanksgiving however, a Tegrity lecture will be loaded on FerrisConnect for that day's lecture that you are responsible for viewing.

Email

Please use the email system on FerrisConnect while the course is in session.

Course Objective

To learn how to think statistically and to learn enough basic statistics to be able to perform elementary statistical tests.

Course Outcomes

Students who have completed Math 251 should be able to:
- Define basic statistical terms.
- Interpret and create visual displays of data.
- Interpret and compute statistical summaries of data.
- Calculate probabilities by applying various methods (e.g counting methods, probability distributions, central limit theorem).
- Compute and interpret point and interval estimates of the mean and proportion.
- Perform hypothesis tests for means and proportions and interpret the results.
- (If time permits) Identify linear relationships and describe the strength and significance of the relationship.

Prerequisite

A minimum of a C- in MATH 130, 26 on the ACT math part, or 590 on the SAT math part.

Textbooks and Notes

An Introduction to Biostatistics, 2nd edition, Glover and Mitchell, 2008

It is not possible for you to understand all of the material during lecture. You must solve problems and may have to read and reread the book until concepts are clear. In addition, I may gloss over a topic or deliberately not cover material in lecture (including examples given in the lecture notes) if it is in the book and is easy to understand. One of the reasons why this textbook was chosen for this course was because of its readability. In particular, you must understand the examples given in the book. You are responsible for the material in the book as well as lecture material and I may test you on material that is found in the reading but was not covered in class

Office Hours and Schedule

Monday and Wednesday 11 – 1 p.m. (ASC 2026)

You may also make an appointment to see me But please be aware that if you make an appointment to see me outside of my normal office hours and do not show up without canceling ahead of time then afterwards I will only consent to see you during my normal office hours or if I am in my office and am not busy. Normally, I spend a great deal of time in or near my office. However, I suggest calling ahead of time to check if I am in my office.

If more than one student shows up during an office hour then I will take turns answering questions. Therefore, do not wait for me outside my office door if I am with a student but make your presence known. If I need to speak with a student on a one-to-one basis because of a sensitive issue such as grades or advising then I will let you know.

Grading Policy

Course Grades

93% to 100%	= A	78% to 80%	= B-	61% to 64%	= D+
87% to 92%	= A-	74% to 77%	= C+	58% to 60%	= D
84% to 86%	= B+	71% to 73%	= C	55% to 57%	= D-
81% to 83%	= B	65% to 70%	= C-	54% and below	= F

50 points/quiz (The lowest quiz grade will be weighed half as much as the other quizzes)
10 points/homework (The two lowest HW grades will be dropped) (Total scaled to 75 points)
100 points/test (The lowest test grade will be weighed half as much as the other tests)
150 points Cumulative final exam.

If your answer on an assignment, quiz, or exam is wrong, partial credit may be given if correct intermediate steps are shown. However, if your answer is right but the intermediate steps are wrong or nonexistent, full credit and perhaps even partial credit may not be given. The reason for grading in such a manner is that I need to see if your logic is correct. It is possible to make several mistakes and still get the "correct" answer.

Whatever you write down on an assignment, quiz, or exam will be graded. Therefore, erase or neatly cross out whatever is not part of your solution i.e. do not use your assignment, quiz, or exam as scratch paper. It is to your advantage to make your solutions legible and easy to follow since partial credit grading is subjective.

To be consistent in assigning partial credit, I usually grade one or two questions at a time. Partial credit grading is a time-consuming task; I will try to return your test or quiz as soon as possible but sometimes I may need more time.

Your final course grade depends on many factors. It may depend on how many courses and which courses you are taking, whether you work during the semester, whether you have other responsibilities or are having personal problems, if you are repeating the course, if you have a weak/strong mathematical background, etc. You may spend very little time studying for this course but do well on the exams or spend a lot of time studying for this course but do poorly on the exams. When I assign your grade, however, I have to ignore all of these factors. Your grade is based upon my opinion on how much you know (which is based upon how well you do on homework, projects, quizzes, and exams) and not on how hard you tried. I respect a student who tries his/her best. Your grade is not necessarily an indication of whether you tried your best

Quizzes and Exams

Quizzes and exams are cumulative. The reason for this is that it has been scientifically shown that repeatedly reviewing material helps transfer information from working memory to long term memory which is one definition of learning. However, most of the material on each exam/quiz will be on topics covered after the previous exam/quiz. It is even possible that I will notput ANY previous material on an exam/quiz. Therefore, when preparing for an exam/quiz, I strongly suggest that you study the latest material before reviewing earlier material.

If you have an excused absence then you may make up your quiz/exam after you return but there may be a 5% deduction for each day or portion of the day after the quiz/exam was given in class. I may allow you to take the quiz or exam before the regularly scheduled day depending on the excuse. If you do not have an excused absence then you will not be allowed to make up an exam or quiz. You are required to make up an exam as soon as possible consistent with your excuse.

Please keep your quizzes and exams until the end of the semester in case there is a dispute on the grade.

Quizzes are approximately 10 to 25 minutes long and are given at the beginning of the class period.

If you arrive late then you will not be given any extra timefor quizzes or exams.

Homework

Homework will be collected at the beginning of class. If you are late for class then you will be allowed to turn in the homework as soon as you enter the class (or if there is a quiz, directly after the quiz). Late homework will not be accepted whether or not there is an excused absence.

Not all homework problems will be graded. I will choose which problems to grade aheadof time. You must show your work. Remove messy fringes. Staple papers together on the top, lefthand corner (do not bend a corner or tear the paper to attach pages together). Problems should be done in order. Write neatly. On the top right-hand corner print your name, the HW number, the date, and your section number. **Each infraction will result in a deduction of one point**.

Please keep your homework until the end of the semester in case there is a dispute on the grade.

FerrisConnect

I will use it to post grades, the syllabus, exam solutions, announcements,Tegrity lectures, important dates, and other relevant material for the course.

Excused Absences

The following is a list of excused absences:

1. Medical emergency (your own). A doctor's appointment by itself is not considered to be a medical emergency. You must provide a written excuse from a doctor and permission for me to discuss with your doctor, if necessary, whether this was a medical emergency that prevented you from taking your regularly scheduled exam.
2. Medical emergency (a family member).
3. Death in the family or a very close personal friend
4. Jury duty/or being subpoenaed for court testimony
5. University excused activity such as being on an athletic team and having to play away.
6. Military service
7. Wedding of a relative or friend. You are excused from the exam only if it is extremely difficult for you to take the exam and still make the wedding. For example, if your exam is in the morning and the wedding is at night in Grand Rapids then you are still expected to sit for the exam. You are only excused for one wedding per semester.
8. If you have a job scheduled during the exam (not quiz) period where it is impossible for you to find a replacement.
9. Inclement weather in which local police agencies suggest that it is dangerous to drive (this only applies to commuters who do not live near campus and not to students returning to campus after being away for the weekend)
10. Other issues not listed that I feel are beyond your control.

I may also ask for written confirmation such as a doctor's note. If you are not sure if the excuse is valid then check with me ahead of time if possible.

The following excuses <u>are examples</u> of unexcused absences and do not constitute a complete list:

1. Transportation problems (except for #8 from the previous section)
2. Oversleeping
3. Day care problems
4. Being in jail
5. An job interview
6. Escorting a sick student to the infirmary unless no one else is available to help
7. A friend's wedding (except for #7 from the previous section)
8. A doctor's appointment for a non-emergency. Difficulty in finding an alternate appointment does not excuse your absence.
9. Going on vacation with your family and/or friends

Attendance Policy

It is not a good idea to miss class because it will be difficult to catch up. Attendance will be taken at the beginning of each class. If your class ordinarily meets two/three times a week then you may have two/three unexcused absences without any penalty respectively. Additional unexcused absences will result in a loss of 1.5%/1% of your final grade per incident respectively.

Coming in late to class disturbs the learning atmosphere. You are allowed one late absence without penalty. Future late arrivals will incur a ½ absence if 0-15 minutes late and a full absence if more than 15 minutes late. Leaving class early will incur a ½ absence unless I am informed in advance and I consider it to be a valid excuse or if your leaving is considered to be an emergency.

Signing someone else in will result in a 1.5% penalty for both the absent student and the signer and is considered to be an instance of cheating.

Whether or not your absence was unexcused or excused, you are responsible for learning the material reviewed in the class as well as being aware of the quiz dates or other administrative details that were announced in the class. Please ask your classmates for this information and class notes.

Student Participation

I will call on people to answer questions in class. If I specifically call on a student then please let that student attempt to answer the question. If you have a question, then please raise your hand. If I don't respond to you immediately it is because I want to finish whatever concept I am trying to cover. I want to involve everyone in class.

I will not answer every question in class. If the answer to your question is found in the syllabus then I will tell you that it is in the syllabus. You are responsible for knowing the syllabus. If your question requires a time-consuming answer or if it is not pertinent to the topic then I may answer your question after class or during office hours. I may not answer your question or only give you a hint if I feel that you would benefit by rereading the book and/or thinking a little longer then trying to answer your own question. <u>The literature on pedagogy states that the more that you do yourself, the better the chance is that you will understand, remember, and use the concept in the future.</u>

Calculator and Cheat Sheet Policy

<u>Graphing calculators</u> are not allowed on quizzes and exams. <u>Non-programmable, scientific calculators</u> are allowed on quizzes and exams, however you need to show your work even if calculators are allowed i.e. you need to show me that you would be able to do the calculations by hand if you were given enough time. <u>It is to your advantage to learn the basic statistical functions on your scientific calculator to check your answers.</u> Assume that scientific calculators are allowed on a quiz or exam unless I specify otherwise. You may not borrow a calculator from another student during an exam unless that student does not need to use the calculator any longer during the exam. I reserve the right to check that your calculator's memory register is cleared before exams.

You may not use your own cheat sheet. I <u>may</u> give you a cheat sheet for certain quizzes or exams. I will announce when this will be the case.

Cell Phone Policy

Turn-off your cell phones when you are in the class. Cell phones going off disturb the learning atmosphere in the class.

Grade of Incomplete (I)

Receiving a grade of incomplete (I) in a course indicates that you have successfully completed a major portion of the course requirements, and you should not re-register for the course. The grade of "I" is a temporary designation that is assigned for illness, injury, birth of a child, death of a family member, jury duty or other necessary absences, generally beyond the control of the student, which prevents you from completing the course requirements.

<u>Completion of at least 75% of course work at passing levels is required before an (I) grade may be assigned. In this course, this means that you must satisfactorily complete all work up to and including exam III.</u> You must make arrangements with me to complete all required work by the close of the following semester, excluding summer. I may require you to sign an agreement stipulating assignments and deadlines that must be met. Once you complete the course requirements I will submit a grade change form to the dean's office for approval and processing.

Incomplete grades that are not made up within the following semester, excluding summer semester, are changed to the grade of "F", unless I submit a written authorization for a time extension.

Student Conduct and Cheating and Academic Dishonesty Policy

The University expects you to conduct yourself with dignity and respect when you are with other students and faculty. Improper conduct includes talking in class, criticizing unconstructively, or simply being rude. You are considered to be and expected to act like adults and will be held to that standard. I will do all that I can to preserve the integrity of the learning atmosphere. <u>If you disrupt this learning atmosphere I reserve the right to ask you to leave the classroom</u>.

It is honorable to try your best but still not do well in the course. It is not honorable to commit academic dishonesty. Cheating on a homework, quiz, or exam will result in a zero on the homework, quiz, or exam and referral to Student Judicial Services for the first incident and possibly failure of the course depending on my judgment. A second incident of cheating will automatically result in the failure of the course. Signing someone else in on the attendance sheet is also considered an instance of cheating.
A student who has been found to be in violation of academic misconduct will be referred to Student Judicial Services and may receive a failing grade in the course and any of the disciplinary sanctions outlined in the Board of Trustees policy of student responsibilities, including suspension or dismissal from the university.

The University encourages a mature attitude toward learning and sound academic morale, and discourages illegitimate aids in examinations, laboratory work and homework assignments. Cheating, plagiarism and other forms of academic dishonesty including the acquisition, without permission, of tests and other academic material belonging to a member of the University community, and the sale and/or distribution of such material are in violation of University policy and subject to disciplinary action.

"Cheating" includes, but is not limited to: (1) use of any unauthorized assistance in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; or (3) the acquisition, without permission, of tests or other academic material belonging to a member of the University faculty or staff.

I consider gaining or giving information about an earlier given exam or quiz this semester as a form of cheating. For example, if student A takes a test at 11:00 AM and tells student B who has to take a similar exam at 1:00 PM what problems were on the morning exam then both students are guilty of cheating even if the exams are not exactly the same or the students are from different sections.
"Plagiarism" includes, but is not limited to, the use by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Miscellaneous Information

Q1. Who am I?

A1. I am a transplant from the Northeast. I grew up in New York, New Jersey, and Connecticut so I say "soda" not "pop" and I don't hunt. I have a BS and MS in Electrical Engineering and I worked as an engineer for 5 years on Long Island, NY. I have a Ph.D. in Applied Mathematics and Statistics from SUNY at Stony Brook. I have done postdoctoral work in biostatistics at the University of North Carolina at Chapel Hill. This is my 15th year teaching at Ferris.

Q2. Why study statistics?

A2. Statistics is particularly important in science because it is used in helping to discover relationships in otherwise very complicated processes. For example, pharmaceutical companies may have many promising experimental drugs but scientifically testing all of them would be prohibitively difficult and expensive. Statistics can be used as a first step in winnowing out the more promising experimental drugs from the group. Statistics is also used in making business and political decisions. For example, advertising companies rely heavily on surveys while politicians rely on polls. Insurance companies depend on actuaries to help them assess risk. Financial institutions predict trends partly based upon statistical information.

Probability, which is a part of statistics, is used to model physical processes that are not deterministic such as quantum physics. Probability is also an integral part of genetics.

I have had former students tell me that, much to their surprise, statistics is used in higher level courses at the undergraduate and graduate levels. This includes being used in pharmacy school.

Statistics and probability are interesting in their own rights. I find that some of the results are counterintuitive. Puzzling over the subtleties inherent in these problems is quite interesting and I find it quite satisfying when I can finally make sense of them

Q3. Why study math when the people in your field tell you that you don't need it?

A3. To study mathematics is to learn to think clearly. Abraham Lincoln studied Euclid's Elements (geometry) as a lawyer because he thought that it was an excellent way to train himself to think logically.

Trying to decide what skills you'll need in the future is like trying to hit a moving target: you have to aim where the target will be and not where it is now. The problem is that you won't know where the "target" will be. If you can think logically then you will be better prepared to deal with the unknown when the future does come.

At the Academic Honors Convocation in March, 2001, the guest speaker and FSU alumnus (class of '90) Ms. Carrie Cusack said that she wished that she took more courses outside of her major (CIS). She said that she now knows that to do her job well requires a whole range of skills and that the courses outside of her major were just as important as those within her major. In particular, she wished that she studied harder in statistic (a branch of mathematics) class.

Q4. You've never done well in math and are terrified of failing this course. What should you do?

A4. The difficult part about learning statistics is not doing the calculations but knowing which calculations to do! You will notice that most of the solutions are short. The keys to doing well are to do problems and to keep asking yourself how the concepts fit together. You will probably only receive very little partial credit if you start in the wrong direction and thus miss the main idea. Another difficult aspect to learning statistics is how to interpret your results. If you study with other students then it helps to explain the concepts to each other and to ask each other questions. Even if you think that you know what's going on in class, the act of explaining a concept to someone else reinforces the concept in your mind.

Don't miss class. Studies have shown that students who regularly attend class do better than those who don't. In addition, you can't make up quizzesor exams unless you have an excused absence. Keep up in class. It's much harder to catch up than to keep up. You are expected to spend approximately 3 or more hours of homework and reading outside of class for each hour of lecture.

Do as many difficult problems as possible. Do problems that are not assigned especially if your grasp of the material is shaky. Students have told me that they don't understand why they had difficulty doing the problems when they understood how I did the problems in class. However, trying to solve problems by watching me solve problemsis like trying to learn how to swim by watchingme swim! You must try the problems yourself.
Go to my office hours and to the review sessions.

Go to Academic Support Services (ASC 1017, 591-3543) for free tutoring. You will probably need to make an appointment ahead of time. If your grasp of the prerequisites of this course is very poor then consider withdrawing from this course and taking the prerequisite.

Continually review material given earlier in the semester.

Q5. Will I slow down?
A5. Only if you have specific questions on the materialand if the number of questions are not excessive. College classes move much faster than high school classes. Eventuallyyou will get use to the pace.

Q6. Is there extra credit in this course?
A6. You may have an opportunity to earn a few extra points during the optional sessions and review sessions.

Q7. What is my teaching philosophy?
A7. The two quotes below summarize the heart of my teaching philosophy.

"The great teacher makes a few simple points. The powerful teacher leaves one or two fundamental truths. and the memorable teacher makes the point not by telling but by helping the students discover on their own. Learning takes place through discovery, not when you're told something but when you figure it out for yourself. All a really fineteacher does is make suggestions, point out problems, above all, ask questions, and more questions, and more questions...

What should you ask of your professors? (1) Don't tell me things; let me find out for myself. (2) But when I need help, give it to me. (3) And when my work is poor, don'ttell me it's good. Many professors would rather be liked than be understood; not a fewfind it easier to indulge the students than teach them. Don't accept from professors compliments when they owe you criticism. And love them when they're tough. Proverbs says, 'Rebuke a wise person, and you'll be loved, rebuke a fool and you'll be hated.' Show yourselves wise, and you'llget professors who care about what you know.

What should your professors ask of you? (1) Don't ask me to sell you my subject; let meexplain it to you. Once you're in the classroom, relevance is a settled question: this is what you want to know; nowlet me teach it. (2) Don't stop work in the middle of the semester. It's easy to start with enthusiasm, and it's easy to end with commitment. But in the middle of a course, it's hard to sustain your work; the beginning is out of sight, the end and goal and purpose of the course not yet on the horizon. Do your best when the weather looks bleak. (3) Don't sit back and wait to be told things; stay with me and allow the logic of the course to guide us both; join me, think with me."

Jacob Neusner
Convocation speech to entering freshmen
Elizabethtown College
September 1991

Finally, some advice from a very successful person with only 3 months of formal education:

"If you resolutely determined to make a lawyer [or anyhing else] of yourself, the thing is more than half done already…Get the books, and read and study till you understand them in their principle features …Always bear in mind that your own resolution to succeed, is more important than any other one thing."

Abraham Lincoln
Letter to Isham Reavis, Esq.
November, 1855

I reserve the right to make needed and appropriate adjustments in this syllabus.

HW For Math 251 (Statistics for the Life Science)

Chapter 1 Introduction to Data Analysis	**Page**	**Problems responsible for understanding**	**HW problems to hand in**	**HW #; DUE**
1.1 Introduction				
1.2 Populations and Samples				
1.3 Variables or Data Types				
1.4 Measures of Central Tendency: Mean, Median, and Mode				
1.5 Measures of Dispersion and Variability	24	1-4, 6, 8, 11, 19-21, 27, 28	2, 3, 11, 20, 27	1
1.6 Descriptive Statistics for Frequency Tables or Grouped Data				
1.7 The Effect of Coding Data				
1.8 Tables and Graphs				
1.9 Quartiles and Box Plots				
1.10 Accuracy, Precision, and the 30-300 Rule	24	5, 7, 9, 10, 12-18, 22-26, 29, 30	7, 10, 15, 22, 26, 30	2
Chapter 2 Introduction to Probability				
2.1 Definitions				
2.2 Use of Permutations and Combinations	56	1-7, 9, 13, 30, 33	1, 2, 3, 13, 33	3
2.3 Introduction to Set Theory and Venn Diagrams				
2.4 Axioms and Rules of Probability	56	10-12, 13-18, 22, 26-29, 32, 34-36	10, 11, 14, 15, 17, 28, 32, 36	4
2.5 Probability Rules and Mendelian Genetics	56	19-21, 23-25, 31	20, 23, 24, 31	5
Chapter 3 Probability Distributions				
3.1 Discrete Random Variables				
3.2 The Binomial Distribution	91	1, 3, 5, 7-9, 13, 21, 22a, 24, 25, 27, 29-31, 33, 37, 39, 40	1, 5, 7, 22a, 25, 27, 40	6
3.3 The Poisson Distribution				
3.4 Continuous Random Variables				

3.5 The Normal Distribution				
3.6 The Standard Normal Distribution	91	2, 4, 6, 10-12, 14-17, 18, 19, 20, 23, 26, 28, 32, 34-36, 38, 41, 42	2, 4, 11, 14, 19, 23, 34, 38, 42	7
Chapter 4 Sampling Distributions				
4.1 Definitions				
4.2 Distribution of the Sample Mean				
4.3 Confidence Intervals for the Population Mean	122	1, 3, 5, 6, 8, 14, 15, 23	1, 3, 5, 6, 8, 23	8
4.4 Confidence Intervals for the Population Variance				
4.5 Confidence Intervals for a Population Proportion	122	2, 4, 7, 9-13, 16-22, 24	2, 13, 16, 19, 24	9
Chapter 5 Introduction to Hypothesis Testing				
5.1 An Overview: The Famous Cornflakes Example				
5.2 Typical Steps in a Statistical Test of Hypothesis	141	1, 2, 5-8	1, 2, 6, 7, 8	10
5.3 Type I versus Type II Errors in Hypothesis Testing				
5.4 Binomial Examples of Hypothesis Testing	141	3, 4, 9, 10	4, 10	11
Chapter 6 One-Sample Tests of Hypothesis				
6.1 Hypotheses Involving the Mean	165	4, 6, 11-13, 18, 21, 22, 25, 26, 30, 31	4, 6, 21, 22, 25, 30	12
6.2 Hypotheses Involving the Variance	165	1-3, 5, 28	1, 2, 5, 28	13
Chapter 7 Tests of Hypothesis Involving Two Samples				
7.1 Comparing Two Variances				
7.2 Testing the Differences Between Two Means of Independent Samples	194	1, 2, 11-13, 17, 19, 27, 28, 31-33, 35, 38-41	2, 11, 27, 40	14
7.3 Confidence Intervals for Differences in Means				
7.4 The Difference Between Two Means with Paired Data	194	3-6, 10, 25, 34	4, 5, 10, 25	15

16 SPRING MATH320-001 COURSE OUTLINE

COURSE	**Math 320-001** 8:00 – 8:50, MTWR, STARR 202
INSTRUCTOR	Dr. Hengli Jiao, Office 2028 ASC, Contact: 591 – 2825, jiaoh@ferris.edu
OFFICE HOURS	9:00-10:00am, MTWR or by **appointment.**
TEXTBOOK	Required to purchase Webassign accessing to Calculus, 10th Edition, by Larson, Hostetler, and Edwards, Cengage.
PREREQUISITE	Math230 with a grade of C- or better recommended.
GENERALOVER VIEW	This course will cover material from chapters 10-13 of the text. Topics of the course include functions of multivariable, vector-valued functions, partial differentiation, multiple integration, parametric equations, and other coordinate systems.
COURSE GOALS	❖ To become familiar with the major concepts and techniques of multivariable calculus. ❖ To develop skills in formulating, solving, and interpreting mathematical problems. ❖ To gain experience with applications of multivariable integral and differential calculus concepts. ❖ To practice communicating mathematical ideas to others. ❖ To become a more independent learner and logical thinker.
ATTENDANCE POLICY	Students are required to be present for all classes. Attendance will be taken. This course is a 4-credit hour course. Therefore, students should plan to spend 4 hours in class and more than 16 hours outside of class every week in order to be successful in this course. If you are absent from class, you are responsible for the material covered; arrange to copy another student's notes and be informed of any announcements made during class. Athletes who anticipate missing class due to scheduled events must notify the instructor in advance in writing. In addition, athletes should provide a copy of their performance schedule to the instructor ASAP. If you are not in the room when attendance is taken, you may assume that you have been marked absent. If you walk in late, you must see the instructor after that class to be sure that your presence is noted. Students should realize that **extreme or chronic tardiness** and **bad behavior** are not acceptable and can be expected to affect the final grade. Each student may upon occasion need to be away from class due to illness or other important matters. The following policy recognizes these life issues but at the same time reflects the real world need to be present in class in order to learn and share your learning with others in the class. Each student will be allowed to miss up to **FIVE** classes without penalty. These absences may be for any reason. If the number of your absences is greater than or equal to **SIX**, you will be automatically assigned an **F** for your final grade.
BEHAVIOR	Do not interrupt the class unless you have a special reason and inform the instructor in advance. The following behaviors are **absolutely not tolerated**: ❖ Talking while the instructor is lecturing. ❖ Using phone in class. When you walk into the class your phone should be **turned off**. ❖ Regularly walking out and in the classroom while class is in session. ❖ Leaving class early without approval from the instructor in advance.

16 SPRING MATH320-001 COURSE OUTLINE

<table>
<tr><td>EVALUATION</td><td>
Grades in the course are based on four exams, quizzes, and worksheets if any. The following grading scale can be used to estimate grades for individual quizzes and exams; however, course grades will be determined from a curve based on point totals, attendance, improvement, effort, attitude, and so on. No make-up exam will be given unless you have a reasonable excuse. No early or late make-up quiz and worksheet will be given for any reason. Late assignments will not be accepted.
If you miss one of the four exams, you will be automatically assigned an "F" grade <u>unless you are excused and make it up later.</u>
<table>
<tr><td>Examinations</td><td>Test1-3 100 points each and test 4 200 points</td><td>500 points</td></tr>
<tr><td>Quizzes</td><td>Each quiz is 10 points.</td><td>Total of quizzes</td></tr>
<tr><td>Worksheets</td><td>Each worksheet is 10 points.</td><td>Total of worksheets</td></tr>
</table>
<table>
<tr><td>A = 90%-100%</td><td>A- =87%-89%</td><td>B+ = 84%-86%</td><td>B = 81%-83%</td></tr>
<tr><td>B- =78%-80%</td><td>C+ =75%-77%</td><td>C = 72%-74%</td><td>C- = 69%-71%</td></tr>
<tr><td>D+= 66%-68%</td><td>D = 63%-65%</td><td>D- = 60%-62%</td><td>F=under 60%</td></tr>
</table>
</td></tr>
<tr><td>CONTENT AND PROBLEMS</td><td>The following are sections of chapters we will cover. The problems in each section are for your own practice only. Remember the exam problems are similar to these problems, so practicing more problems will definitely help you get better grade. DO THE PROBLEMS</td></tr>
<tr><td>CHAPTER 11
Vectors and the Geometry of Space</td><td>11.1 Vectors in the Plane: 1-60, 67-79 odd, 80-89
11.2 Space Coordinates and Vectors in Space: 1-68, 71-82, 85-89
11.3 The Dot Product of Two Vectors: 1-18, 21-38, 41-48, 55-58, 61-68
11.4 The Cross Product of Two Vectors in Space: 1-20, 23-41, 45-52
11.5 Lines and Planes in Space: 1-18, 21-52, 53-68, 75-78
11.6 Surfaces in Space: 1-16, 19-30, 41-56
11.7 Cylindrical and Spherical Coordinates: 1-32, 35-42, 69-94
Review Exercise: 1-54, 57-60</td></tr>
<tr><td>CHAPTER 12
Vector-Valued Functions</td><td>12.1 Vector-Valued Functions: 1-32, 45-74
12.2 Differentiation and Integration of Vector-Valued Functions: 1-4, 7-34, 37-64
12.3 Velocity and Acceleration: 1-22, 23-27, 30-32, 37-40, 45, 49, 50
12.4 Tangent Vectors and Normal Vectors: 1-34,41, 49-52
12.5 Arc Length and Curvature: 1-8, 13-42, 47-51, 53
Review Exercise: 1-56</td></tr>
<tr><td>CHAPTER 13
Functions of Several Variables</td><td>13.1 Introduction to Functions of Several Variables: 1-38, 45-56, 81-84
13.2 Limits and Continuity: 1-18, 21, 23, 29-44, 49-52
13.3 Partial Derivatives: 1-36, 43-54, 59-76, 77-81 odd, 85-90
13.4 Differentials: 1-20, 21-27 odd, 43, 44
13.5 Chain Rules for Functions of Several Variables: 1-40, 41-49 odd, 50-56
13.6 Directional Derivatives and Gradients: 1-20, 24-56, 61-66
13.7 Tangent Planes and Normal Lines: 1-30, 33-38, 41-51
13.8 Extrema of Functions of Two Variables: 1-20, 25-52, 57-60
13.10: Lagrange Multipliers (optional): 1-34
Review Exercise: 9-52, 70-72</td></tr>
</table>

16 SPRING MATH320-001 COURSE OUTLINE

CHAPTER 14 Multiple Integration	**14.1 Iterated Integrals and Area in the Plane: 1-54, 65,66** **14.2 Double Integrals and Volume: 1-26, 29-36, 43-52, 70-73** **14.3 Change of Variables: Polar Coordinates: 1-33, 41, 42** **14.4 Center of Mass and Moments of Inertia: 1-18, 27-46** **14.5 Surface Area: 1-26, 29-36** **14.6 Triple Integrals and Applications: 1-30** **14.7 Triple Integrals in Cylindrical and Spherical Coordinates: 1-6, 9-16, 25-28** **14.8 Change of Variables: Jacobians: 1-28** **Review Exercise: 1-12, 17-32, 45-58**
STUDY STRATEGIES	❖ Attend all classes and come prepared. Have your homework completed. Bring the text, paper, pen or pencil, and a calculator (scientific or graphing) to each class. ❖ Read the section in the text that is to be covered before class. Make notes about any questions that you have and, if they are not answered during the lecture, ask them at the appropriate time. ❖ Participate in class. As mentioned above, **ask questions**. Also, do not be afraid to answer questions. ❖ Take notes on all definitions, concepts, rules, formulas and examples. After class, read your notes and fill in any gaps, or make notations of any questions that you have. ❖ **DO THE PROBLEMS**!!! You learn mathematics by doing it yourself. Allow at least two hours outside of each class for problems. Remember the methods of solving problems are more important than just getting correct answers. Do not fall behind. ❖ Seek help when needed. Visit your instructor during office hours and come prepared with specific questions; check with school's tutoring service; find a study partner in class; check additional books in the library for more examples if necessary - just do something before the problem becomes insurmountable. ❖ Do not cram for exams. Each chapter in the text contains a chapter review and this study guide contains a practice test at the end of each chapter. (The answers are at the back of the study guide). Work these problems many days before the exam and review any areas of weakness.
EXAM DATES	**1st Test: TBA 2nd Test : TBA 3rd Test: TBA 4th Test: University Schedule**
REMARK	**The instructor reserves the right to make reasonable changes for the above descriptions.**

Instructor's Schedule

	Monday	Tuesday	Wednesday	Thursday
8:00-8:50	Math 320-001 STARR 202	Math 320-001 STARR 202	Math 320-001 STARR 202	Math 320-001 STARR 202
9:00-9:50	Office Hour	Office Hour	Office Hour	Office Hour
11:00-11:50		Meeting		Meeting
12:00-12:50	Math 226-002 STARR 202	Math 226-002 STARR 202	Math 226-002 STARR 202	Math 226-002 STARR 202

MATH 322.001 (Linear Algebra)
3 credits, fall 2015
MWF 11:00-11:50 a.m. STR 137

Professor Kent Sun, Ph.D.
Office: ASC 2026 (231-591-2579)
Email: kentsun@ferris.edu

Course Description

An introduction to the theory of vector spaces with emphasis on matrix algebra. Topics included are linear transformation, independence, rank, and inverses.

Course Material and Test Schedule

Chapter 1 Linear Equations and Matrices
- 1.1 Linear Systems
- 1.2 Matrices
- 1.3 Dot Product and Matrix Multiplication
- 1.4 Properties of Matrix Operations
- 1.5 Matrix Transformations
- 1.6 Solutions of Linear Systems of Equations
- 1.7 The Inverse of a Matrix

(Exam I)

Chapter 3 Determinants
- 3.1 Definition and Properties
- 3.2 Cofactor Expansion and Applications
- 3.3 Determinants from a Computational Point of View

Chapter 4 Vectors in R^n
- 4.2 n-vectors
- 4.3 Linear Transformations

(Cumulative exam II containing material up to and including chapter 4)

Chapter 6 Real Vector Spaces
- 6.1 Vector Spaces
- 6.2 Subspaces
- 6.3 Linear Independence

(Cumulative exam III containing material up to and including section 6.3)

- 6.4 Basis and Dimension
- 6.5 Homogeneous Systems
- 6.6 The Rank of a Matrix and Applications
- 6.8 Orthonormal Bases in R^n (If time permits)

Chapter 8 Eigenvalues, Eigenvectors, and Diagonalization
- 8.1 Eigenvalues and Eigenvectors
- 8.2 Diagonalization (If time permits)

(A cumulative final exam is scheduled for Thur., Dec. 17 from 10:00 to 11:40 a.m.)

Course Objective

To learn the basics concepts in Linear algebra.

Learning Outcomes

1) Matrix Operations: Students will be able to perform elementary arithmetic with matrices, including matrix multiplication, and list the basic properties of these matrix operations.
2) Solving Systems of Linear Equations with Matrices: Students will be able to determine when a system of linear equations is consistent and be able to compute the solution to the system.
3) Inverse Matrices: Students will be able to calculate the inverse of any invertible square matrix.

4) Determinants: Students will be able to demonstrate the connection between determinants and invertible matrices.
5) Evaluating Determinants: Students will be able to evaluate a given determinant by co-factor expansion along any of its rows or columns.
6) Cramer's Rule: Students will be able to solve a system of linear equations, which is amenable to such analysis, by the use of Cramer's Rule
7) Vectors: Students will be able to perform basic operations on vectors in real n-space, where n is any positive integer.
8) Vector Space: Students will be able to define and explain in detail a vector space as well as its many associated concepts including subspaces, spanning sets, linearly independent sets, bases, dimension, and linear transformations; and to prove elementary theorems involving such concepts.
9) Eigenvalues & Eigenvectors: Students will demonstrate the ability to work with the basic definitions and theorems involving eigenvalues, eigenvectors, and diagonalization (optional).

Prerequisite

C- or better in Math 220 or its equivalent

Textbooks

Required: Introductory Linear Algebra: An Applied First Course, 8th edition, Kolman and Hill; Pearson, Prentice Hall.

You are responsible for reading the textbook and doing the HW problems. In particular, pay close attention to the examples in the textbook. If you have questions aboutthese examples then ask for help.

Office Hours

Monday and Wednesday 2:00– 4:00 p.m. (ASC 2026)

You may also make an appointment to see me. But please be aware that if you make an appointment to see me outside of my normal office hours and do not show up without canceling ahead of time then afterwards I will only consent to see you during my normal office hours or if I am in my office and am not busy. Normally, I spend a great deal of time in or near my office. However, I suggest calling ahead of time to check if I am in my office.

If more than one student shows up during an office hour then I will take turns answering questions. Therefore, do not wait for me outside my office door if I am wih a student but make your presence known. If I need to speak with a student on a one-to-one basis because of a sensitive issue such as grades or advising then I will let you know.

Blackboard

I will use it to post the syllabus, announcements, Tegrity lectures, important dates, and other relevant material for the course.

Grading Policy

Course Grades

93% to 100%	= A	78% to 80%	= B-	61% to 64%	= D+
87% to 92%	= A-	74% to 77%	= C+	58% to 60%	= D
84% to 86%	= B+	71% to 73%	= C	55% to 57%	= D-
81% to 83%	= B	65% to 70%	= C-	54% and below	= F

Quizzes (The points of the quizzes will vary and be worth up to 15 points)
5 points/homework (The two lowest HW grades will be dropped)
100 points/exam (Not the cumulative final. The lowest grade will be weighed half as much as the other exams)
150 points Cumulative final exam.

If at all possible, you must show your work on the HW and not just give me the answer. Homework will be collected at the beginning of class. If you are late for class then you will be allowed to turn in the homework as soon as you enter the class or if there is a quiz then directly after the quiz. **Late homework will not be accepted whether or not there is an excused absence**. Not all problems will be graded. I will choose which problems to grade ahead of time. You must show your work. Remove messy fringes. Staple papers together on the top, lefthand corner (do not bend a corner or tear the paper to attach pages together). Problems should be done in order. Write neatly. On the top right-hand corner print your name, the HW number, the date, and your section number. **Not giving a proper heading will result in a deduction of one point for the assignment.**

Quiz dates are announced. In general, quizzes may not be made up unless there is a University excused absence such as an Athletic event or a conference.

Quizzes are usually short and are given at the beginning or end of the class period as determined by me. If you are late for a quiz, you will not be given any extra time to take it.
For example, I may give a quiz at the end of the class period that may be on thatday's lecture.

Make up quizzes must be taken as soon as possible as consistent with your excuse and determined by me.

Exams may be made up only with my permission and may incur a deduction in the exam grade of5 points for each 24 hour period or part of after the normal starting exam time. Make up exams are required to be taken as soon as possible consistent with your excuse and determined by me. If you are late for an exam, you will not be given any extra time to takethe exam.

The cumulative final exam is worth 150 points.

If your answer is wrong, partial credit may be given if correct intermediatesteps are shown. However, if your answer is right but the intermediate steps are wrong or nonexistent, full credit and perhaps even partial credit may not be given.

Your final course grade depends on many factors. It may depend on how many courses and which courses you are taking, whether you are working during the semester, whether you have other responsibilities or are having personal problems, if you are repeating the course, if you had a weak/strong mathematical background, etc. You may spend very little time studying for this course but do well on the exams or spend a lot of time studying for this course but do poorly on the exams. When I assign your grade, however, I have to ignore all of these factors. Your grade is based upon my opinion on how much you know (which is based upon how well you do on the exams and quizzes) and not on how hard you tried. I respect a student who tries his/her best. Your grade is not necessarily an indication of whether you tried your best.

You, however, are the person most responsible for your learning and your future.

In general, it is better to keep up with the course rather than cramming before exams and quizzes. This is a 300 level course and is taught at an upper-level undergraduate level. If you have questions you can come to me for help and, in addition, the Academic Support Center (ASC 1017 231-591- 3543) offers free tutoring.

Grade of Incomplete (I)

Receiving a **grade of incomplete** (I) in a course indicates that you have successfully completed a major portion of the course requirements, and you should not re-register for the course. The grade of "I" is a temporary designation that is assigned for illness, injury, birth of a child, death of a family member, jury duty or other necessary absences, generally beyond the control of the student, which prevents you from completing the course requirements.

Completion of at least 75% of course work at passing levels is required before an (I) grade may be assigned. In this course, this means that you must satisfactorily complete all work up to and

including the third exam.
You must make arrangements with me to complete all required work by the close of the following semester, excluding summer. I may require you to sign an agreement stipulating assignments and deadlines that must be met. Once you complete the course requirements I will submit a grade change form to the dean's office for approval and processing.

Incomplete grades that are not made up within the following semester, excluding summer semester, are changed to the grade of "F", unless I submit a written authorization for a time extension.

Student Conduct and Cheating and Academic Dishonesty Policy

The University expects you to conduct yourself with dignity and respect when you are with other students and faculty. Improper conduct includes talking in class, criticizing unconstructively, or simply being rude. You are considered to be and expected to act like adults and will be held to that standard. I will do all that I can to preserve the integrity of the learning atmosphere. If you disrupt this learning atmosphere I reserve the right to ask you to leave the classroom.

It is honorable to try your best but still not do well in the course. It is not honorable to commit academic dishonesty. Cheating on a homework or exam will result in a zero on the homework or exam and referral to The Office of Student Conduct for the first incident and possibly failure of the course depending on my judgment. A second incident of cheating will automatically result in the failure of the course. Signing someone else in on the attendance sheet is also considered an instance of cheating.

A student who has been found to be in violation of academic misconduct will be referred to The Office of Student Conduct and may receive a failing grade in the course and any of the disciplinary sanctions outlined in the Board of Trustees policy of student responsibilities, including suspension or dismissal from the university.

The University encourages a mature attitude toward learning and sound academic morale, and discourages illegitimate aids in examinations, laboratory work and homework assignments. Cheating, plagiarism and other forms of academic dishonesty including the acquisition, without permission, of tests and other academic material belonging to a member of the University community, and the sale and/or distribution of such material are in violation of University policy and subject to disciplinary action.

"Cheating" includes, but is not limited to: (1) use of any unauthorized assistance in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; or (3) the acquisition, without permission, of tests or other academic material belonging to a member of the University faculty or staff.

I consider gaining or giving information about an earlier given exam this semester as a form of cheating. For example, if student A takes a test at 11:00 a.m. and tells student B who has to take a similar exam at 1:00 p.m. what problems were on the morning exam then both students are guilty of cheating even if the exams are not exactly the same or the students are from different sections.

I consider lying to me as a type of cheating. For instance, claiming that you were too ill to take a test but going to classes before and after a scheduled test is an instance of cheating.

"Plagiarism" includes, but is not limited to, the use by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

I am responsible for maintaining the learning atmosphere of the classroom. If you disturb this atmosphere with excessive socializing, complaining etc. then I have the right to have you removed from the classroom and/or submit your name to the Student Conduct Office.

Attendance Policy

You are allowed 3 unexcused absences without a penalty. Each additional unexcused absence will lower your final average by one percent.

However, it's not a good idea to miss class, even if you have unexcused absences left "to burn" because it will be difficult to catch up.

Coming in late to class disturbs the learning atmosphere. You are allowed one late absence without penalty. Future late arrivals will incur a ½ absence if 0-15 minutes late and a full absence if more than 15 minutes late. Leaving class early will incur a ½ absence unless I am informed in advance and I consider it to be a valid excuse or if your leaving is considered to be an emergency.

Whether or not your absence was unexcused or excused, you are responsible for learning the material reviewed in the class as well as being aware of the quiz dates or other administrative details that were announced in the class. Please ask your classmates for this information and class notes. Please do not ask me for my notes or to repeat a lecture for you.

The following are excused absences:

1. Medical emergency (your own). A doctor's appointment by itself is not considered to be a medical emergency. You must provide a written excuse from a doctor and permission for me to discuss with your doctor, if necessary, whether this was a medical emergency that prevented you from taking your regularly scheduled exam.
2. Medical emergency (a family member).
3. Death in the family or a very close friend
4. Jury duty/or being subpoenaed for court testimony
5. University excused activity such as being on an athletic team and having to play away.
6. Military service
7. Wedding of a relative or friend. You are excused from the exam only if it is extremely difficult for you to take the exam and still make the wedding. For example, if your exam is in the morning and the wedding is at night in Grand Rapids then you are still expected to sit for the exam. You are only excused for one wedding per semester.
8. Inclement weather in which local police agencies suggest that it is dangerous to drive (this only applies to commuters who do not live near campus and not to students returning to campus after being away for the weekend)
9. Other issues not listed that I feel are beyond your control.

The following excuses are examples of unexcused absences and do not constitute a complete list:

1. Transportation problems (except for #8 from the previous section)
2. Oversleeping
3. Day care problems
4. Being in jail
5. An job interview
6. Escorting a sick student to the infirmary unless no one else is available to help
7. A friend's wedding (except for #7 from the previous section)
8. A doctor's appointment for a non-emergency. Difficulty in finding an alternate appointment does not excuse your absence.
9. Going on vacation with your family and/or friends

If you want to claim an excused absence then you must turn in an Excused Absence Form to me within a week, if possible as determined by me, of your absence otherwise I will consider your absence to be unexcused.

Student Participation

I will call on people to answer questions in class. If I specifically call on a student then please let that student attempt to answer the question. If you have a question, then please raise your hand.

If I don't respond to you immediately it is because I want to finish whatever concept I am trying to cover. I want to involve everyone in class.

I will not answer every question in class. If the answer to yourquestion is found in the syllabus then I will tell you that it is in the syllabus. You are responsible for knowing the syllabus If your question requires a time-consuming answer or if it is not pertinent to the topic then I may answer your question after class or during office hours. I may not answer your question or only give you a hint if I feel that you would benefit by rereading the book and/or thinking a little longer then trying to answer your own question. The literature on pedagogy states that the more that you do yourself, the better the chance is that you will understand, remember, and use the concept in the future.

Calculator and Cheat Sheet Policy

Calculators are allowed on quizzes and exams, however I may ask you to show me how to do the calculations by hand. You may not borrow a calculator from another student during an exam unless that student no longer needs to use the calculator for the exam. I reserve the right to check that your calculator's memory register is cleared before exams.

You may not use your own cheat sheet. I may give you a cheat sheet for quizzes and exams. I will announce when this will be the case.

Cell Phone Policy

Turn-off your cell phones when you are in the class. Cell phones going off disturb the learning atmosphere in the class.

Miscellaneous

Q. Who is the instructor?

A. I am a transplant from the Northeast. I grew up in New York, New Jersey, and Connecticut so I say "soda" not "pop" and I don't hunt. I have a BS and MS in Electrical Engineering and I worked as an engineer for 5 years on Long Island, NY. I have a Ph.D. in Applied Mathematics and Statistics from SUNY at Stony Brook. I have done postdoctoral work in biostatistics at the University of North Carolina at Chapel Hill. This is my 16th year teaching at Ferris.

Q. Why study math when the people in your field tell you that you don't need it?

A. To study mathematics is to learn to think clearly. Abraham Lincoln studied Euclid'sElements (geometry) as a lawyer because he thought that it was an excellent way to train himself to think logically.

Trying to decide what skills you'll need in the future is like trying to hit a moving target: you have to aim where the target will be and not where it is now. The problem is that you won't know where the "target" will be. If you can think logically then you will be better prepared to deal with the unknown when the future does come.

At the Academic Honors Convocation in March, 2001, the guest speaker and FSU alumnus (class of '90) Ms. Carrie Cusack said that she wished that she took more courses outside of her major (CIS). She said that she now knows that to do her job well requires a whole range of skills and that the courses outside of her major were just as important as those within her major. In particular, she wished that she studied harder in statistic (a branch of mathematics) class.

Q. How should you study?

A. Students have told me that they don't understand why they had difficulty doing the problems when they understood how I did the problems in class. However, trying to solve problems by watching me solve problems is like trying to lean how to swim by watchingme swim! You must try the problems yourself. **Reading and going over notes (highlighting or underlining) are NOT good learning methods because they are NOT active learning methods.**

Be active in your learning by periodically **quizzing** yourself. For example, you can do this with note cards or with the Cornell Method. This method will force you to retrieve material which will help you remember it. It will also tell you whether you really know the material because if you can't recall the material then you don't know it. Quiz yourself on previous material from time to time to keep the concept fresh in your mind. However, wait a few days between quizzes.
Do optional problems.

Reinforce your understanding the material with **elaboration** which is restating concepts in your own words and connecting it to something else that you know.

Don't cram because you will forget most of the material after an exam and then end up with even more material to learn for future exams. For instance, it is much better to study Linear Algebra 1.5 hours/day for six days than to study twelve hours ofLinear Algebra in one day. In addition, by spreading out your studying, you may end up spending fewer hours studying but understand and remember more material.

If you study in groups, then quiz each other with difficult questions. Ask your study partners to explain concepts or summarize material in their own words. Be active in your learning.

Don't miss class. Studies have shown that students who regularly attend class do better than those who don't. In addition, you can't make up exams unless you have an excused absence. Keep up in class. It's much harder to catch up than to keep up. You are expected to spend approximately 3 or more hours of studying outside of class for each hour of lecture.

Get enough sleep (8 to 9 hours) consistently. Exercise regularly. Eat right. Don't work too many hours (10 hrs/week is the maximum recommended amount by Ferris). Limit your socializing (Face book, Twitter, texting etc.)

Go to my office hours.

Go to Academic Support Services (ASC 1017, 591-3543) for free tutoring. You will probably need to make an appointment ahead of time. Ifyour grasp of the prerequisites of this course is very poor then consider withdrawing from this course and taking the prerequisite.

Continually review material given earlier in the semester by quizzing yourself.

Real learning (understanding, recalling, and being able to use the material) is **hard** and requires **great effort**. There is no easy way for real learning to occur.

Q. What kind of student participation is expected?
A. I will call on people to answer questions in class. If I specifically call on a student then please let that student attempt to answer the question. If you have a question, then please raise your hand. If I don't respond to you immediately it's because I want to finishwhatever concept I am trying to cover. My goal is to involve everyone in class.

Q. Will I slow down?
A. Only if you have specific questions on the material. College classes move much faster than high school classes. Eventually you will get use to the pace.

Q. Is it necessary to read the book?
A. Yes. You can't possibly record everything that I say in class and it's helpful to be able to reread a chapter until a concept is clear. I may gloss over a topic that I consider to be easy to understand if you read the book. You are responsible for the material in the book as well as lecture material.

Q. What is my teaching philosophy?
A. The three quotes below summarize the heart of my teaching philosophy.

"The great teacher makes a few simple points. The powerful teacher leaves one or two fundamental truths. And the memorable teacher makes the point not by telling but by helping the students discover on their own. Learning takes place through discovery, not when you're told something but when you figure it out for yourself. All a really fine teacher does is make suggestions, point out problems, above all, ask questions, and more questions, and more questions...

What should you ask of your professors? (1) Don't tell me things; let me find out for myself. (2) But when I need help, give it to me. (3) And when my work is poor, don'ttell me it's good. Many professors would rather be liked than be understood; not a few find it easier to indulge the students than teach them. Don't accept from professors compliments when they owe you criticism. And love them when they're tough. Proverbs says, 'Rebuke a wise person, and you'll be loved, rebuke a fool and you'llbe hated.' Show yourselves wise, and you'll get professors who care about what you know.

What should your professors ask of you? (1) Don't ask me to sell you my subject; let meexplain it to you. Once you're in the classroom, relevance is a settled question: this is what you want to know; now let me teach it. (2) Don't stop work in the middle of the semester. It's easy to start with enthusiasm, and it's easy to end with commitment. But in the middle of a course, it's hard to sustain your work the beginning is out of sight, the end and goal and purpose of the course not yet on the horizon. Do your best when the weather looks bleak. (3) Don't sit back and wait to be told things; stay with me and allow the logic of the course to guide us both; join me, think with me."

Jacob Neusner (1932 -)
Convocation speech to entering freshmen
Elizabethtown College
September 1991

"If you resolutely determined to make a lawyer [or anything else] of yourself, the thing is more than half done already...Get the books, and read and study till you understand them in their principle features ...Always bear in mind that your own resolution to succeed, is more important than any other one thing."

Abraham Lincoln (1809 – 1865)
Letter to Isham Reavis, Esq.
November, 1855

"The unexamined life is not worth living."
Socrates (469 – 399 B.C.)

I reserve the right to make needed and appropriate adjustments in this syllabus.

HW For Math 322 (Linear Algebra)
Introductory Linear Algebra: An Applied First Course (8th Edition) by Kolman and Hill

"ru" means read and understand. You do nothave to do the ru problems, you only need to understand the results

HW #	Section	Page	HW	Date Due
Chapter 1 Linear Equations and Matrices				
1)	1.1	8	1-17odd, 18, 19, 23, 25, 27, T.4	
2)	1.2	19	1-3, 5bc, 6ab, 9, 10, T.1, 3, 7, ru T.2, 5, 6	
3)	1.3	34	3, 5, 7abc, 10, 11, 15, 19-27odd, 33, T.1, 2, 7, ru T.4-6	
4)	1.4	49	6, 7, 10-13a,15, T.6, 12ab, 18, 23a, 26, 27, ru T.24, 29, 30	
5)	1.6	85	1-9, 19a, 21a, 29a, 41, 43, 47, T.11, 12	
6)	1.7	105	5b, 18, 22-26, T.1, 8	
Chapter 3 Determinants				
7)	3.1	192	6ad, 9, 11, 13a, 15, 18c, 22, 23, T.3,5-10, 14, 16	
8)	3.2	207	2, 4a, 15a, 17a, 19a, 23, T.1,10	
Chapter 4 Vectors in R^n				
9)	4.2	244	4c, 7a, 11b, 13b, 15, 16, 17, 18, 20a, 25, 26, 27a, T.5, 6, 9, 10, 13	
10)	4.3	255	3, 13, 17, 30, T.3, 4, 8, 10, 11	
Chapter 6 Real Vector Spaces				
11)	6.1	278	1, 3, 4, 11, 13, 15, 19, T.3	
12)	6.2	287	2, 4, 5, 7b, 10b, 16ab, 19ac (give examples of why it's not a subspace), 25a, 27a, T.3, 6, 7	
13)	6.3	301	1ab, 2ab, 4a, 7, 10b, 12a, 15, T.1, 5	
14)	6.4	314	2abc, 8, 10a, 11, 14, 16, 18bc, 26, 28b	
15)	6.5	327	2ab, 3, 8, 11, 18, 22,T.1	
16)	6.6	337	1, 9, 15, 18, 21, 22, 24, 26, 29, 32, 36	
17)	6.8	359	1b, 2b, 4, 10, 14, 19, 21	
Chapter 8 Eigenvalues, Eigenvectors, and Diagonalization				
18)	8.1	420	2b, 13, 18, T.5, 6	

I reserve the right to make needed and appropriate adjustments in this syllabus.

MATH 324 – Fundamental Concepts of Mathematics – Fall 2015 Syllabus

Section: Days, Time, Room **Credit Hours**: 3.0

001: T/Th 12:00 – 1:15, Starr 232

Instructor: Dr. Michael Dekker

- Office: ASC 2038
- Office Phone: (231) 591-2566 or 1-800-4-FERRIS and ask for x2566
- Home Phone: (616) 452-4717 (not after 9pm)
- Email: dekkerm@ferris.edu
- Office Hours: M 10am – 12pm, T/Th 1:30 – 2:30

Textbook: *A Transition to Advanced Mathematics,* 7th edition
Smith, Eggen & St. Andre: Thomson-Brooks/Cole
ISBN: 9780495562023

Prerequisite: MATH 220 (one semester of calculus)

Course Description: MATH 324 is an introduction to mathematical structure and deductive logic through the study of fundamental systems. Topics include logic, arguments, set theory, relations, induction, and algebraic structures. Standard methods of mathematical proof are emphasized. This course is very different from a calculus course, where the problems are mostly computational in nature.

Course Content: The sections of the text we will cover in this course are:

1.1 – 1.6	Logic and Proofs
2.1 – 2.4	Set Theory
3.1, 3.2	Relations
4.1 – 4.5	Functions
5.1 – 5.3	Cardinality
6.1, 6.2	Concepts of Algebra

Supplies: The textbook, paper and a three-ring binder. There will be **many** handouts for this course, and each will be three-hole-punched. Previous students have made very good use of a binder to store them. Calculators are not necessary for this course and will not be allowed for use on the exams. In addition, cell phones and other communication devices are unacceptable for keeping track of time during the exams.

Blackboard: Some course information can be found on Blackboard: the homework assignments, a course calendar with due dates, copies of the handouts, and solutions to some textbook problems.

Exams: There will be three midterm exams and a final exam. The tentative dates for the exams are:

Exam I	Thursday, September 18 covering Chapter 1
Exam II	Thursday, October 16 covering Chapter 2
Exam III	Tuesday, November 18 covering Chapters 3 and 4
Final Exam	Tuesday, December 9 at noon covering Chapters 5 & 6 and cumulative topics

Any student who fails to take an exam on the scheduled date will receive a score of 0 for the exam unless I am notified of the absence ***before*** the exam is given. Only students with a legitimate, university-approved reason for absence will be allowed to take a make-up exam.

Homework: The problems you must complete outside of class come in three varieties:

- Textbook Problems: Exercises from the textbook will be assigned for each section that we cover. Although these will not be collected, it is important that you do every problem that is assigned to ensure your mastery of the topics. Also, some exam problems will be similar in nature to the exercises from the textbook. Learning mathematics is best accomplished by doing mathematics. Some classroom time can be spent on your homework questions.
- Turn-In Assignments: For most sections I will also distribute a collection of problems that will be collected and graded. Late submissions will not receive full credit, or may not be accepted at all.
- Preview Assignments: For some sections I will hand out an assignment that you must complete *before* we cover the material in class. These activities are designed to get you thinking about the upcoming material or introduce some simple ideas (so we don't have to use class time introducing them). Completing these activities gives you more exposure to the material, keeps you on track with the class, and should help your grade! The preview activities will be collected and graded, and each will be worth 10 points. For grading purposes, these assignments will be grouped together with the Turn-in Activities (see below). Of this group, I will drop your lowest score.

In-Class Activities: In addition to homework assignments and exams, you will complete some activities:

- In-Class Group Activities: During some class periods you will work in groups to complete some activities that move us along through the material. These activities facilitate mathematical exploration and require you to collaborate with your classmates in learning. These activities are only graded for completion, and you cannot receive credit for them if you are absent.
- Turn-in Group Activities: In section 2.4 you will twice work in groups during class to complete a more substantial activity, and these will be turned in and graded for accuracy. You cannot receive credit for them if you are absent. Each will be worth 10 points and for grading purposes they will be grouped together with the Preview Assignments (see above). Of this group, I will drop your lowest score.

Oral Presentation: An important part of mathematics is communicating with your peers, not only in writing but in person as well. To give you more experience along these lines, each of you will make a brief oral presentation to your classmates. This can be done alone or in a pair. We will go over the details later in the semester.

Attendance: I will keep track of your attendance. While absences could lead to poor scores on the in-class activities, it is also no surprise that students with poor attendance typically receive lower scores on homework and the exams as well. Regardless of the reason for any absence, you are responsible for all material covered in class.

We do not have class on Thursday, November 27 (Thanksgiving).

Tardiness: Class will begin on time. In order to avoid continual interruptions during the first few minutes of class, please make every effort to arrive before we start. I reserve the right to begin imposing penalties on latecomers if excessive tardiness becomes a problem.

Grading: Your scores on the exams, the final, the activities, your oral presentation, and the graded assignments problems will determine your final grade. Each proof or problem solution (from the homework or an exam) will be graded for mathematical accuracy, including but not limited to the following: correct statement justifications, the proper use of notation, the use of the correct proof format, legibility, presentation, and efficiency. When grading proofs, I am primarily looking for a correct, logical argument that proves the desired result, not necessarily the most efficient proof possible. However, if a proof is substantially longer than necessary, you may be penalized.

Specifically, your final grade will be determined by the percentage of the possible points that you earn. The point distribution is as follows:

Midterm Exams	~46%	300 points
Final	~15%	100 points
Turn-In Homework Assignments	~23%	150 points
Preview Assignments & Turn-In Activities	~9%	60 points
In-Class Activities	~3%	20 points
Oral Presentation	~3%	20 points
TOTAL	100%	650 points

The grading scale for this class is as follows, as a percentage of the possible points earned:

93% up to 100%	= A	80% up to 83%	= B-	67% up to 70%	= D+
90% up to 93%	= A-	77% up to 80%	= C+	63% up to 67%	= D
87% up to 90%	= B+	73% up to 77%	= C	60% up to 63%	= D-
83% up to 87%	= B	70% up to 73%	= C-	less than 60%	= F

Learning Outcomes

- **Logic**: The students will demonstrate a thorough knowledge of propositional logic.
- **Numbers**: The students will demonstrate a thorough knowledge of number and operation, including even/odd numbers, divisibility and prime numbers.
- **Set Theory**: The students will demonstrate a thorough knowledge of set theory.
- **Relations and Functions**: The students will demonstrate a thorough knowledge of relations and functions.
- **Cardinality**: The students will demonstrate a thorough knowledge of the cardinality of sets.
- **Groups**: The students will demonstrate a thorough knowledge of basic group theory.
- **Conjectures**: The students will formulate and evaluate conjectures on a variety of topics.
- **Proofs**: The students will prove statements that stem from all the topics of the course, both in writing and orally.
- **Collaboration and Communication**: The students will contribute to graded small-group activities, critique classmates' written proofs, and complete peer reviews of oral presentations.

My Background: I grew up on the southeast side of Grand Rapids, went to GR Christian High School, and received my undergraduate degree in math and physics from Calvin College. I received my doctoral degree in topology (a fun field of mathematics) from the University of Notre Dame. This is my 13th year at Ferris, where I've taught a broad range of different courses. I still live on the SE side of Grand Rapids with my wife, four kids – two girls, ages 14 and 11, and two boys, ages 8 and 5 (from July to March their ages form an arithmetic sequence) – a cat, and a Sheltie puppy. Current and classic music likes: Twenty One Pilots, The Fratellis, Sufjan Stevens, Weezer, Wilco, Radiohead, Macklemore, U2, Beck, R.E.M., Sarah McLachlan, Matthew Sweet, John Denver, Fatboy Slim and others. My sports teams: The Fighting Irish, Tigers, Red Wings, Pistons, Lions and Denver Broncos. I will defeat you in a Star Wars trivia contest. Other stuff I find myself doing: serving at church; watching good movies and TV; maintaining the yard; drinking fine beer; reading good books; coaching tee-ball; and building with LEGOs.

Finally, I reserve the right to alter anything in this document, including exam dates and course policies.

MATH 325 – College Geometry – Spring 2016 Syllabus

Course Section: MATH 325-001 **Credit Hours:** 4.0
Days, Times, Room: M 12:00 – 12:50, Starr 212
T/Th 12:00 – 1:15, Starr 212

Instructor: Dr. Michael Dekker

- Office: ASC 2038
- Office Phone: (231) 591-2566 or 1-800-4-FERRIS and ask for x2566
- Cell Phone: (616) 648-2015
- Email: dekkerm@ferris.edu
- Office Hours: M 1pm – 3pm, T/Th 10am – 11am and by appointment

Textbook: None (but lots of handouts from the instructor)

Prerequisite: MATH 324

Course Description: MATH 325 is primarily an axiomatic development of Euclidean geometry with an emphasis on the writing of geometric proofs. The course also features the exploration of geometry with technology, geometric constructions, coordinate geometry, transformational geometry, and measurement.

Course Content: The aim of this course is to cover all the material in the course pack, which includes the following topics: the measurement of length, angle measure, area and volume; axiomatic systems; lines, rays and segments; angles; triangles and congruence; quadrilaterals; similarity; circles; concurrence points; constructions; transformational geometry; and coordinate geometry.

Exams: There will be three midterm exams and a final exam. The ***tentative*** dates for the exams are:

Exam I	Sections 1-7	Date: Tuesday, February 2
Exam II	Sections 8-16	Date: Tuesday, March 1
Exam III	Sections 17-22	Date: Tuesday, April 5
Final Exam	Sections 23-27 and cumulative topics	Date: Tuesday, May 3 at noon

Any student who fails to take an exam on the scheduled date will receive a score of 0 for the exam unless I am notified of the absence ***before*** the exam is given. Only students with a legitimate, university-approved reason for absence will be allowed to take a make-up exam, at a time and date arranged by the instructor and student.

Oral Presentation: Once or twice during the semester each student will give an oral presentation to the class, proving a chosen theorem. This presentation can be done alone or in pairs. Also, in order to use our class time efficiently, you may choose to make a video recording of the presentation and upload it to the course Blackboard site. Your presentation(s) will be evaluated by me and by your classmates, using a rubric that I will provide.

Homework: Homework will be assigned for each section that we cover. Usually, I will collect some of the assigned homework for each section. If there are problems to be turned in, they will be announced with the assignment. You will be able to access all this information on Blackboard as well. Late homework will not receive full credit, or might not be accepted at all.

Comments on Homework: Although not all the homework will be collected and graded, it is important that you do every problem that is assigned, as the exam problems will be similar in nature to the problems in the homework. Learning to do mathematics well is accomplished through plenty of practice, and working the homework problems is the best way to practice. Usually, some classroom time will be spent on your homework questions.

In-Class Activities: Many times during the semester you will complete an activity in a group of two or three students. These activities could include an exploration of the current topic, making conjectures, using technology, and developing proofs. Some activities will simply be graded for completion, while others will be graded for correctness. Your attendance is required in order to receive credit for these activities.

Supplies: Beyond the basic supplies you need for a math course (pencils and paper), you will need a straightedge and a compass for doing constructions later in the course. Compasses can be obtained very cheaply at stores like Meijer (yay!) and Wal-Mart (boo!). A basic calculator will be necessary for some computational problems.

Attendance: I will keep track of attendance and you are expected to attend each class session. Regardless of the reason for any absence, you are responsible for all material presented in class.

Tardiness: Class will begin on time. In order to avoid continual interruptions during the first few minutes of class, please make every effort to arrive before we start. I reserve the right to begin imposing penalties on latecomers if excessive tardiness becomes a problem.

Grading: Your scores on the activities, exams, your presentation, and the graded homework problems will determine your final grade. Each proof or problem solution (from the homework or an exam) will be graded for mathematical accuracy, including but not limited to the following: correct statement justifications, the proper use of notation, the use of the correct proof format, legibility, presentation, and efficiency. When grading proofs, I am primarily looking for a correct, logical argument that proves the desired result, not necessarily the most efficient proof possible. However, if a proof is substantially longer than necessary, you may be penalized. For non-proof problems you must put together a solution of the problem that one of your peers could read and understand, not simply some chicken-scratch work followed by an answer in a box.

Specifically, your final grade will be determined by the percentage of possible points that you earn on the exams, the final, the quizzes, and the graded homework. The point distribution is as follows:

Midterm Exams	300 points (51%)
Final Exam	100 points (17%)
Homework	150 points (26%)
In-Class Group Activities	15 points (2.6%)
Oral Presentation(s)	20 points (3.4%)
TOTAL	585 points (100%)

The grading scale for this class is as follows, as a percentage of the possible points earned:

93% to 100% = A	80% up to 83% = B-	67% up to 70% = D+
90% up to 93% = A-	77% up to 80% = C+	63% up to 67% = D
87% up to 90% = B+	73% up to 77% = C	60% up to 63% = D-
83% up to 87% = B	70% up to 73% = C-	less than 60% = F

Learning Outcomes

- **Axiomatic Geometry**: The students will demonstrate a thorough knowledge of an axiomatic development of Euclidean geometry and its place in history.
- **Other Geometry**: The students will demonstrate a thorough knowledge of coordinate and transformational geometry and their places in history.
- **Constructions:** The students will perform and justify a variety of geometric constructions.
- **Measurement**: The students will demonstrate a thorough knowledge of geometric measurement and its uses in solving real-world problems.
- **Proofs**: The students will prove theorems from many of the topics of the course, both in writing and orally.
- **Technology**: The students will demonstrate the use of a computer-based geometry program in making and justifying geometric conjectures.
- **Collaboration**: The students will work together in small groups on a variety of graded activities.

My Background: I grew up on the southeast side of Grand Rapids, went to GR Christian High School, and received my undergraduate degree in math and physics from Calvin College. I received my doctoral degree in topology (a fun field of mathematics) from the University of Notre Dame. This is my 13th year at Ferris, where I've taught a broad range of different courses. I still live on the SE side of Grand Rapids with my wife, four kids – two girls, ages 14 and 11, and two boys, ages 8 and 5 (from July to March their ages form an arithmetic sequence) – a cat, and a Sheltie puppy. Current and classic music likes: Twenty One Pilots, The Fratellis, Sufjan Stevens, Weezer, Wilco, Radiohead, Macklemore, U2, Beck, R.E.M., Sarah McLachlan, Matthew Sweet, John Denver, Fatboy Slim and others. My sports teams: The Fighting Irish, Tigers, Red Wings, Pistons, Lions and Denver Broncos. I will defeat you in a Star Wars trivia contest and I have probably seen Episode VII more times than you. Other stuff I find myself doing: serving at church; watching good movies and TV; maintaining the yard; drinking fine beer; reading good books; coaching tee-ball; and building with LEGOs.

Finally: I reserve the right to alter anything in this document, including exam dates and course policies.

Ferris State University

MATH328 – Discrete Structures

Spring 2016

Instructor	Dr. J.F. (Jim) Nystrom nystroj@ferris.edu
Office and Phone	ASC 2056, (231) 591 – 5864
Office Hours	TR 3 – 5 pm and/or by appointment.
Required Text	Dossey, et. al.. *Discrete Mathematics*, 5th Edition (see bookstore).
Lecture	WF 3:00 – 4:15 pm. STR 204

- ## Course Description (*Catalog Description*)

(3 credits) Discrete Mathematics topics for Applied Mathematics and Computer Science. including: Sets. Algorithms. Recursion. Combinatorics, and Graph Theory.
Requires: MATH 216 or MATH 220.

- ## Learning Outcomes

A student succeeding in this course should be able to:

1. Solve simple or moderately complex counting problems using combinations and permutations.
2. Demonstrate knowledge of sets, relations, functions, congruence, graphs and trees by solving problems involving the use of these aforementioned concepts.
3. Prove simple or moderately complex mathematical statements involving integers using mathematical induction.
4. Read simple or moderately complex algorithms and utilize said algorithms to solve discrete mathematical problems, including problems involving graphs, trees, and cryptography. (The algorithms encountered in this course should include a mix of sequential, conditional, repetitive and recursive constructs.)
5. Development a rudimentary understanding of algorithm complexity, and demonstrate this by calculating approximations for how long certain algorithms would take to solve a problem when given information about problem size and computational speeds.

- **Grading**

The course grade is based on Midterm Examinations, Quizzes, and a Comprehensive Final Exam. The following tables show how the course numerical grade (of 100 total points) is calculated and also how the course letter grade will be assigned.

Calculation of 100 point Numerical Grade

Component	Percent of Numerical Grade
Quizzes	20
Midterm Examination I	25
Midterm Examination II	25
Final Exam	30

Calculation of Letter Grade from Numerical Grade

A	>= 92	B	80 – 86	C	70 – 75	D	55 – 65
A-	86 – 92	B-	75 – 80	C-	65 – 70	F	< 55

(Please note that the letter grade assignment is the guaranteed curve. The instructor may or may not lower the grade required for the "A", for instance, at his discretion.)

The Midterm Grade numerical grade calculation will use a quiz for 10% and the first Midterm Exam at 90%.

- **Calculator**

A Casio fx-260 or TI-36X or similar non-programmable, non-graphing calculator may be used on exams and quizzes. No cell-phone or multiline-display calculators will be permitted during examinations.

- **Homework**

The homework consists of suggested problems. Homework will be assigned in class. There will be time in-class to review homework solutions and ask questions about the homework. (Also pay attention to the verbal discussion of this issue on syllabus review day.)

- **Examinations**

There will be two in-class Midterm examinations during the semester (tentatively set for February 19, 2016 and April 15, 2016). The Final Exam is May 3, 2016 from 2 – 3:40 PM. **No make-up exam** for the Midterms will be given. Upon verification of an excused absence, the Final or the other Midterm grade (whichever is lowest) will also count as the grade for a single missed Midterm exam. NOTE: The Midterm and Final Exams may be fairly difficult, meaning that if you do not understand the material very well, you will probably not get a very good score on the exams. Also, the instructor may choose to curve exam grades at his discretion (based on difficulty of the exam and class performance).

- **Quizzes**

There will be two in-class Quizzes during the semester (tentatively set for February 5, 2016 and April 1, 2016). **No make-up quiz** for the quizzes will be given. Upon verification of an excused absence, the Final, a Midterm grade, or the other quiz (whichever is lowest) will also count (with a percent of points available calculation) as the grade for a single missed quiz

- **Student Conduct**

All students should refrain from cheating, they should not be disruptive in class, and in general should follow the FSU Student Code of Conduct (as outlined in the FSU Student Handbook, available online from the Office of Student Conduct). Failure to follow said code will most certainly result in sanctions in accordance with the aforementioned handbook and any other applicable rules and regulations. See the *COLLEGE OF ARTS AND SCIENCES SYLLABUS ATTACHMENT* for more details about potential consequences of cheating and/or disruptive behavior.

Students should turn cell phones off or to silent while in class; and students should never, ever answer a call in class.

- **Attendance**

For this course, while I strongly encourage attendance at each class, *attendance is NOT required*. If you miss a class, it is your responsibility to obtain any notes, handouts, etc., that you missed. (That is, do not ask the instructor for the notes from a class you missed.)

- **Services for Students with Disabilities**

If you need disability accommodations in this class, you should first contact the *Ferris State University Disabilities Service Office (DSO)*. If you suspect that you may need special accommodations, the DSO will review your documentation to determine your eligibility for services or accommodations. It is important that you contact them in a timely fashion as it may take several days to review requests and prepare accommodations.

- **General Advice**

Don't panic. Attend class and be on time. Study hard: keep up with the reading, start early on (and complete) all the assignments, and ask the instructor questions when you have any. Review the College of Arts & Sciences Syllabus Attachment for other helpful and important information. **NOTE:** The last day to drop this class is March 23, 2016.

- **Tentative Course Outline for MATH328 (Spring 2016)**

We will try to cover at least one-half of the course textbook this semester, most likely, in the following order:

- Chapter 1: Introduction to Combinational Problems and Techniques
  - Three example problems (Sections 1 - 3)
  - Algorithms (Section 4)
- Chapter 2: Sets, Relations, and Functions
  - Set operations and relations (Sections 1 - 2)
  - Functions (Section 4)
  - Mathematical induction and applications (Sections 5 - 6)

Midterm Examination (February 19, 2016)

- Chapter 3: Coding Theory
  - Congruence and the Euclidean algorithm (Sections 1 - 2)
- Chapter 4: Graphs
  - Graphs, paths, circuits, shortest paths and distance (Sections 1 - 3)
  - Directed graphs and multigraphs (Section 5)
  - *Matrices review when needed* (Appendix B)

Midterm Examination (April 15, 2016)

- Chapter 5: Trees
  - Trees, spanning trees and depth-first search (Sections 1 - 3)
  - Rooted trees, binary trees and binary search trees (Sections 4 - 6)
- Chapter 10: Combinational Circuits and Finite State Machines (if time permits)

Final Exam (May 3, 2016)

Ferris State University
MATH 330-001 – Differential Equations
Spring 2015

Instructor:	Jerome Trouba
	troubaj@ferris.edu
Office and Phone:	ASC 2044, (231) 591 – 5630
Office Hours:	MWF: 8-9, 11-12, 1-2
Class Meets:	MWF 10-10:50, SCI 136
Text:	Fundamentals of Differential Equations, 8th edition by Nagle, Saff, Snider

Course Description: Ordinary linear differential equations and classical solutions to special types of non-linear equations. Also, numerous applications, series solutions, and solutions of systems of linear differential equations.

Learning Outcomes:

1. Students will be able to model physical phenomena with first-order differential equations, to solve such equations using analytic, graphical, or numerical methods, and to analyze and communicate the results.
2. Students will be able to model physical phenomena with second-order differential equations, to solve such equations using analytic, graphical, or numerical methods, and to analyze and communicate the results.
3. Students will be able to model physical phenomena with systems of differential equations, to solve such equations using analytic, graphical, or numerical methods, and to analyze and communicate the results.

Grading: Your grade will be determined primarily on exams and homework as described below. Letter grades follow a ten-point scale: A: 100-93, A- 92-90, B+: 89-87, B: 86-83, B- 82-80, C+: 79-77, C: 76-73, C- 72-70, D+: 69-67, D: 66-60, F: < 60.

Grade Calculation	
Exams (3)	30%
Homework	20%
Projects	20%
Final Exam	30%
Total	100%

Attendance: Attendance is one of the most important factors in determining your success. Regardless of the reason for any absence, you are responsible for all material presented in class. In my experience, LACK of attendance is the #1 reason for failure.

Homework: Mathematics, like any fine art (e.g. learning an instrument or thrashing at guitar hero) is best learned through practice. Therefore, homework is a considerable percentage of your final grade. Put simply, you will fair poorly in this course if you do not do homework. I encourage you to work together on your homework, BUT to ultimately be responsible for your own work, in order to understand the material.

Exams: I anticipate three exams: Chapter 2, Chapter 4, and Chapter 5/6. Additionally a cumulative final exam will be given. Timing of class material makes it difficult for me to provide a firm exam date (though I will let you know at least a week in advance.) I don't like to rush through the material to "stay on track." I anticipate the first exam to be on September 16.

Projects: I feel projects get at the heart of mathematics, they serve as a way to apply what you've learned to a non-trivial problem. I anticipate two projects (one from chapter 3 and another from chapter 5).

Student Conduct: All students should refrain from cheating (don't copy from books/websites/each other), they should not be disruptive in class, and in general should follow the FSU Student Code of Conduct (as outlined in the FSU Student Handbook). Please do not use your cell phone in class. Failure to follow said code will most certainly result in sanctions in accordance with the aforementioned handbook and any other applicable rules and regulations. See the College of Arts and Sciences Syllabus Attachment for more details about potential consequences of cheating and/or disruptive behavior. Seriously, cheating can result in dismissal from the university!

FerrisConnect: Some information and material regarding this course can be found on FerrisConnect, including:

- The syllabus, homework assignments, and handouts.
- Exam and homework scores.

SYLLABUS

Math-340, Numerical Analysis, 3 Credits, Section 001
Spring 2016, M, W, F, 1:00 – 1:50 PM, STR #137

Instructor: Dr. Siddikov

Office: ASC 2030

Phone: 591 - 5913

E-mail: SiddikoB@ferris.edu , http://faculty.ferris.edu/siddikov/ (personal faculty webpage)

Office hours: M, W: 5:00 – 6:00 PM, F: 2:00 – 3:00 PM, and by appointment

Text: *Numerical Mathematics and Computing*, by W. Cheney and D. Kincaid, 7th Edition, 2013.

Brief Course Description: This course covers the main topics of numerical analysis, including numerical algorithms for interpolation, root finding, integration, differentiation, linear algebra, differential equations, spline functions, and the method of least squares.

Course Content: Chapters 1.1, 1.2, 2, 3, 4, 5.1, 5.2, 5.3, 6.1, 6.2, 7.1, 7.2, and 9.1.

Prerequisites: C- or higher grade in Math-230 and CPSC-130, or its equivalent.

Course Learning Outcomes: At the end of this course, the student should be able to solve real-world problems in several fields of numerical analysis. In particular, students will have demonstrated abilities through special numerical projects their competence in the following areas: Taylor's theorem, root approximations, interpolation, numerical integration and splines.

Technology: Personal computer (with Maple software if it is possible) and Calculator.

Exams: There will be 2 numerical projects, 2 midterm exams and final exam (closed book, closed notes). All students are required to complete the 2 numerical projects, and take the final and 2 midterm exams. Check the attached approximate schedule for dates of the midterm and final exams as well as for the due dates of numerical projects.

Makeups: You are expected to take each exam, and complete all two numerical projects. A makeup exam (or other arrangement) will only be given for reasons approved by the instructor. In this case permission should be sought prior to the exam.

Homework: Homework will be assigned regularly and discussed during the next class meeting. Although it will not be collected, it is important to work the problems. Many exam questions will be similar to homework problems.

Attendance: Regular attendance is required. To avoid disruption during the class sessions, please **do not come to class late or exit the class early.**

Total Points:

Numerical Projects	- 50 (2 numerical projects: each worth 25 points)
Midterm Exams	- 200 (2 midterm exams, each worth 100 points)
Final Exam	- 100
Total Points Possible	- 350

Grading Scale (percent):

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59

APPROXIMATE SCHEDULE

Math-340, Sec. 001, Spring 2016, M, W, F, 1:00 – 1:50 PM. STR #137

Instructor: Prof. Siddikov

DATE		CHAPTERS AND SECTIONS	EXAMS AND PROJECTS	HOMEWORK PROBLEMS	NUMERICAL PROJECTS (*Computer Problems*)
Month	Day				
January	11	1.1		1: 2; 3: 8; 9;	
	13	1.1		11(a),(c): 12; 14: 17	
	15	1.2		1: 4; 8: 14: 27:	
	20	1.2		37; 48; 50; 56(a)	
	22	2.1		1: 2; 3(a); 5;	
	25	2.1		6(a),(b),(c); 7(d)	
	27	2.2		1: 2; 3: 7; 9;	
	29	2.2		15; 16; 24(a)	
February	01	2.3		1: 2; 3;	
	03	2.3		4: 5; 6	
	05		Exam 1		
	08	3.1	Numerical Project #1	1: 5; 7: 8;	*1; 2; 3; 4; 7;*
	10	3.1		11; 20; 23	*9; 16; 19;20*
	12	3.2	Numerical Project #1	1: 4; 9: 15;	*1; 2; 4; 8;*
	15	3.2		28; 30; 39; 44	*9; 13; 15; 19*
	17	3.3	Numerical Project #1	1:2;3;4:9;	*1;2;3;4;*
	19	3.3		10; 13(a), (b); 17	*6; 7; 18; 19*
	22	*NP #1*	*Assign Numerical Project #1*		
	24	4.1	Numerical Project #2	1: 4; 6:	*1; 2; 3;*
	26	4.1		13(b); 15; 23;	*4; 6; 7;*
	29	4.1		25; 34; 41	*12; 16;*
March	02	4.2	Numerical Project #2	1: 6; 7:	*1; 3; 5; 7;*
	04	4.2		13; 17	*9; 12; 13*
	14	4.3	Numerical Project #2	1: 2; 3: 5:	*1(a),(b),(c); 2;*
	16	4.3		8(b); 14(a), (b); 24(b)	*3; 4; 5; 6; 7*
	18	*NP #2*	*Assign Numerical Project #2*		
	21	5.1		2; 11; 12; 17;	
	23	5.1		18; 27; 32; 36	
	28	5.2		1; 2; 4; 6:	*Due date of the*
	30	5.2		11; 12; 19; 24	*Numerical Project*
April	01	5.3		1: 3(a), (b); 4;	*#1; March 27,2015*
	04	5.3		5: 6; 10; 11	
	06		Exam 2		
	08	6.1		1: 2; 11; 12;	
	11	6.1		17; 20; 21	

DATE		CHAPTERS AND SECTIONS	EXAMS AND PROJECTS	HOMEWORK PROBLEMS	NUMERICAL PROJECTS (*Computer Problems*)
Month	Day				
April	13	6.2		1; 3; 9; 10;	
	15	6.2		14; 22; 27; 32	
	18	7.1		1; 2; 5; 7;	
	20	7.1		10; 12; 15; 16	
	22	7.2		1; 2(a), (b); 3; 4; 9;	*Due date of the*
	25	7.2		10; 13; 14(a); 18	*Numerical Project*
	27	9.1		1; 3; 5; 6;	*#2: April 24, 2015*
	29	9.1		11; 13; 18; 25	

FINAL EXAM: Wednesday, May 4, 2016, 12:00 – 1:40 PM, STR #137

Professor: David McClendon (2046 ASC, phone x2574 (231-591-2574 off campus), hours MTWR 3-4, T 5-6, or by appointment, email: `mcclend2@ferris.edu`)

Lectures: 4:00-4:50 MTWR in SCI 336.

Web: This course has a Blackboard page at FerrisConnect (accessed through MyFSU) to which announcements and weekly assignments will be posted (check this page regularly). Solutions to the homework problems are posted to this page weekly under "Course Documents".

I also maintain a personal web page at `http://mcclendonmath.com/414.html`. This page contains the lecture notes, old exams, useful handouts and information on Actuarial Exam P.

Prerequisites: Single- and multi-variable calculus and some basic statistics (Math 220, 230 251 and 320) are the most important prerequisites: you should be proficient at differentiating and integrating functions and have some recollection of material related to infinite series. We'll also use a bit of linear algebra (multiplication of matrices, matrix inverses, dot products, transposes and determinants).

Textbook: There is no required textbook. Good references include:

- *A First Course in Probability* by Ross, ISBN 0-13-185662-6.
- *Knowing the Odds: An Introduction to Probability* by Walsh, ISBN 0-8218-8532-4.
- *Introduction to Probability Theory* by Hoel, Port and Stone, ISBN 0-395-04636-X.
- *John E. Freund's Mathematical Statistics with Applications*, by Miller and Miller, ISBN 0-13-142706-7.
- *Introduction to Probability* by Grinstead and Snell, available for free online at the following address:
  `http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/amsbook.mac.pdf`

Lecture notes: You will need my lecture notes, which can be obtained in two ways:

- as a course pack, available at the bookstore
- online, at my web page as a pdf file

You should bring the lecture notes to class every day as they contain the examples and notes from which I will teach the course.

Course material: Math 414 is called "Statistics" but is really a course in probability theory. Essentially, probability is the branch of mathematics which tries to make predictions about data which will come from the repetition of some experiment which might have several different outcomes. In Math 414, we will cover most of "the basics" of probability theory: combinatorics, discrete and continuous probability distributions, conditional probability and independence, joint distributions, expected value and variance, moment generating functions, laws of large numbers and the Central Limit Theorem. This corresponds roughly to the material on Actuarial Exam P.

Probability theory is a really nice branch of math that has applications to a wide range of real-world problems, most especially in economics and business but also in the hard-core sciences.

Learning outcomes: Upon completion of Math 414, it is my hope and expectation that you will become proficient in probability theory. This includes the ability to:

1. Use the language of sample spaces and events to model probabilistic problems;
2. Solve elementary combinatorics problems;
3. Calculate probabilities of events and probabilities associated to discrete and continuous random variables;
4. Derive density and/or distribution functions for random variables defined as a transformation of other random variables;
5. Compute probabilities, marginals, conditional densities, etc. given a joint distribution, and determine whether or not random variables are independent;
6. Compute and interpret expected values, moments and generating functions, variance and covariance, conditional expectation and variance;
7. Write arguments mimicking the proof of the Central Limit Theorem;
8. Apply the Central Limit Theorem to solve problems associated to sums and averages of i.i.d. random variables.

Supplies: You should bring two or three colored pens or pencils to class each day to help you take good notes. Some problems we discuss are best attacked by use of color-coded pictures. (Calculators are prohibited on 414 exams, but you will need a TI-30X calculator for the Actuarial Exam P.)

Grading policy: Your homework average counts 20%; your worst midterm counts 10%; the other three midterms count 15% each; the in-class activities count 5% and the final exam counts 20%. Grades are curved at the end of the semester, but an average of 90% will receive at least A-, an average of 80% will receive at least B-, etc.

Attendance policy: I have no formal attendance policy. That said, **nothing** is more correlated with strong performance in my classes than attendance in lectures.

Homework: There will be weekly assignments which are due in class (usually on Wednesdays); the problems due are listed on the attached course calendar and come from the list of homework problems distributed on the first day of class (if you lose this list, you can download another copy from Blackboard or my website). I will grade a subset of the homework problems each week for correctness; your work should be legible and easy to follow, and you should show all your work.

Some (many) of the homework questions will be hard! It is normal not to know how to do some of the questions. Work with others and/or come ask me for help on the problems on which you are struggling.

Activities: We will frequently spend a class period working on an activity (usually on Thursdays; the dates are listed on the attached course calendar). These vary in style (some review concepts from previous math courses; others review or reinforce ideas from Math 414) and logistics (sometimes, you will present solutions at the board and sometimes, you will submit written work). For each activity, you will get a grade which combines the correctness of your work with your participation with the rest of your group and with the class.

Midterms: There are four midterms on **Wednesday, September 23, Wednesday, October 14, Wednesday, November 4** and **Wednesday, December 2.** The midterms not only test your ability to do homework questions but also your understanding of the material - to get an idea of what might be asked, you can look at my old exams which are available on my web page.
On each exam, you may use one $8.5'' \times 11''$ sheet of paper with anything you want written on it on both sides during the exams; you will not be permitted to use calculators or other study aids.
You may make up an exam that you miss (whether your absence is excused or not) but the makeup exams are considerably more difficult. If you miss an exam, contact the professor; you are to make up the exam at the *earliest possible time*.

Final exam: The final exam covers the whole semester. As with the midterms, you may use one $8.5'' \times 11''$ sheet of paper with anything you want written on it. If you miss the final, you can take a makeup but the makeup final will be significantly harder.

Getting help: Whenever my office door is open, you can knock and enter. Feel free to ask me how to do any or all of the homework questions. You can also seek assistance from students who have taken 414/416 from me in the past.

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements should register with the Educational Counseling and Disability Services office (x3057, `ecds@ferris.edu`). While ECDS will send me a letter outlining the accomodations to make for you, I would appreciate it if you could contact me immediately for assistance with any necessary classroom accomodations.

Academic dishonesty: Papers will be monitored for "magic answers". Issues with academic dishonesty are taken very seriously, will almost always result in an F for the class, and will be referred to the Office of Student Conduct.

Professor: David McClendon (2046 ASC, phone x2574 (231-591-2574 off campus), hours M 3-4, T 1-2, W 10-11, W 3-4, R 1-2 or by appointment, email: `mcclend2@ferris.edu`)

Lectures: 2:00-2:50 MTWR in SCI 136.

Web: This course has a Blackboard page at FerrisConnect (accessed through MyFSU) to which announcements and weekly assignments will be posted (check this page regularly). Solutions to the homework problems are posted to this page weekly under "Course Documents".

I also maintain a personal web page at `http://mcclendonmath.com/416.html`. This page contains the lecture notes, old exams, useful handouts, etc.

Prerequisites: C- or better in Math 414.

Textbook: There is no required textbook, but I recommend *Markov Chains* by J.R. Norris, ISBN 978-0521633963. Here are some other good books covering course material:

- *Introduction to Stochastic Processes* by Gregory Lawler, ISBN 158488651X
- *Stochastic Processes* by Sheldon Ross, ISBN 0471120626
- *Introduction to Stochastic Processes* by Hoel, Port and Stone, ISBN 0881332674

Lecture notes: You will need my lecture notes, which can be obtained in two ways:

- as a course pack, available at the bookstore
- online, at my web page as a pdf file (make sure to get the 2016 version)

You should bring the lecture notes to class every day as they contain the examples and notes from which I will teach the course.

Course material: In Math 416, we will study stochastic processes, especially Markov processes in discrete and continuous time and Brownian motion.

Learning outcomes: Upon completion of Math 416, it is my hope and expectation that you will be able to:

1. given a Markov chain in either discrete or continuous time, find its class structure, calculate stationary and/or steady-state distributions and mean return times, compute infinitesimal matrices, etc.
2. prove that a given process is a martingale;
3. solve problems related to stopping times for random walk and gambler's ruin;
4. understand and apply the properties of Brownian motion; and
5. gain experience communicating technical mathematical ideas to a broad audience.

Supplies: You should bring two or three colored pens or pencils to class each day to help you take good notes. Some problems we discuss are best attacked by use of color-coded pictures.

Grading policy: Your homework average counts 15%. There are three group presentations in the middle of the semester, which count 7.5%, 5% and 7.5%, respectively. There will be occasional activities which collectively count 5%. Each midterm counts 15% and your final presentation counts 15%. Grades are curved at the end of the semester, but an average of 90% will receive at least A-, an average of 80% will receive at least B-, etc.

Attendance policy: I have no formal attendance policy. That said, **nothing** is more correlated with strong performance in my classes than attendance in lectures.

Homework: There will be seven homework assignments which are due on the dates indicated on the attached course calendar. The problems come from the list of homework problems distributed on the first day of class (if you lose this list, you can download another copy from Blackboard). I will grade a subset of the homework problems each week for correctness; your work should be legible and easy to follow, and you should show all your work.

Some (many) of the homework questions will be hard! It is normal not to know how to do some of the questions. Work with others and/or come ask me for help on the problems on which you are struggling.

Group presentations: You will have three group assignments on the dates indicated on the course calendar. For the first two assignments, your group is to: (1) write up a handout for the class on your topic (I will run these off for the entire class) and (2) give a short (15 min) presentation on some aspects of the topic you are assigned. The last group assignment is to lecture on one or two sections from my lecture notes. For each presentation, you will have some time in class to work on your project; apart from that, you are to prepare on your own time.

Activities: There will be occasional activities similar to those done in Math 414; these will be done in groups. Depending on the activity, you may have to turn in solutions or write solutions on the board.

Midterms: There are three midterms on **Monday, February 15, Wednesday, March 16** and **Monday, April 18**. The midterms not only test your ability to do homework questions but also your understanding of the material. On each exam, you may use one 8.5″ × 11″ sheet of paper with anything you want written on it on both sides during the exams; you will not be permitted to use calculators or other study aids. You may make up an exam that you miss (whether your absence is excused or not) but the makeup exams are considerably more difficult. If you miss an exam, contact the professor; you are to make up the exam at the *earliest possible time*.

Final presentations: In place of a final exam, you will do a final presentation during the last week of class (you can work alone or in a small group). As with the group presentations, you are to make a handout for the audience and give a presentation on aspects of your topic, but this time your presentation should be more substantial (and last an entire class period). I will have a list of topics from which you can choose; you may choose a different topic if I approve it in advance. You will have three days of class time to prepare your presentation; apart from that, you are to prepare on your own time.

Getting help: Whenever my office door is open, you can knock and enter. Feel free to ask me how to do any or all of the homework questions.

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements should register with the Educational Counseling and Disability Services office (x3057, `ecds@ferris.edu`). While ECDS will send me a letter outlining the accommodations to make for you, I would appreciate it if you could contact me immediately for assistance with any necessary classroom accommodations.

Academic dishonesty: Papers will be monitored for "magic answers". Issues with academic dishonesty are taken very seriously, will almost always result in an F for the class, and will be referred to the Office of Student Conduct.

Professor: David McClendon (2046 ASC, phone x2574 (231-591-2574 off campus), hours M 3-4, T 1-2, W 10-11, W 3-4, R 1-2 or by appointment, email: `mcclend2@ferris.edu`)

Meetings: M 4:00-5:50 and W 4:00-4:50 in SCI 117

Web: `mcclendonmath.com/417.html`

Prerequisites: C- or better in Math 414.

Text: *Actex P Study Manual* (2012 Edition) by Sam Broverman, ISBN 978-1-56698-894-0. This text contains 8 practice exams at the end, which I will not use in class - you can complete them on your own time for additional practice.

Required calculator: TI-30X (this is the only permitted calculator on Exam P, so it will be the only permitted calculator in this course).

Information on Actuarial Exam P:

`https://www.soa.org/education/exam-req/edu-exam-p-detail.aspx`

This page contains sample paper/pencil questions, online exam questions, and information on how to register for the exam.

Learning outcomes: Upon completion of Math 417, it is my hope and expectation that you will be able to able to pass Exam P. At the very least, I hope you will improve your chances of passing by:

1. learning to solve probability questions in the context of risk management and insurance (i.e. insurer's risk, deductibles, benefit limits, inflation, etc.)
2. memorizing relevant facts for the exam;
3. developing the ability to recall lists of concepts based on "key words" in exam questions;
4. developing problem-solving techniques and exam strategies; and
5. gaining extensive practice with sample Actuarial Exam P problems.

Grading policy: First, if you can provide documentation to me that you have passed the actuarial exam, you get an A.

Otherwise, your grade will consist of your performance on practice exams (50%), homework (20%) your attendance and participation in class activities (20%), and journals (10%). Grades will be curved at the end of the semester, but be advised: if your performance on practice exams does not indicate that you are likely to pass the actuarial exam, I am unlikely to give you an A or A-.

Practice actuarial exams: There will be five practice actuarial exams on the dates listed on the course calendar. These will be 2 hours long and consist of 20 multiple choice questions (the actual exam is 30 questions in 3 hours). I will grade these exams, looking for overall strong performance and/or a general trend of improvement from one exam to the next. After each exam, we will have a "post-mortem" session in class where we discuss some of the problems.

Homework: Homework will be individualized for each student based on their results on practice exams. I will assign problems from the text to you, depending on the areas of your practice exams where I think you could use the most practice.

Journals: Each of you is to keep a "journal" which records your activities outside of class as far as studying for the actuarial exam. Every day (including weekends) should have an entry which describes what you did **that day** to help prepare for the exam. This may include reading, solving sample problems, reviewing 414 notes, taking a practice exam, etc. Your entry should include the amount of time you spend studying, and a **brief but specific** description of what you did. If you did nothing, say you did nothing (your journal grade will depend on you keeping records, not whether or not you study).

Example of a good journal entry: $1/8/15$: I read p. 58-64 in Actex manual and solved problems 15-18 (1 hr 17 min total)

Example of a good journal entry: $1/8/15$: Reread 414 lecture notes on joint MGFs; watched a video at khanacademy.org on joint MGFs; made a summary sheet of properties of joint MGFs (34 min)

Example of a bad journal entry: $1/8/15$: I read and did some practice problems (about 1 hr)

The point of the journals is to try to get you to hold yourself accountable for studying for the exams on your own outside of class. The Society of Actuaries recommends that you spend 300 hours preparing for this exam! We only meet for 50 hours in class this semester.

Journals are collected on the days on the attached course calendar marked with "J".

Attendance policy: Attendance at every class meeting is expected; part of your grade comes from your presence in class and your participation in group work, activities, games, etc.

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements should register with the Educational Counseling and Disability Services office (x3057, `ecds@ferris.edu`). While ECDS will send me a letter outlining the accomodations to make for you, I would appreciate it if you could contact me immediately for assistance with any necessary classroom accomodations.

Academic dishonesty: Issues with academic dishonesty are taken very seriously, will almost always result in an F for the class, and will be referred to the Office of Student Conduct.

Ferris State University
MATH 440 – Mathematical Modeling
Fall 2015

Instructor:	Jerome Trouba
	troubaj@ferris.edu
Office and Phone:	ASC 2044, (231) 591 – 5630
Office Hours:	MWF 8-9, 11-12, 1-2 (T/TR 8-1:30)
Class Meets:	Tuesday, Thursday 1:30-2:45, Starr 206
Text:	A First Course in Mathematical Modeling (5th Edition) by Giordano, Fox, and Horton. On Amazon: $125 to rent, used/new $170 and up.
Prerequisites:	MATH 322 or MATH 328 with a C- or better.

- **Course Description** (Catalog Description)
  Introduction to mathematical models. Includes topics dependent upon student interests and backgrounds. A broad mathematics background is required.

- **Learning Outcomes**
  1. *Creative and Empirical Model Construction*: Given a real-world scenario, the student will learn to identify the problem, make assumptions and collect data, propose a model, test the assumptions, refine the model as necessary, fit the model to data if appropriate, and analyze the underlying mathematical structure of the model to appraise the sensitivity of the conclusions when the assumptions are not precisely met.
  2. *Model Analysis:* Given a model, the student will learn to work backward to uncover the implicit underlying assumptions, assess critically how well those assumptions fit the scenario at hand, and estimate the sensitivity of the conclusions when the assumptions are not precisely met.
  3. *Model Research:* The student will investigate a specific area to gain a deeper understanding of some behavior and learn to use what has already been created or discovered.

- **Attendance**
  Attendance is one of the most important factors in determining your success, but just showing up isn't enough; you need to participate in class—taking part in our discussions. Reading the text is necessary. I will be very disappointed in you if you do not show up and will impart my disappointment on your final course grade.

- **Grading**
  Your grade will be earned by your hard work on many varied projects and homework sets. No exams will be given. The final project will also consist of a poster presentation—I hope we can attend a conference together!

Grade Calculation	
Projects	20%
MCM Report	5%
ILAP Project	10%
UMAP Project	10%
Final Project/Poster	30% / 5%
Homework	20%
Total	100%

- **Projects**
I foresee two projects (personal finance and prescription drugs) plus a significant final project. You must complete one project solely on your own and one project with a group. (It is an important life skill to be able to work together and by yourself.) Group projects will be graded to a higher standard than single projects. A rubric will be used to grade projects—I expect high quality.
Additional projects include an ILAP—Interdisplinary Lively Application Project of your choosing and a UMAP (Undergraduate Mathematics and its Applications) project of your choosing. These projects get to the heart of mathematical modeling and are real-world and very applicable.
    - Final Project: A significant, semester-long investigation into a specific (approved) topic of your choosing. A final paper will be written and a poster will be presented during final exam week.

- **MCM Report**
The Mathematical Contest in Modeling "challenges teams of students to clarify, analyze, and propose solutions to open-ended problems. The contest attracts diverse students and faculty advisors from over 500 institutions around the world." It began in 1985. Groups of students are given four days to design a model. Your task will be to choose an interesting topic and read the top paper and report on it.

- **Homework**
Mathematics, like any fine art (e.g. learning an instrument or thrashing at guitar hero) is best learned through practice. Therefore, homework is a considerable percentage of your final grade. The homework is designed to aid you in completing the projects, to give you the basic understanding of the topic so that you can apply it. Put simply, you will fair poorly in this course if you do not do homework. We will discuss homework in class and as such you CANNOT turn it in late.

- **Student Conduct**
All students should refrain from cheating (don't copy from books/websites/each other), they should not be disruptive in class, and in general should follow the FSU Student Code of Conduct (as outlined in the FSU Student Handbook). Please do not use your cell phone in class. Failure to follow said code will most certainly result in sanctions in accordance with the aforementioned handbook and any other applicable rules and regulations. See the College of Arts and Sciences Syllabus Attachment for more details about potential consequences of cheating and/or disruptive behavior. Seriously, cheating can result in dismissal from the university!

- **Lastly**
This class can be the most useful class of your life, but you need to put the time and effort into it to make it so.

MATH 420 – Abstract Algebra
Spring 2015 Syllabus

Section: Day, Time, Room **Credit Hours**: 3.0

MATH 420-001: T/Th 1:30, SCI 132

Instructor: Dr. Michael Dekker
- Office: ASC 2038
- Office Phone: (231) 591-2566 or 1-800-4-FERRIS and ask for x2566
- Home Phone: (616) 452-4717 (not after 10pm)
- Email: dekkerm@ferris.edu
- Office Hours: M 1pm – 3pm, T/Th 10am – 11am and by appointment

Textbook: *Abstract Algebra: An Inquiry-Based Approach*
Hodge, Schlicker, and Sundstrom: CRC Press
ISBN: 9781466567061

Prerequisite: MATH 324 or special permission.

Course Description: MATH 420 is an introduction to abstract algebra, which includes the topics of groups, rings, fields, integral domains, homomorphisms, isomorphisms and their elementary properties.

Course Content: Our textbook is divided into seven parts, and each part is not divided into sections or chapters, but rather "investigations". There will be a substantial amount of in-class group activities in which you will explore these mathematical topics. The investigations that we will cover are:

Part I	Investigations 1-4	The Integers
Part II	Investigations 5,6	Other Number Systems
Part III	Investigations 7-10	Rings
Part IV	Investigation 11	Polynomial Rings
Part V	Investigation 18	More Ring Theory
Part VI	Investigations 19-26,28-31	Groups

FerrisConnect: You can find the following on the course FerrisConnect site:
- The course calendar with homework assignments, exam schedule and due dates
- Electronic copies of any handouts
- Your scores on homework sets, activities and the exams

Exams: There will be three midterm exams and a final exam. The tentative dates for the exams are:

Exam I	Thursday, February 5 covering Investigations 1-6
Exam II	Tuesday, February 26 covering Investigations 7-11,18
Exam III	Tuesday, April 7 covering Investigations 19-25
Final Exam	Wednesday, May 6 at 2pm, covering cumulative material and Investigations 26,28-31

Any student who fails to take an exam on the scheduled date will receive a score of 0 for the exam unless I am notified of the absence ***before*** the exam is given. Only students with a legitimate, university-approved reason for absence will be allowed to take a make-up exam, at a time and date arranged by the instructor and student.

Homework: Sets of exercises from the textbook will be assigned for each investigation that we cover. Some of these problems will be collected and graded. Late homework will not receive full credit, or might not be accepted at all. However, you will only be graded out of a smaller number of possible homework points for the entire course. These numbers (the number of homework points available to you and the number I will use as the "possible points" for computing grades) will be determined toward the end of the semester.

Although not all the homework problems from the textbook will be collected, it is important that you do every problem that is assigned. Some exam problems will be similar in nature to the problems in the homework. Learning mathematics is best accomplished by doing mathematics. Some classroom time can be spent on your homework questions.

Activities: In addition to graded sets of exercises and exams, you will complete some graded activities:

- Preview Activities: Our textbook contains preview activities that are intended to be completed *before* we cover the material in class. These activities are designed to get you thinking about the upcoming material or introduce some simple ideas (so we don't have to use class time introducing them). Completing these activities gives you more exposure to the material, keeps you on track with the class, and should help your grade!
- In-Class Activities: You will frequently work in groups to complete activities that move us along through the material. These activities facilitate mathematical exploration and require you to collaborate with your classmates in learning. Some of these activities will be turned in and graded.

Oral Presentation: An important part of mathematics is communicating with your peers, not only in writing but in person, as well. To give you more experience along these lines, each of you will make at least one brief oral presentation to your classmates. This can be done alone or in a pair, and you can also record your presentation and post it online rather than making the presentation in class. We will go over the details later in the semester.

Attendance: I will keep track of your attendance. While absences can lead to poor scores on the in-class activities, it is also no surprise that students with poor attendance typically receive lower scores on the exercises and the exams as well. Regardless of the reason for any absence, you are responsible for all material covered in class.

We do not have class on March 12 and 14 (spring break) nor on Thursday, April 2 (mid-semester recess).

Tardiness: Class will begin on time. In order to avoid continual interruptions during the first few minutes of class, please make every effort to arrive before we start. I reserve the right to begin imposing penalties on latecomers if excessive tardiness becomes a problem.

Grading: Your scores on the exams, the final, the activities, your oral presentation, and the graded homework problems will determine your final grade. Each proof or problem solution (from the homework or an exam) will be graded for mathematical accuracy, including but not limited to the following: correct statement justifications, the proper use of notation, the use of the correct proof format, legibility, presentation, and efficiency. When grading proofs, I am primarily looking for a correct, logical argument that proves the desired result, not necessarily the most efficient proof possible. However, if a proof is substantially longer than necessary, you may be penalized.

Specifically, your final grade will be determined by the percentage of the possible points that you earn. The point distribution is as follows:

Midterm Exams	48%	OR	300 points
Final	16%		100 points
Homework	24%		150 points
Preview Activities	8%		50 points
Oral Presentation	3%		20 points
TOTAL	100%		620 points

The grading scale for this class is as follows, as a percentage of the possible points earned:

93% up to 100%	= A	80% up to 83%	= B-	67% up to 70%	= D+
90% up to 93%	= A-	77% up to 80%	= C+	63% up to 67%	= D
87% up to 90%	= B+	73% up to 77%	= C	60% up to 63%	= D-
83% up to 87%	= B	70% up to 73%	= C-	less than 60%	= F

Learning Outcomes

- **Numbers**: The students will demonstrate a thorough knowledge of number systems and operations.
- **Rings**: The students will demonstrate a thorough knowledge of rings, fields and integral domains.
- **Groups**: The students will demonstrate a thorough knowledge of binary structures and groups, including subgroups, cyclic groups, permutation groups, and the place of group theory in history.
- **Advanced Groups**: The students will demonstrate a thorough knowledge of cosets, direct products and group homomorphisms.
- **Conjectures**: The students will formulate and evaluate conjectures on a variety of topics.
- **Proofs**: The students will prove statements that stem from all the topics of the course, both in writing and in one oral presentation to the class.
- **Collaboration and Communication**: The students will contribute to graded small-group activities, critique classmates' written proofs, and complete peer reviews of oral presentations.

My Background: I grew up on the southeast side of Grand Rapids, went to GR Christian High School, and received my undergraduate degree in math and physics from Calvin College. I received my doctoral degree in topology (a field of mathematics; try Wikipedia or ask me) from the University of Notre Dame. This is my twelfth year at Ferris, where I've taught a broad range of different courses. I still live on the SE side of Grand Rapids with my wife and four kids – two girls, ages 13 and 10, and two boys, ages 7 and 4 (From July to March their ages form an arithmetic sequence). Current and classic music likes: Twenty One Pilots, Postmodern Jukebox, Lily & Madeleine, The Fratellis, Sufjan Stevens, Weezer, Wilco, Radiohead, Macklemore, U2, Beck, R.E.M., Sarah McLachlan, Matthew Sweet, John Denver, Midnight Oil, Fatboy Slim and others. My sports teams: The Fighting Irish, Tigers, Red Wings, Pistons, Lions and Denver Broncos. I will defeat you in a Star Wars trivia contest. Other stuff I find myself doing: serving at church; watching good movies and TV; maintaining the yard; drinking expensive, snobby beer; building LEGOs; reading good books; coaching tee-ball; and riding my bike.

Finally: I reserve the right to alter anything in this document, including exam dates and course policies.

MATH 430 - Advanced Calculus- 3 Credit hours

Section 001
3:00-4:15 TR STARR 207

Name and Short Biography: I am Dr. Victor Piercey. Prior to coming to Ferris, I practiced law in New York City and attended graduate school in Mathematics at Michigan State University and the University of Arizona. In my spare time, I enjoy playing guitar and reading history.

Education: I have degrees in humanities, law, and mathematics. My Ph.D is in mathematics and is from the University of Arizona.

Teaching Experience: I have taught college students since 2003, including students at Michigan State University, Lansing Community College, the University of Arizona, and Central Arizona College. I have been at Ferris since 2012.

Email: piercev1@ferris.edu (preferred method of contact)
Office Phone: 231-591-2823

Office Location: ASC 2036

Office Hours and Open Door Policy: I maintain an open-door policy. This means that if I am in my office, I am happy to speak with you. Feel free to drop by anytime!

My official office hours are:

1. Mondays, 3 - 4 pm, ASC 2036
2. Tuesdays, 2 - 3 pm, ASC 2036
3. Wednesdays, 1 - 2 pm, IRC Connector (near Starbucks), and
4. Thursdays, 1 - 2 pm, ASC 2036.

Appointment: I am always happy to arrange appointments, including setting aside a regularly weekly time just for you!.

Prerequisites: MATH 320 and MATH 324.

Materials for this course

1. Advanced Calculus with Generalizations, Course Notes by Robert Vallin. This will be available on Blackboard and handed out at the first class meeting.

Course Description: A more rigorous approach to limits, continuity, sequences, and multivariable calculus, plus additional topics such as line and surface integrals. Fourier series, and gamma and beta functions.

Course Outcomes:

1. Using the definition of a limit of a sequence, write rigorous proofs of abstract theorems and concrete examples.
2. Using the definition of a limit of a function, write rigorous proofs of abstract theorems and concrete examples.
3. Effectively communicate mathematical arguments orally and in writing.

About Advanced Calculus: Advanced Calculus, also called Real Analysis, is typically one of the most difficult courses in undergraduate mathematics. This is because while the content *seems* familiar, we are developing our understanding of calculus with much more rigor. Specifically this involves the definitions of different types of limits.

Dispositions and Inquiry-Based Learning: Realizing the learning outcomes for this course will require that you engage intensive problem situations. Engaging with problem situations involves exploring, discussing with others, conjecturing, verifying, drawing conclusions, and justifying your answers. In short, you will be expected to adopt a positive disposition, take the initiative, and do your best to work with others through the problem situations that are encountered in this course.

Communication: Communication skills are critical in any professional environment. As a result, you will frequently be asked to communicate your work orally and in writing. If time permits, we will begin using TeX typesetting.

Learning from Mistakes: Mistakes and errors often contain some germ of truth and are wonderful opportunities to learn. In this class you should expect to learn from your own errors as well as those of your classmates. Taking a positive attitude toward mistakes is an important theme in this course!

Grading: Each students grade for the course will be based on ...

1. presentations and failure quality (15%)
2. written homework assignments (15%)
3. 3 in class exams (45%)
4. and the final exam (Monday, May 4 at 2:00). (25%)

Letter Grade Distribution:

93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	Equal to or below 59.99	F

Grading Details:

1. Participation:
   Your participation in each class period will be scored out of 4 according to the following rubric:
   - 4: Delivered complete or mostly complete solutions to all assigned problems with well-formulated questions where stuck AND posed questions and ideas to presenters.
   - 3: Delivered solutions to all assigned problems but at least one was incomplete without any well-formulated questions OR did not pose any questions or ideas to presenters.
   - 2: Delivered solutions to some but not all assigned problems.
   - 1: Did not deliver solutions to any assigned problems, but did pose questions and ideas to presenters.
   - 0: Did not participate or unexcused absence.
2. Written Homework:
   Each problem will be scored out of 4 according to the following rubric:
   - 4: Perfect solution, written perfectly, and caught all of peer's errors.
   - 3: Minor error(s) in solution or writing, or minor error(s) in peer's work that weren't caught.
   - 2: Major error(s) in solution or writing, or major error(s) in peer's work that weren't caught.
   - 1: Solution and writing are OK, but peer review not completed for the problem.
   - 0: Incomplete attempt or no attempt submitted.

   You can earn an extra point for participation or a homework problem by submitting a creative approach that is correct and that I did not see coming.

Written Homework and Peer Review: Homework will be assigned once per week and will be processed over a two-week cycle. Problems will typically be assigned on Tuesdays, due for peer review on Thursdays, returned with peer review on the following Tuesday, and submitted for grading that Thursday. When you turn in your homework, you should turn in your peer-reviewed draft as well as your final draft. If you have no comments for a problem in your peer review, you should still review your work in case your reviewer did not spot your errors. If you are confident in your original solution, you do not need to rewrite it.

When you complete your peer review, please record your name and make your comments in a different color.

You should expect your first written homework assignment during the third week of the semester. This will give you time to acclimate to the nature of this course and will give me time to get to know your strengths and weaknesses.

Attendance: It should be clear that attendance and engagement are critical in this course and will impact your participation grade as well as your ability to complete homework and peer reviews. If you must miss class, please inform me. Include the reason and provide documentation when you return. I will be the sole judge of whether your reason warrants an excused absence. I will be happy to let you know ahead of time whether your reasons constitutes a valid excuse.

Important Definitions:

The following are the fundamental definitions related to limits.

- Limit of a Sequence: The sequence (x_n) converges to the real number L if $\forall \epsilon > 0$, $\exists N$ such that $\forall n > N$ we have $|x_n - L| < \epsilon$.

- Limit of a Function: The limit of f as $x \to x_0$ is L if $\forall \epsilon > 0$, $\exists \delta > 0$ such that whenever $0 < |x - x_0| < \delta$, $|f(x) - L| < \epsilon$.

Note that these definitions **do not** tell you how to find the limit. These are examples of non-constructive definitions.

Also note the quantifiers: $\forall$ means "for every" and $\exists$ means "there exists."

The Academic Support Center: The Academic Support Center, located in ASC 1017, provides free tutoring for students enrolled in math courses at FSU. Although it is best to make an appointment for tutoring (by calling 591-3543), tutoring is sometimes available on a walk-in basis. Please contact the support center to learn about their hours of operation.

Academic Honesty: Cheating will not be tolerated. Penalties for cheating on a test or quiz will range from a zero grade to referral to the dean of your college for disciplinary action. Cheating may result in a grade of F in the course, suspension, or dismissal from the university.

Students with Disabilities: Students who need special consideration because of any disability are urged to see their instructor as soon as possible.

MATH 450 - Theory of Interest - 3 Credit Hours

Section 001
12:00-12:50 MWF SCI 120

Name and Short Biography: I am Dr. Victor Piercey. Prior to coming to Ferris, I practiced law in New York City and attended graduate school in Mathematics at Michigan State University and the University of Arizona. In my spare time, I enjoy playing guitar and reading history.

Education: I have degrees in humanities, law, and mathematics. My Ph.D is in mathematics and is from the University of Arizona.

Teaching Experience: I have taught college students since 2003, including students at Michigan State University, Lansing Community College, the University of Arizona, and Central Arizona College. I have been at Ferris since 2012.

Email: piercev1@ferris.edu (preferred method of contact)
Office Phone: 231-591-2823

Office Location: ASC 2036

Office Hours and Open Door Policy: I maintain an open-door policy. This means that if I am in my office, I am happy to speak with you. Feel free to drop by anytime!

My official office hours are:

1. Mondays, 10 - 11 am
2. Tuesdays, 12:30 - 1:30 pm
3. Wednesdays, 9 - 10 am and
4. Fridays, 10 - 11 am

Appointment: I am always happy to arrange appointments, including setting aside a regularly weekly time just for you!.

Prerequisites: MATH 251 and MATH 320, with C- or better.

Materials for this course

1. Mathematics of Investment and Credit by Samuel A. Broverman, 5th Edition.

Course Description: The fundamental concepts of financial mathematics and how these concepts are applied in calculating present and accumulated values for various streams of cash flows as a basis for future use in: reserving, valuation, pricing, asset/liability management, investment income, capital budgeting, and valuing contingent flows. Emphasis on preparing students for the Society of Actuaries Exam FM.

Course Outcomes:

1. Solve problems involving the time value of money.
2. Solve problems involving annuities with non-contingent payments.
3. Solve problems involving loans.
4. Solve problems involving bonds.
5. Solve problems involving general cash flows and portfolios.
6. Solve problems involving (financial) immunization.

Technology: On exams and quizzes, you will only be allowed to calculators that are allowed for SOA exams. These include the following TI calculators:

1. BA-35
2. BA II-Plus (regular or professional edition)
3. TI-30XS Multiview
4. TI-30Xa
5. TI-30XIIS
6. TI-30XIIB
7. TI-30XB Multiview

Note that memories must be cleared for all exams. For homework (and your project) you can use whatever calculator you want.

You should also be prepared to use Excel for some homework assignments. If we need a workshop day to get up to speed on Excel, we will do that.

Grading: Each students grade for the course will be based on ...

1. homework and quizzes (25%)
2. project (15%)
3. 3 in class exams (45%)
4. and the final exam (Monday, Dec. 14 at 12:00). (15%)

Letter Grade Distribution:

93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	Equal to or below 59.99	F

The Academic Support Center: The Academic Support Center, located in ASC 1017, provides free tutoring for students enrolled in math courses at FSU. Although it is best to make an appointment for tutoring (by calling 591-3543), tutoring is sometimes available on a walk-in basis. Please contact the support center to learn about their hours of operation.

Academic Honesty: Cheating will not be tolerated. Penalties for cheating on a test or quiz will range from a zero grade to referral to the dean of your college for disciplinary action. Cheating may result in a grade of F in the course, suspension, or dismissal from the university.

Students with Disabilities: Students who need special consideration because of any disability are urged to see their instructor as soon as possible.

Professor: Victor Piercey (2036 ASC, phone x2823 (231-591-2823 off campus), hours M 10-11, T 12:30-1:30, W 9-10, F 10-11 or by appointment, email: `piercev1@ferris.edu`)

Meetings: T 4:30-5:45 and R 4:30-5:45 in SCI 117

Prerequisites: C- or better in Math 450.

Text: *Actex FM Study Manual Volumes I and II* (December 2014 Edition) by Matthew J. Hassett, et. al., ISBN 978-1-62542-384-9. We will only have time to work a selected set of problems in class and on exams, it is expected that you will work as many (if not all) of the other problems on your own outside of class..

Required calculator: Only calculators allowed on Exam FM. I recommend either TI-30XIIB or TI-BAII Plus.

Information on Actuarial Exam FM:

`https://www.soa.org/education/exam-req/edu-exam-fm-detail.aspx`

This page contains sample paper/pencil questions, online exam questions, and information on how to register for the exam.

Learning outcomes: Upon completion of Math 451, it is my hope and expectation that you will be able to able to pass Exam FM. At the very least, I hope you will improve your chances of passing by:

1. learning to solve problems in financial mathematics, including problems from interest theory and financial economics (the latter includes general financial derivatives, options, forwards and futures contracts, swaps, hedging, and investment strategies);
2. memorizing relevant facts for the exam;
3. developing the ability to recall lists of concepts based on "key words" in exam questions;
4. developing problem-solving techniques and exam strategies; and
5. gaining extensive practice with sample Actuarial Exam FM problems.

Grading policy: First, if you can provide documentation to me that you have passed the actuarial exam, you get an A.

Otherwise, your grade will consist of your performance on practice exams (50%), homework (20%) your attendance and participation in class activities (20%), and journals (10%). Grades may be curved at the end of the semester, but be advised: if your performance on practice exams does not indicate that you are likely to pass the actuarial exam, I am unlikely to give you an A or A-.

Practice actuarial exams: There will be at least three practice actuarial exams on dates to be determined in class. These will be 2 hours long and consist of 25 multiple choice questions (the actual exam is 35 questions in 3 hours). We will schedule time outside of class for this based on your availability. I will grade these exams, looking for overall strong performance and/or a general trend of improvement from one exam to the next. After each exam, we will have a "post-mortem" session in class where we discuss some of the problems.

Homework: You are expected to be working problems outside of exams every day. Every week, you will turn in written solutions (in your OWN words) to the five most challenging problems that you worked outside of class. In addition to submitting your solutions, I would like you to write a paragraph detailing what you found difficult about those problems and identifying any trends (for example, "I notice that I am having difficulty determining whether a future or present value calculation should be used"). As we proceed, I may make specific suggestions to you in order for you to address your difficulties. Homework will be collected every Tuesday, starting on January 19.

Journals: Each of you is to keep a "journal" which records your activities outside of class as far as studying for the actuarial exam. Every day (including weekends) should have an entry which describes what you did **that day** to help prepare for the exam. This may include reading, solving sample problems, reviewing 450 notes, reading part of the 450 text, taking a practice exam, etc. Your entry should include the amount of time you spend studying, and a **brief but specific** description of what you did. If you did nothing, say you did nothing (your journal grade will depend on you keeping records, not whether or not you study).

Example of a good journal entry: 1/8/15: I read p. 58-64 in Actex manual and solved problems 15-18 (1 hr 17 min total)

Example of a good journal entry: 1/8/15: Reread 450 section on increasing annuities; reviewed 450 notes on increasing annuities; made a summary sheet of increasing annuities (34 min)

Example of a bad journal entry: 1/8/15: I read and did some practice problems (about 1 hr)

The point of the journals is to try to get you to hold yourself accountable for studying for the exams on your own outside of class. The Society of Actuaries recommends that you spend 300 hours preparing for this exam! We only meet for 45 hours in class this semester.

Journals are collected on Thursdays, starting on January 21.

Attendance policy: Attendance at every class meeting is expected; part of your grade comes from your presence in class and your participation in group work, activities, games, etc.

Class activities: It is expected that you will **read the modules** outside of class. Expect that we will work at a pace of roughly one or two days per module. During most class sessions, I will have you work and present past exam problems out of the Actex manual. If there are areas of persistent difficulty, I may deliver a brief "mini-lecture." I will also provide one-day lectures on modules 5, 6, and 7 during weeks 3, 4, and 5 of the class. That is only because those are topics from the Theory of Interest that we did not have time to cover in class.

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements should register with the Educational Counseling and Disability Services office (x3057, `ecds@ferris.edu`). While ECDS will send me a letter outlining the accommodations to make for you, I would appreciate it if you could contact me immediately for assistance with any necessary classroom accommodations.

Academic dishonesty: Issues with academic dishonesty are taken very seriously, will almost always result in an F for the class, and will be referred to the Office of Student Conduct.

Appendix C

CPSC 200 Master Course Document

Course. CPSC 200: Object-Oriented Programming (4 credits)

FSU Catalog Description. This course introduces programming and software engineering. The methodology is based on object-oriented analysis. Discussion of fundamental algorithms and elementary data structures is included, focusing an ADTs throughout. User interfaces are covered in the specification of programming tasks.

Prerequisites. CPSC 130 and MATH 126/130, or consent of the instructor.

Textbook. Course text is at the instructor's discretion. The current text is Walter Savitch, Absolute C++, 6th Edition, ©2016 Pearson.

Course Objectives. Students successfully completing CPSC 200 will be able to:

1. Understand and apply basic C++ data types, operators, expressions, and control structures such as sequence, selection, and iteration.
2. Use a C++ compiler and predefined code libraries.
3. Design and implement C++ functions, demonstrating an understanding of the call-by-value and call-by-reference mechanisms.
4. Understand and use simple data structures such as strings, arrays, and vectors.
5. Understand and use file I/O, separate compilation, and C++ namespaces.
6. Design and implement C++ classes.
7. Understand and implement recursive C++ functions.
8. Identify and debug syntax, logic, and run-time errors in a C++ program.
9. Develop good programming style and structure, including the principles of problem decomposition and top-down design, to produce readable code that is easy to maintain.

Topics and Approximate Time Allocation

- C++ Basics (4 hr): Introduction to C++. Variables, expressions, and assignment statements. Console input/output. Programming style. Libraries and namespaces.
- Flow of Control (4 hr): Boolean expressions. Branching mechanisms. Loops. Introduction to file input.
- Functions (4 hr): Predefined functions. Programmer defined functions. Scope rules.
- Parameters and Overloading (4 hr): Call-by-value parameters, call-by-reference parameters, constant reference parameters. Overloading and default arguments. Testing and debugging functions.
- Arrays (4 hr): Introduction to arrays. Arrays in functions. Programming with arrays, partially filled arrays. Searching and sorting an array. Multidimensional arrays.
- Structures and Classes (4 hr): Defining structure types. Defining classes. Accessors, mutators, constructors, nested classes. The `const` parameter modifier, inline functions, static functions. Vectors.
- Operator Overloading (4 hr): Basic operator overloading. Overloading binary and unary operators. Overloading with member functions. Overloading with `friend` functions. Overloading insertion and extraction operators, the assignment operator, increment and decrement operators, and the array operator.
- Strings (4 hr): C-strings. Character manipulation tools. The C++ standard `string` class.
- Pointers and Dynamic Arrays (4 hr).
- Separate Compilation and Namespaces (4 hr).
- Streams and File I/O (4 hr).
- Recursion (4 hr).
- Inheritance (4 hr).
- Templates (4 hr).
- Linked Data Structures (2 hr, if time).

CPSC 200 Assessment Plan

- Instructors may use the assessment mechanism of their choice (homework, quizzes, exams, projects, etc.).
- Success for each objective will be defined as earning a grade of $C-$ or higher.

SEMESTER:

NUMBER OF STUDENTS ASSESSED:

CPSC 200 Course Objective	Number of students who successfully completed the objective
Understand and apply basic C++ data types, operators, expressions, and control structures such as sequence, selection, and iteration.	
Use a C++ compiler and predefined code libraries.	
Design and implement C++ functions, demonstrating an understanding of the call-by-value and call-by-reference mechanisms.	
Understand and use simple data structures such as strings, arrays, and vectors.	
Understand and use file I/O, separate compilation, and C++ namespaces.	
Design and implement C++ classes.	
Understand and implement recursive C++ functions.	
Identify and debug syntax, logic, and run-time errors in a C++ program.	
Develop good programming style and structure, including the principles of problem decomposition and top-down design, to produce readable code that is easy to maintain.	

CPSC 300 Master Course Document

Course. CPSC 300: Data Structures and Algorithms (4 credits)

FSU Catalog Description. This course covers data structures and object-oriented design in some depth. Topics covered include data structures, a formal treatment of recursion, an introduction to basic problem solving strategies, an introduction to complexity analysis and theory of computability. Searching and sorting algorithms are presented in the light of the presentation of problem-solving strategies and complexity issues. Finally, objected-oriented design methodologies are studied.

Prerequisites. CPSC 200 or equivalent.

Textbook. Course text is at the instructor's discretion. The current text is Main/Savitch, Data Structures and Other Objects Using C++, 4th Edition, ©2011 Addison-Wesley.

Course Objectives. Students successfully completing CPSC 300 will be able to:

1. Analyze worst-case, average-case, and best-case running times of algorithms and C++ functions using asymptotic analysis. Compare the asymptotic behaviors of polynomial, exponential, and logarithmic functions and algorithms.
2. Understand fundamental data structures and the analyses of operations performed on them. As time allows, topics will include container classes, vectors, linked lists, stacks, queues, priority queues, deques, trees, and hash tables.
3. Use appropriate algorithms and associated data structures to solve complex problems.
4. Design and implement new data structures using existing ones.
5. Apply standard library data structures in software design.
6. Explain the major algorithms for searching and sorting. Describe and compare the run-time analyses of these algorithms.
7. Understand and apply recursion in problem solving.
8. Understand and apply advanced features of the C++ programming language. As time allows, topics will include data abstraction and encapsulation, information hiding, operator overloading, dynamic memory allocation, template functions, template classes, iterators, inheritance, and exception handling.

Topics and Approximate Time Allocation

- The phases of software development (4 hr): Specification, design, implementation.
- Running time analysis (4 hr): Big-O notation. Worst-case, average-case, and best-case analyses.
- Abstract data types and C++ classes (4 hr).
- Container classes (6 hr).
- Pointers and dynamic arrays (2 hr): Designing classes with dynamic array members.
- Linked lists (4 hr).
- Software development with templates, iterators, and the STL (6 hr).
- Stacks (4 hr).
- Queues (4 hr): Queues, priority queues, and deques.
- Recursion (2 hr).
- Trees (4 hr).
- Balanced trees (4 hr).
- Seaching (4 hr).
- Sorting (4 hr).

CPSC 300 Assessment Plan

- Instructors may use the assessment mechanism of their choice (homework, quizzes, exams, projects, etc.).
- Success for each objective will be defined as earning a grade of $C-$ or higher.

SEMESTER:

NUMBER OF STUDENTS ASSESSED:

CPSC 300 Course Objective	Number of students who successfully completed the objective
Analyze worst-case, average-case, and best-case running times of algorithms and C++ functions using asymptotic analysis. Compare the asymptotic behaviors of polynomial, exponential, and logarithmic functions and algorithms.	
Understand fundamental data structures and the analyses of operations performed on them. As time allows, topics will include container classes, vectors, linked lists, stacks, queues, priority queues, deques, trees, and hash tables.	
Use appropriate algorithms and associated data structures to solve complex problems.	
Design and implement new data structures using existing ones.	
Apply standard library data structures in software design.	
Explain the major algorithms for searching and sorting. Describe and compare the run-time analyses of these algorithms.	
Understand and apply recursion in problem solving.	
Understand and apply advanced features of the C++ programming language. As time allows, topics will include data abstraction and encapsulation, information hiding, operator overloading, dynamic memory allocation, template functions, template classes, iterators, inheritance, and exception handling.	

CPSC 320 Master Course Document

Course. CPSC 320: Computer Simulation (3 credits)

FSU Catalog Description. An introduction to discrete and continuous processes including queues and population dynamics. Examples will be modeled using Pascal and/or simulation languages such as Dynamo and SIMSCRIPT.

Prerequisites. CPSC 200, MATH 216/220, and MATH 251.

Textbook. Course text is at the instructor's discretion. Suggestions are:

- Sheldon Ross, *Simulation*, 5th Edition, ©2013 Academic Press
- Averill Law, *Simulation Modeling and Analysis*, 4th Edition, ©2007 McGraw-Hill

Course Objectives. Students successfully completing CPSC 320 will be able to:

1. Understand the basic principles and methods underlying elementary Monte Carlo methods and computer simulation of discrete-event stochastic systems.
2. Gain familiarity with the most commonly used stochastic models for discrete-event systems.
3. Become skilled at developing probabilistic models of a wide variety of real-world systems.
4. Become adept at designing, running, and analyzing simulations.
5. Appreciate the power and wide applicability of simulation techniques.
6. Be able to critique someone else's simulation results.

Topics and Approximate Time Allocation

- General introduction and overview of modeling and simulation; key issues in simulation (4 hr).
- Fundamental concepts of systems and models (4 hr).
- Probability theory (4 hr).
- Statistical methods (4 hr).
- Monte Carlo methods (6 hr).
- Discrete-event stochastic systems (6 hr).
- Data collection and model validity (2 hr).
- Selecting input probability distributions (4 hr).
- Random number generators (4 hr).
- Random variate generation (4 hr).
    - Discrete distributions.
    - Continuous distributions.
- Output data analysis; decision making using simulation (2 hr).

CPSC 320 Assessment Plan

- Instructors may use the assessment mechanism of their choice (homework, quizzes, exams, projects, etc.).
- Success for each objective will be defined as earning a grade of $C-$ or higher.

SEMESTER:

NUMBER OF STUDENTS ASSESSED:

CPSC 320 Course Objective	Number of students who successfully completed the objective
Understand the basic principles and methods underlying elementary Monte Carlo methods and computer simulation of discrete-event stochastic systems.	
Gain familiarity with the most commonly used stochastic models for discrete-event systems.	
Become skilled at developing probabilistic models of a wide variety of real-world systems.	
Become adept at designing, running, and analyzing simulations.	
Appreciate the power and wide applicability of simulation techniques.	
Be able to critique someone else's simulation results.	

(authored by D. McClendon, November 2015)

PROPOSED

MATH 220 Course Master Document

Course: MATH 220 - Calculus 1 (4 credits)

FSU catalog description: The first of a three-semester sequence in analytical geometry and calculus. Topics include: the limit, the derivative, differentiation of algebraic and transcendental functions, and definite and indefinite integration.

Prerequisite / Placement: Math 126 or 130 with a grade of C- or better; or ≥ 26 on the ACT; or ≥ 590 on the SAT.

Learning outcomes: students successfully completing Math 220 will be able to:

1. Infer information about a function from a limit statement, derivative or integral.

   (Examples: whether a function is continuous or discontinuous; equations of horizontal and/or vertical asymptotes; tone and/or concavity of a function; classification of relative extrema; etc.)

2. Estimate limits, derivatives, and integrals numerically and graphically (including situations where the limit, derivative or integral does not exist).

   (Examples: estimation of limits and derivatives using tables and/or graphs; numerical integration; etc.)

3. Compute limits, derivatives, and integrals of algebraic, trigonometric and transcendental functions.

   (Includes: evaluation of limits; calculations of derivatives using the definition; differentiation rules including exponential, logarithmic and inverse trigonometric functions; implicit differentiation; logarithmic differentiation; derivatives of indefinite integrals; evaluation of integrals using the Fundamental Theorem of Calculus; basic u-substitutions; etc.)

4. Solve problems which apply limits, derivatives and integrals.

   (Examples: one-dimensional motion; absolute and local extrema; applied optimization problems; related rates; tangent line approximation; area; etc.)

Suggested textbook: *Calculus*, 10th ed., by Larson and Edwards, Brooks/Cole Cengage (2014)

Faculty teaching 220 who wish to use their own materials in place of Larson may do so; however, faculty using a textbook other than Larson should inform the Core Committee in advance of teaching the course.

Course content: (sections here are from the Larson textbook, 10th edition)

SECTIONS	TOPIC
§1.1-1.5	Limits (omit the formal ϵ-δ definition of the limit)
§2.1-2.6	Differentiation
§3.1-3.7, 3.9	Applications of Differentiation
§4.1-4.5	Integration
§5.1-5.7	Transcendental Functions

(authored by D. McClendon, November 2015)

PROPOSED

MATH 230 Course Master Document

Course: MATH 230 - Calculus 2 (4 credits)

FSU catalog description: The second of a three-semester sequence in analytical geometry and calculus. Topics include: applications of integration, integration techniques, infinite series, conic sections, parametric equations, and polar coordinates.

Prerequisite / Placement: MATH 220 with a C- or better.

Learning outcomes: students successfully completing Math 230 will be able to:

1. Compute definite, indefinite and improper integrals using different integration techniques (u-substitutions; parts; partial fractions; etc.)
2. Apply L'Hôpital's Rule to evaluate indeterminate forms.
3. Solve problems which apply integrals (area between curves; volume; arc length; surface area; etc.)
4. Determine, with appropriate reasoning, whether an infinite series converges absolutely, converges conditionally or diverges.
5. Find the Taylor series of a function and use that series to solve problems involving polynomial approximation.

Suggested textbook: *Calculus*, 10th ed., by Larson and Edwards, Brooks/Cole Cengage (2014)

Faculty teaching 230 who wish to use their own materials in place of Larson may do so; however, faculty using a textbook other than Larson should inform the Core Committee in advance of teaching the course.

Course content: (sections here are from the Larson textbook, 10th edition)

SECTIONS	TOPIC
§7.1-7.4	Applications of Integration
§8.1-8.2, 8.5	Techniques of Integration
§8.7	L'Hôpital's Rule
§8.8	Improper Integrals
§9.1-9.10	Infinite Series; Taylor Series; Polynomial Approximation

(K. Sun, Proposed Spring 2016)

Mathematics Course Master Document

Course: Math 251 - Statistics for the Life Sciences, 3 credits

F.S.U. Catalog Description: A first course in statistics, including a broad range of applications from science. Topics include: Data display, descriptive statistics, probability, estimation, inference, and regression.

Pre-Requisite: MATH 130 (or higher) with a grade of C- or better, or 26 on ACT or 590 on SAT.

Learning Outcomes: Students successfully completing the course will be able to …

1) Define basic statistical terms.
2) Interpret and create visual displays of data.
3) Interpret and compute statistical summaries of data.
4) Calculate probabilities by applying various methods (e.g. counting methods, probability distributions, central limit theorem).
5) Compute point and interval estimates of means, proportions, and variances (if time permits) and interpret the results.
6) Perform hypothesis tests of means, proportions, and variances (if time permits) and interpret the results.
7) Identify and describe the strength and significance of a linear relationship (if time permits).

Suggested Textbook: *An Introduction to Biostatistics* by Glover and Mitchell; 3rd edition or newer.

Typical Course Content: Applications should be included where the instructor sees fit. Additional review may be needed as determined by the instructor.

1) Introduction to Data Analysis:
   a. Populations and samples
   b. Variables or data types
   c. Measures of central tendency: mean, median, and mode
   d. Measures of dispersion and variability
   e. Descriptive statistics for frequency tables or grouped data
   f. The effect of coding data
   g. Tables and graphs
   h. Accuracy, precision, and the 30-300 Rule (if time permits)

2) Introduction to Probability:
   a. Definitions
   b. Use of permutations and combinations
   c. Introduction to set theory and Venn Diagrams
   d. Axioms and rules of probability
   e. Probability rules and Mendelian Genetics

3) Probability Distributions:

a. Discrete random variables
b. The Binomial Distribution
c. The Poisson Distribution
d. Continuous random variables
e. The Normal Distribution
f. The Standard Normal Distribution

4) Sampling Distributions:
   a. Definitions
   b. Distribution of the sample mean
   c. Confidence intervals for the population mean
   d. Confidence intervals for the population variance (if time permits)
   e. Confidence intervals for the population proportion

5) Introduction to Hypothesis Testing:
   a. Typical steps in a statistical test of hypothesis
   b. Type I versus Type II errors in hypothesis testing
   c. Binomial examples of hypothesis testing

6) One-Sample Tests of Hypothesis:
   a. Hypotheses involving the population mean
   b. Hypotheses involving the population variance (if time permits)

7) Tests of Hypothesis Involving Two Samples:
   a. Comparing two variances (if time permits)
   b. Testing the differences between two means of independent samples
   c. Confidence intervals for the difference of two means (if time permits)
   d. The difference between two means with paired data

8) Linear Regression and Correlation (If time permits):
   a. Simple linear regression
   b. Simple linear correlation analysis

Assessment Plan:

- Instructor may use the assessment mechanism of their choice (exams, quizzes, projects, homework, etc.).
- The following information should be collected and turned in to the assessment committee. The information collected should be anonymous…do not include instructor name or section number.
- You may combine sections onto one form so it is important to include the total number of students. Please use counts instead of percentages.

Semester: ____________

Math 251 Learning Outcomes	**Number of students who successfully learned the outcome (i.e. earned 70% or C- or higher)**	**Total number of students assessed**
Create and interpret descriptive statistics (e.g. describing data sets in terms of their types, central tendency, and variability as well as creating and interpreting visual displays of the data.)		
Calculate probabilities by applying various methods (e.g. counting methods, probability distributions, Central Limit Theorem.)		
Compute and interpret point and interval estimates (e.g. of the mean and proportion.)		
Perform hypothesis tests (e.g. for means and proportions) and interpret the results		
Identify and describe the strength and significance of linear relationships (if time permits).		

Comments (optional):

(Hengli Jiao, Spring 2016)

Mathematics 320 Analytical Geometry and Calculus 3

Course: Math 320, Analytical Geometry and Calculus 3, 4 credits

F.S.U. Catalog Description:

The third of a three-semester sequence in analytic geometry and calculus. Topics include: vector valued functions, functions of several variables, and multiple integrals.

Pre-Requisite / Placement

MATH 230 with a C- or better recommended.

Learning Outcomes: Students successfully completing the course will be able to ...

1. Perform standard various operations on vectors in two-dimensional space and three dimensional space and interpret the operations geometrically. Determine the equations of lines and planes using vectors.
2. Identify various quadric surfaces through their equations
3. Define vector-valued functions of one real variable and sketch space curves, compute derivatives and integrals of vector-valued functions, and solve application problems with vector-valued functions.
4. Define functions of several variables and their limits, calculate the partial derivatives of functions of several variables, apply the chain rules for functions of several variables, calculate and apply the gradients and directional derivatives of functions of several variables and, solve problems involving tangent planes and normal lines.
5. Determine the extrema of functions of several variables including using the Lagrange multiplier method to find extrema of functions with constraints
6. Define and compute double integrals using iterated integrals, polar coordinates, and change of variables and solve application problems using double integrals.
7. Compute triple integrals in Cartesian, cylindrical, and spherical coordinates.

Suggested Textbook(s): Calculus, 10th Ed., Larson and Edwards, Brook/Cole Cengage Learning.

Typical Course Content: Applications should be included where the instructor sees fit. Additional review may be needed as determined by the instructor.

1. **Vectors and the Geometry of Space**
   a. Vectors in the Plane
   b. Space Coordinates and Vectors in Space
   c. The Dot Product of Two Vectors
   d. The Cross Product of Two Vectors in Space
   e. Lines and Planes in Space
   f. Quadratic Surfaces in Space
   g. Cylindrical and Spherical Coordinates

2. **Vector-Valued Functions**
   a. Vector-Valued Functions
   b. Differentiation and Integration of Vector-Valued Functions
   c. Velocity and Acceleration
   d. Tangent Vectors and Normal Vectors
   e. Arc Length and Curvature

3. **Functions of Several Variables**
   a. Introduction to Functions of Several Variables
   b. Limits and Continuity
   c. Partial Derivatives and Differentials
   d. Chain Rules for Functions of Several Variables
   e. Directional Derivatives and Gradients
   f. Tangent Planes and Normal Lines
   g. Extrema of Functions of Two Variables
   h. Lagrange Multipliers

4. **Multiple Integration**
   a. Iterated Integrals and Area in the Plane
   b. Double Integrals and Volume
   c. Change of Variables: Polar Coordinates
   d. Center of Mass and Moments of Inertia
   e. Surface Area
   f. Triple Integrals and Applications:
   g. Triple Integrals in Cylindrical and Spherical Coordinates
   h. Change of Variables: Jacobians

Assessment Plan:

- Instructor may use the assessment mechanism of their choice (exams, quizzes, projects, homework, etc.).
- The following information should be collected and turned in to the assessment committee. The information collected should be anonymous…do not include instructor name or section number.
- You may combine sections onto one form so it is important to include the total number of students. Please use counts instead of percentages.

Semester: ____________

Math 320 Learning Outcomes	**Number of students who successfully learned the outcome (i.e. earned 70% or C- or higher)**
Solve a variety of problems involving various operations on vectors in two-dimensional space and three dimensional space and know how to interpret the operations geometrically. Know how to determine the equations of lines and planes using vectors. Solve a variety of problems involving vector functions of one real variable including sketching space curves, computing derivatives and integrals of vector functions, and applications of vector functions.	
Solve a variety of problems of functions of several variables including limits, continuity, partial derivatives of functions of several variables. Be able to properly apply the chain rules for functions of several variables and use the gradients and directional derivatives of functions of several variables to solve application problems. Solve problems of the extrema of functions of several variables including using the Lagrange multiplier method to find extrema of functions with constraints and applications.	
Evaluate double integrals using iterated integrals, polar coordinates, and change of variables and solve application problems using double integrals. Compute triple integrals in Cartesian, cylindrical, and spherical coordinates.	

Total number of students assessed: ____________

Comments (optional):

MATH 328 Master Course Document

Course. MATH 328: Discrete Structures (3 credits)

FSU Catalog Description. Discrete Mathematics topics for Applied Mathematics and Computer Science, including: Sets, Algorithms, Recursion, Combinatorics, and Graph Theory.

Prerequisites. MATH 216 or MATH 220.

Textbook. Course text is at the instructor's discretion. The current text is John A. Dossey, et. al., Discrete Mathematics, 5^{th} Edition, ©2006 Pearson.

Course Objectives. Students successfully completing MATH 328 will be able to:

1. Solve simple or moderately complex counting problems using the multiplication principle, pigeon-hole principle, combinations and permutations, and other arrangements and/or selections which may include repetitions.
2. Demonstrate knowledge of sets, relations, and functions by solving problems involving the use of these aforementioned concepts.
3. Prove simple or moderately complex mathematical statements involving integers using mathematical induction.
4. Demonstrate knowledge of congruence and the RSA encryption method, by solving problems involving the use of these aforementioned concepts.
5. Demonstrate knowledge of graphs and trees by solving problems involving the use of these aforementioned concepts.
6. Read simple or moderately complex algorithms and utilize said algorithms to solve discrete mathematical problems, including problems involving sets, graphs, trees, and cryptography. (The algorithms encountered in this course should include a mix of sequential, conditional, repetitive and recursive constructs.)
7. Development a rudimentary understanding of algorithm complexity, and demonstrate this by calculating approximations for how long certain algorithms would take to solve a problem when given information about problem size and computational speeds.

Topics and Approximate Time Allocation

- Basics (4 hr): Introduction to combinational problems and techniques, including the use of PERT charts.
- Algorithms and Efficiency (2 hr): Introduction to algorithms and efficiency, including big-O notation.
- Set, Relations and Functions (5 hr): Set operations, relations, equivalence relations, partitions, and functions.
- Mathematical Induction and Introduction to Number Theory (3 hr): Proving simple or moderately complex mathematical statements involving integers using mathematical induction. Fundamental theorem of arithmetic, techniques for prime factorization, and basic number theory.
- Counting Techniques (5 hr): Fundamental counting principles (including the addition principle, the multiplication principle, and the pigeon-hole principle), combinations, permutations, and arrangements and selections which may include repetitions.
- Congruence and the RSA Method (5 hr): Congruence, modular arithmetic, Euclidean Algorithm, Extended Euclidean Algorithm, Modular Exponentiation Algorithm, and the RSA Encryption Method.
- Graphs (8 hr): Graphs, multigraphs, and their representations. Paths and circuits (including Euler paths/circuits and Hamiltonian paths/circuits), shortest paths and distance, and directed graphs. Included is coverage of the Euler Circuit Algorithm and the Breadth-First Search Algorithm.
- Trees (7 hr): Properties of trees, spanning trees, rooted trees, expression trees, binary trees and traversals. Included is coverage of Prufer's Algorithm, the Depth-First Search Algorithm, the use of Backtracking techniques, and various traversal algorithms.
- Quizzes, Examinations, and Reviews (6 hr)
- Network Flows (3 hr, if time permits): Flows and cuts, and a Flow Augmentation Algorithm.

MATH 328 Assessment Plan

- Instructors may use the assessment mechanism of their choice (homework, quizzes, exams, projects, etc.).
- Success for each objective will be defined as earning a grade of $C-$ or higher.

SEMESTER:

NUMBER OF STUDENTS ASSESSED:

MATH 328 Course Objective	Number of students who successfully completed the objective
Solve simple or moderately complex counting problems using the multiplication principle, pigeon-hole principle, combinations and permutations, and other arrangements and/or selections which may include repetitions.	
Demonstrate knowledge of sets, relations, equivalence relations, partitions, and functions.	
Prove simple or moderately complex mathematical statements involving integers using mathematical induction.	
Demonstrate knowledge of congruence and the RSA encryption method.	
Demonstrate knowledge of graphs and trees.	
Read simple or moderately complex algorithms and utilize said algorithms to solve discrete mathematical problems, including problems involving sets, graphs, trees, and cryptography.	
Development a rudimentary understanding of algorithm complexity, and demonstrate this by calculating approximations for how long certain algorithms would take to solve a problem when given information about problem size and computational speeds.	

(Hengli Jiao, Proposed, Spring 2016)

Mathematics Course Master Document

Course: Math 330 – Differential Equations, 3 credits

F.S.U. Catalog Description:

Ordinary linear differential equations and classical solutions to special types of non-linear equations. Numerous applications of first order differential equations. Series solution, systems of lineal differential equations, and applications, and applications of second order differential equations.

Pre-Requisite / Placement

MATH 230 with a C- or better recommended.

Learning Outcomes: Students successfully completing the course will be able to …

1. Find general solutions to first-order, second-order, and higher-order homogeneous and nonhomogeneous differential equations.
2. Identify and apply initial and boundary values to find particular solutions to first-order, second-order, and higher order homogeneous and non-homogeneous differential equations.
3. Select and apply appropriate methods to solve differential equations; these methods will include, but are not limited to, undetermined coefficients, variation of parameters, Laplace and inverse Laplace transforms.
4. Select and apply numerical analysis techniques to solve differential equations; these techniques will include Euler and Runge-Kutta methods.

Suggested Textbook(s): A First Course in Differential Equations with Modeling Applications, 10th edition, Brooks/Cole, Cengage Learning.

Typical Course Content: Applications should be included where the instructor sees fit. Additional review may be needed as determined by the instructor.

Introduction to Differential Equations

a. Definition and Terminology
b. Initial-Value vs Boundary-Value Problems

First-Order Differential Equations

a. Solution Curves without a Solution
b. Separation of Variables
c. Linear Equations
d. Exact Equations
e. Solutions by Substitutions

Modeling with First-Order Differential Equations

a. Linear Models
b. Nonlinear Models

Higher-Order Differential Equations

a. Preliminary Theory-Linear Equations
b. Reduction of Order
c. Homogeneous Linear Equations with Constant Coefficients
d. Undetermined Coefficients – Superposition Approach
e. Undetermined Coefficients – Annihilator Approach (optional)
f. Variation of Parameters
g. Cauchy-Euler Equation
h. Solving Systems of Linear DEs by Elimination
i. Nonlinear Differential Equations

The Laplace Transform

a. Definition of the Laplace Transform
b. Inverse Transforms and Transforms of Derivatives
c. Operational Property I
d. Operational Property II
e. The Dirac Delta Function
f. Systems of Linear Differential Equations

Numerical Solutions of Ordinary Differential Equations

a. Euler Methods
b. Runge-Kutta Methods

Assessment Plan:

- Instructor may use the assessment mechanism of their choice (exams, quizzes, projects, homework, etc.).
- The following information should be collected and turned in to the assessment committee. The information collected should be anonymous…do not include instructor name or section number.
- You may combine sections onto one form so it is important to include the total number of students. Please use counts instead of percentages.

Semester: ____________

Math 330 Learning Outcomes	**Number of students who successfully learned the outcome (i.e. earned 70% or C- or higher)**
Solve a variety of first order differential equations with methods including separation of variables, integrating factor, exact equations, and solutions by substitutions. Be able to determine a particular solution using initial or boundary values. Know how to model linear and nonlinear first order differential equations.	
Solve a variety of higher order linear differential equations with methods including reduction of order, auxiliary equations, variation of parameters, and Cauchy-Euler equations. Be able to deter particular solutions using superposition approach for constant nonhomogeneous linear equation with constant coefficients. Solve systems of linear differential equation by elimination method.	
Solve linear and linear systems of differential equations using Laplace and inverse Laplace transforms. Solve first-order initial-value problems using Euler and Runge-Kutta Methods manually and technologically.	

Total number of students assessed: ____________

Comments (optional):

(Bakhodirzhon Siddikov, Proposed: Spring 2017)

Mathematics Course Master Document

Course: Math 340 - Numerical Analysis, 3 credits

F.S.U. Catalog Description: Numerical Algorithms for Root Finding, Interpolation, Integration, Linear Algebra, and Differential Equations.

Pre-Requisite / Placement: Math 230 and CPSC 130 with a grade of C- or better.

Learning Outcomes: Students successfully completing the course will be able to …

1) Solve the system of linear equations by Gaussian elimination with scaled partial pivoting method.
2) Find the root(s) of a continuous function by using the bisection, Newton's, and secant methods.
3) Construct the Lagrange and Newton forms of the interpolating polynomial for the given table of values of a function.
4) Find the first, second, and third degree spline interpolants for the given table of values of a function.
5) Estimate the definite integral by employing the trapezoid rule, Simpson's rule, and the Romberg algorithm.
6) Solve the initial-value problem by using the Runge-Kutta and Taylor series methods.
7) Fit a function of the given form to the given data points in the least-squares sense.

Suggested Textbook(s): *Numerical Mathematics and Computing* by Cheney and Kincaid; 7th edition

Typical Course Content: Applications should be included where the instructor sees fit. Additional review may be needed as determined by the instructor.

1) Introduction:
   a. Preliminary Remarks
   b. Review of Taylor Series

2) Systems of Linear Equations:
   a. Naïve Gaussian Elimination Method
   b. Gaussian Elimination with Scaled Partial Pivoting Method
   c. Tridiagonal and Banded Systems

3) Locating Roots of Equations:
   a. Bisection Method
   b. Newton's Method
   c. Secant Method

4) Interpolation and Numerical Differentiation:
   a. Polynomial Interpolation
   b. Errors in Polynomial Interpolation
   c. Estimating Derivatives

5) Numerical Integration:
   a. Trapezoid Rule

b. Romberg Algorithm
c. Simpson's Rule

6) Approximation by Spline Functions:
   a. First- and Second-Degree Splines
   b. Natural Cubic Spline

7) Initial-Values Problems:
   a. Taylor Series Methods
   b. Runge-Kutta Methods

8) Smoothing of Data and the Method of Least Squares:
   a. Method of Least Squares

Assessment Plan:

- Instructor may use the assessment mechanism of their choice (exams, quizzes, projects, homework, etc.).
- The following information should be collected and turned in to the assessment committee. The information collected should be anonymous…do not include instructor name or section number.
- You may combine sections onto one form so it is important to include the total number of students. Please use counts instead of percentages.

Semester: ____________

Math 340 Learning Outcomes	Number of students who successfully learned the outcome (i.e. earned 70% or C- or higher)
Evaluate the accuracy of a given measurement, develop the first n terms and the error in the Taylor series for a given function, solve the system of linear equations by Gaussian elimination with scaled partial pivoting method	
Find the root(s) of a continuous and differentiable function by using the bisection, Newton's, and secant methods, construct the Lagrange and Newton forms of the interpolating polynomial for the given table of values of a function, estimate the definite integral by employing the trapezoid rule, Simpson's rule, and the Romberg algorithm	
Find the first, second, and third degree spline interpolants for the given table of values of a function, solve the initial-value problem by using the Runge-Kutta and Taylor series methods, fit a function of the given form to the given data points in the least-squares sense	

Total number of students assessed: ____________

Comments (optional):

(Trouba, March 21, 2016)

Mathematics Course Master Document

Course: Math 360 - Operations Research

F.S.U. Catalog Description: This course covers the main topics of operations research, including model formulation, linear programming, integer programming, nonlinear programming, network analysis, deterministic and stochastic dynamic programming, game theory and decision theory.

Pre-Requisite / Placement: MATH 322 with a C- or better

(current) Learning Outcomes: Students successfully completing the course will be able to ...

1. Solving Real-World Problems: Students are expected to be able to solve real-world problems in several fields of operations research including: Linear programming using the simplex method, Karmarkar's algorithm, Integer programming, Transportation problems, Network analysis, and Dynamic programming.
2. Future Application: Students should be able to apply the methods from this course to other real-world applications they may encounter in the future.

(proposed) Learning Outcomes: Students successfully completing the course will be able to...

1. Identify and develop operational research models from the verbal description of the real system. (Turn word problems into math problems)
2. Solve developed operational research models using both analytic skills and computational tools. (Solve those math problems)

Suggested Textbook: Optimization in Operations Research (2nd Edition) by Ronald Rardin

Typical Course Content:

Chapter 1: Problem Solving with Mathematical Models
Chapter 2: Deterministic Optimization Models in OR
Chapter 3: Improving Search (to motivate chap 5)
Chapter 4: Linear Programming Models
Chapter 5: Simplex Search for Linear Programming
Chapter 6: Duality, Sensitivity, and Optimality in Linear Programming
Chapter 9: Shortest Path and Discrete Dynamic Programming
Chapter 10: Network Flows and Graphs
Chapter 11: Discrete Optimization Models

Assessment Plan:

- Instructor may use the assessment mechanism of their choice (exams, quizzes, projects, homework, etc.).
- The following information should be collected and turned in to the assessment committee. The information collected should be anonymous...do not include instructor name or section number.
- You may combine sections onto one form so it is important to include the total number of students. Please use counts instead of percentages.

Semester: ____________

Math 360 Learning Outcomes	**Number of students who successfully learned the outcome (i.e. earned 70% or C- or higher)**
Identify and develop operational research models from the verbal description of the real system.	
Solve developed operational research models using both analytic skills and computational tools.	

Total number of students assessed: ____________

Comments (optional):

authored by D. McClendon, January 2016
approved by department on February 16, 2016

MATH 414 Course Master Document

Course: MATH 414 - Mathematical Statistics I (4 credits)

FSU catalog description: A theoretical course in probability and statistics including distributions and densities, expectation, moment generating functions, and functions of random variables.

Prerequisite / Placement: MATH 251 and MATH 320, both with a C- or better.

Learning outcomes: students successfully completing Math 414 will be able to:

1. Use the language of sample spaces and events to model probabilistic problems;
2. Solve elementary combinatorics problems;
3. Calculate probabilities of events and probabilities associated with discrete and continuous random variables;
4. Derive density and/or distribution functions for random variables defined as a transformation of other random variables;
5. Compute probabilities, marginals, conditional densities, etc. given a joint distribution, and determine whether or not random variables are independent;
6. Compute and interpret expected values, moments and generating functions, variance and covariance, conditional expectation and variance;
7. *(Time permitting / optional)* Write arguments mimicking the proof of the Central Limit Theorem;
8. Apply the Central Limit Theorem to solve problems associated with sums and averages of i.i.d. random variables.

Textbook is at the instructor's discretion; suggested texts include:

- *John E. Freund's Mathematical Statistics with Applications*, 8th. ed., by Miller and Miller (Pearson, 2012)
- *A First Course in Probability*, 9th ed., by Ross (Pearson, 2012)
- *Introduction to Probability Theory* by Hoel, Port and Stone (Brooks Cole, 1972)
- *Lecture Notes in Probability* by McClendon (FSU Course Pack, 2015 ed.)

Course content: (sections here are from the texts listed above)

TOPIC	MILLER / MILLER	ROSS	HOEL/ PORT/ STONE	McCLE- NDON
Probability spaces				
Sample spaces, outcomes and events	2.2-2.4	2.2,2.7	1.1-1.2	1.1-1.2
Probability laws	2.4-2.5,2.9	2.3-2.5	1.3	1.3
Conditional probability and independence	2.6-2.7	3.1-3.2, 3.4-3.5	1.4-1.5	1.4
Law of Total Probability and Bayes' Law	2.8-2.9	3.3	1.4	1.5
Combinatorics				
Combinations and permutations	1.2-1.4	1.1-1.4	2.1-2.3	2.3
Binomial coefficients	1.3-1.4	1.4-1.5	2.3	2.3
Partition problems	1.2	1.6	2.4	2.3
Hypergeometric distributions	5.6	1.4,4.8.3	2.4	2.3,4.2
Random variables				
Discrete r.v.s	3.1,3.8	4.1-4.2	3.1	2.1-2.2
Common discrete r.v.s	5.1-5.10	4.6-4.8	3.1,3.5	2.3-2.4
Continuous r.v.s	3.2-3.4	5.1	5.1-5.2	3.1-3.2
Common continuous r.v.s	6.1-6.3,6.5, 6.7-6.8	5.4-5.6	5.3	3.4-3.6
Transformations	7.1-7.6	5.7,6.6	3.2,3.6, 5.2.1,6.2, 6.5,6.7	3.3, 5.4
Joint distributions	3.5,3.8	6.1-6.2	3.3-3.4, 6.1,6.4	4.1-4.3, 5.1-5.2
Joint normal r.v.s	6.7			7.3
Marginal densities	3.6	6.1-6.2	6.1	4.1, 5.1-5.2
Conditional densities	3.7	6.4-6.5	6.3	5.3
Expectation				
Expected value	4.1-4.2	4.3,7.1, 7.2,7.9	4.1-4.2, 7.1-7.2	6.1
Variance, covariance and correlation	4.3,4.6	7.3	4.1-4.5, 7.1	6.2
Moment generating functions	4.3,4.5-4.6	7.3,7.7	4.3,7.3,8.1	7.1-7.2
Joint moments and MGFs	4.7	7.7.1	8.1	7.2
Conditional expectation (regression) and conditional variance	4.8	7.6	7.4	6.3
Limit Theorems				
Markov and Chebyshev inequalities	4.4	7.2.1,8.2	4.6	8.1
Laws of Large Numbers	8.2	8.2,8.4	8.4	8.2
Proof of the Central Limit Theorem	8.2	8.3	8.4	8.3
Applications of the CLT	8.1,8.2	8.3	7.5	8.3

Math 414 Assessment plan:

- Success will be defined as earning a C- or higher;
- The instructor may use the assessment mechanism of their choice (exams, quizzes, homework, projects, etc.);
- The following information should be collected and turned in to the assessment committee. Please use counts rather than percentages.

SEMESTER:

TOTAL NUMBER OF STUDENTS ASSESSED:

Math 414 learning outcomes	Number of students who successfully learned the outcome	Comments (optional)
1. Use the language of sample spaces and events to model probabilistic problems		
2. Solve elementary combinatorics problems		
3. Calculate probabilities of events and probabilities associated to discrete and continuous random variables		
4. Derive density and/or distribution functions for random variables defined as a transformation of other random variables		
5. Compute probabilities, marginals, conditional densities, etc. given a joint distribution, and determine whether or not random variables are independent		
6. Compute and interpret expected values, moments and generating functions, variance and covariance, conditional expectation and variance		
7. Write arguments mimicking the proof of the Central Limit Theorem		
8. Apply the Central Limit Theorem to solve problems associated to sums and averages of i.i.d. random variables.		

(authored by D. McClendon, April 2016)

PROPOSED

MATH 416 Course Master Document

Course: MATH 416 - Mathematical Statistics II (4 credits)

FSU catalog description: A continuation of MATH 414, including sampling distributions, estimation, hypothesis testing, regression and ANOVA.

Prerequisite / Placement: MATH 414, with a C- or better.

General education learning outcomes: Students who have completed Math 416 should acquire these broad-based skills:

1. *Collaboration:* students will work collaboratively on assignments and/or projects, and will critique each other's work.
2. *Communication:* students will gain practice communicating technical concepts, logical arguments and/or quantitative analysis, in writing and/or orally.

Subject-specific learning outcomes should be appropriate topics, chosen at the instructor's discretion, from advanced material in probability, statistics and/or stochastic processes. Possibilities include:

1. *Sampling distributions:* students should be able to calculate probabilities associated to sampling distributions (sample mean, sample variance, etc.);
2. *Point estimation:* students should be able to determine of the statistical properties (bias, efficiency, consistency, etc.) of point estimators;
3. *Advanced hypothesis testing:* students should be able to perform advanced hypothesis tests (z, t, F, χ^2, tests of proportions, etc.) and interpret the results;
4. *Linear regression:* students should be able to compute and interpret linear regressions and correlations (single-variable and/or multivariate);
5. *ANOVA:* students should be able to perform analysis of variance;
6. *Stochastic modeling:* students should be able to formulate stochastic models for real-world problems;
7. *Markov chains:* students should be able to perform elementary computations associated to Markov chains (compute n-step transitions and distributions, classify states as recurrent or transient, find stationary distributions, etc.)

8. *Brownian motion:* students should apply the elementary properties of Brownian motion to solve problems;
9. *Random walk:* students should be able to solve first passage time problems associated to random walks, birth-death processes and/or martingales.

Textbook is at the instructor's discretion; suggested texts include:

- *John E. Freund's Mathematical Statistics with Applications*, 8th. ed., by Miller and Miller (Pearson, 2012)
- *Introduction to Probability Theory* by Hoel, Port and Stone (Brooks Cole, 1972)
- *Introduction to Stochastic Processes* by Hoel, Port and Stone (Waveland Press, 1972)
- *Markov Chains* by Norris (Cambridge, 1997)
- *Lectures on Markov Chains* by McClendon (FSU Course Pack, 2016 ed.)

Course content: (sections here are from the texts listed on the previous page)

Note: (IPT) and (ISP) in the Hoel/Port/Stone column refer to *Introduction to Probability Theory* and *Introduction to Stochastic Processes*, both by Hoel, Port and Stone, respectively.

TOPIC	MILLER / MILLER	ROSS	HOEL/ PORT/ STONE	McCLENDON
Sampling distributions				
Distribution of the mean	8.1-8.3	8.3	7.5 (IPT)	
χ^2, t and F distributions	8.4-8.6	5.6	6.6 (IPT)	
Order statistics	8.7-8.8	6.6		
Point estimation of parameters				
Bias	10.1-10.2, 10.10			
Efficiency, consistency, sufficiency	10.3-10.6			
Methods of finding good estimators	10.7-10.9			
Advanced hypothesis testing				
General setup	12.1-12.4			
Power functions and likelihood ratios	12.5-12.6			
Tests involving means	13.1-13.3			
Tests involving variances and proportions	13.4-13.6			
Linear regression and correlation	14.1-14.8	7.6	7.4, 7.5.2 (IPT)	
Analysis of variance	15.1-15.7	10.4		
Markov chains				
Elementary properties		9.2	1.1-1.4 (ISP)	1.1-1.4
Real-world examples		9.2	1.7-1.9 (ISP)	1.2, 2.5, 5.3-5.4
Recurrence and transience		9.2	1.5, 1.9 (ISP)	1.5-1.6
Stationary distributions			2.1-2.5, 2.7 (ISP)	1.5-1.6
Continuous-time Markov chains			3.1-3.3 (ISP)	4.1-4.4
Poisson processes and queues			3.2.2 (ISP)	5.1-5.2, 5.5-5.6
Random walks and martingales		7.2, 9.2	9.1-9.2 (IPT), 1.6.2 (ISP)	2.1-2.6
Brownian motion			4.3, 5.1-5.4 (ISP)	6.1-6.7

Math 416 Assessment plan:

- Success will be defined as earning a C- or higher;
- The instructor may use the assessment mechanism of their choice (exams, quizzes, homework, projects, etc.);
- If the instructor chooses learning outcomes other than those listed below, the instructor is to fill in those learning outcome(s) on the chart below;
- The following information should be collected and turned in to the assessment committee. Please use counts rather than percentages.

SEMESTER:

TOTAL NUMBER OF STUDENTS ASSESSED:

Math 416 learning outcomes	Number of students who successfully learned the outcome	Comments (optional)
1. Work collaboratively on assignments and critique each other's work.		
2. Gain practice communicating technical concepts, logical arguments and/or quantitative analysis, in writing and/or orally.		
1. Calculate probabilities associated with sampling distributions		
2. Determine the statistical properties of point estimators		
3. Perform advanced hypothesis tests and interpret the results		
4. Compute and interpret linear regressions and correlations		
5. Perform analysis of variance		
6. Formulate stochastic models for real-world problems		
7. Compute quantities associated to Markov chains		
8. Apply properties of Brownian motion to solve problems		
9. Solve first passage time problems associated to random walks		

(authored by D. McClendon, April 2016)

PROPOSED

MATH 417 Course Master Document

Course: MATH 417 - Problem Solving Strategies in Probability Theory (3 credits)

FSU catalog description: Review and practice problem solving for the Society of Actuaries Exam P. Additional topics include specific application of probability to risk management and insurance setting.

Prerequisite / Placement: MATH 414, with a C- or better.

Learning outcomes: Students who have completed Math 417 should:

1. be able to solve problems applying probability in the context of risk management and insurance (i.e. those involving insurer's risk, deductibles, benefit limits, inflation, etc.);
2. have memorized requisite material (i.e. density function, expected value, variance, moment-generating function, etc.) related to common random variables (uniform, binomial, negative binomial, geometric, Poisson, exponential, gamma, hypergeometric, normal, bivariate normal);
3. have gained extensive practice with sample Actuarial Exam P problems; classify such problems into categories (in particular, whether the problem involves probability space laws, versus a single random variable, versus a transformation, versus a joint distribution, etc.); and
4. have developed test-taking strategies relevant to Actuarial Exam P, and learned general strategies to independently prepare for other actuarial examinations.

Textbook is at the instructor's discretion; the suggested text(s) is/are:

- *ACTEX P Study Manual*, 2012 ed., by Broverman (ACTEX/Mad River, 2012)
- *Risk and Insurance* by Anderson and Brown (Society of Actuaries, 2005); available online for free at `beanactuary.org`

Course content:

Applications of probability associated to risk management and insurance
ACTEX P Study Manual: Section 10
Risk and Insurance: p. 1-16

Review of material from Math 414
ACTEX P Study Manual: Sections 0-9

Practice Society of Actuaries Exam P Problems
ACTEX P Study Manual: p. 350-500

Development of test preparation and test-taking skills

Math 417 Assessment plan:

- Instructors should record below the number of students who have passed Exam P while enrolled in Math 417 (or during the first scheduled exam period after the completion of Math 417), and the number of students, in addition to those who passed Exam P, who have demonstrated ability to pass Exam P by scoring at a sufficient level on practice tests;
- With regard to the chart at the bottom of the page below, success will be defined as earning a C- or higher;
- The instructor may use the assessment mechanism of their choice (exams, quizzes, homework, projects, etc.);
- The following information should be collected and turned in to the assessment committee. Please use counts rather than percentages.

SEMESTER:

TOTAL NUMBER OF STUDENTS ASSESSED:

 # OF STUDENTS WHO PASSED EXAM P:
(Include here Math 414 students who passed
Exam P before or without taking Math 417, if any)

 # OF ADDITIONAL STUDENTS WITH ABILITY TO PASS EXAM P AS DEMONSTRATED ON PRACTICE TESTS:

Math 414 learning outcomes	Number of students who successfully learned the outcome	Comments (optional)
1. Solve problems applying probability in the context of risk management and insurance		
2. Memorize requisite material related to common random variables		
3. Gain extensive practice with sample Exam P problems and classify such problems		
4. Develop test-taking strategies relevant to Exam P, and general strategies to independently prepare for other actuarial exams		

(Trouba, April 5, 2016)

Mathematics Course Master Document

Course: Math 440 - Operations Research

F.S.U. Catalog Description: Introduction to mathematical models. Includes topics dependent upon student interests and backgrounds. A broad mathematics background is required.

Pre-Requisite / Placement: MATH 322 or MATH 328 with a C- or better

(current) Learning Outcomes: Students successfully completing the course will be able to …

1. **Solving Real-World Problems:** Students will be able to formulate models for a wide range of situations, including population growth, finances, predator-prey relationships, the solar system, business applications, inventory control, hypersonic velocity, variable stars, heat flow, pollution, space exploration, and ion propulsion.
2. **Future Application:** Students should be able to apply the methods from this course to other real-world applications they may encounter in the future

(proposed) Learning Outcomes:

1. *Creative and Empirical Model Construction*: Given a real-world scenario, the student will learn to identify the problem, make assumptions and collect data, propose a model, test the assumptions, refine the model as necessary, fit the model to data if appropriate, and analyze the underlying mathematical structure of the model to appraise the sensitivity of the conclusions when the assumptions are not precisely met.
2. *Model Analysis:* Given a model, the student will learn to work backward to uncover the implicit underlying assumptions, assess critically how well those assumptions fit the scenario at hand, and estimate the sensitivity of the conclusions when the assumptions are not precisely met.
3. *Model Research:* The student will investigate a specific area to gain a deeper understanding of some behavior and learn to use what has already been created or discovered.

Suggested Textbook: A First Course in Mathematical Modeling (5th Edition) by Giordano, Fox, and Horton.

Typical Course Content:

Chapter 1: Modeling Change
Chapter 2: The Modeling Process, Proportionality and Geometric Similarity
Chapter 3: Model Fitting
Chapter 4: Experimental Modeling
Chapter 5: Simulation Modeling
Chapter 6: Discrete Probabilistic Modeling
Chapter 9: Modeling with Decision Theory
Chapter 10: Game Theory
Chapter 11: Modeling with Differential Equations

Assessment Plan:

- Instructor may use the assessment mechanism of their choice (exams, quizzes, projects, homework, etc.).
- The following information should be collected and turned in to the assessment committee. The information collected should be anonymous…do not include instructor name or section number.
- You may combine sections onto one form so it is important to include the total number of students. Please use counts instead of percentages.

Semester: ____________

Math 440 Learning Outcomes	**Number of students who successfully learned the outcome (i.e. earned 70% or C- or higher)**
Creative and Empirical Model Construction: Given a real-world scenario, the student will learn to identify the problem, make assumptions and collect data, propose a model, test the assumptions, refine the model as necessary, fit the model to data if appropriate, and analyze the underlying mathematical structure of the model to appraise the sensitivity of the conclusions when the assumptions are not precisely met.	
Model Analysis: Given a model, the student will learn to work backward to uncover the implicit underlying assumptions, assess critically how well those assumptions fit the scenario at hand, and estimate the sensitivity of the conclusions when the assumptions are not precisely met.	
Model Research: The student will investigate a specific area to gain a deeper understanding of some behavior and learn to use what has already been created or discovered.	

Total number of students assessed: ____________

Comments (optional):

(authored by V. Piercey, March 2016)

PROPOSED

MATH 450 Course Master Document

Course: MATH 450 - Theory of Interest (4 credits)

FSU catalog description: The fundamental concepts of financial mathematics, and how these concepts are applied in calculating present and accumulated values for various streams of cash flows as a basis for future use in: reserving, valuation, pricing, asset/liability management, investment income, capital budgeting, and valuing contingent cash flows. Emphasis on preparing students for the Society of Actuaries Exam FM.

Prerequisite / Placement: MATH 230 with a C- or better.

Learning outcomes: students successfully completing Math 450 will be able to solve problems involving:

1. the time value of money;
2. annuities with non-contingent payments;
3. loans;
4. bonds;
5. general cash flows and portfolios;
6. immunization;

Textbook *Mathematics of Investment and Credit*, 5th. ed., by Boverman (ACTEX, 2010)

Course content: (sections here are from the text listed above)

TOPIC	BOVERMAN
Time Value of Money	
Interest accumulation	1.1
Present value	1.2
Nominal and effective rates of interest	1.1, 1.4
Nominal and effective rates of discount	1.5
Force of interest and continuous interest accumulation	1.6
Inflation and interest	1.7
Annuities	
Level payment annuities: future value	2.1.1, 2.2
Level payment annuities present value	2.1.2.1 - 2.1.2.3, 2.2
Perpetuities	2.1.2.4
Payments in geometric progression	2.3.1
Payments in arithmetic progression	2.3.2
Internal rates of return, yield rates, and reinvestment rates	2.4.1
Book value and market value	2.4.4
Sinking fund method of valuation	2.4.5
Loans	
Amortization methods	3.1.1
Amortization schedule	3.1.2
Retrospective and prospective forms of outstanding balance	3.1.3 - 3.1.4
Amortization with level payments	3.2
Sinking fund method	3.3
Bonds	
Bond vocabulary	4.1
Price on a coupon date	4.1.1
Premium and discount bonds	4.1.2
Price between coupon dates	4.1.3
Amortization of premium or discount	4.2
Callable bonds	4.3.1
General Cash Flows and Portfolios	
Internal rate of return	5.1.1 - 5.1.2
Net present value	5.1.3
Dollar-weighted rate of return	5.2.1
Time-weighted rate of return	5.2.2
Portfolio and investment year method	5.3.1
Spot rates and forward rates	6.1, 6.3
Immunization	
Exact matching of assets and liabilities	7.2
Macauley and modified duration	7.1.2
Duration of coupon and zero-coupon bonds	7.1.1, 7.1.3
Convexity	7.2.1
Redington immunization	7.2.1
Full immunization	7.2.2

Math 450 Assessment plan:

- Success will be defined as earning a C- or higher;
- The instructor may use the assessment mechanism of their choice (exams, quizzes, homework, projects, etc.);
- The following information should be collected and turned in to the assessment committee. Please use counts rather than percentages.

SEMESTER:

TOTAL NUMBER OF STUDENTS ASSESSED:

Math 450 learning outcomes	Number of students who successfully learned the outcome	Comments (optional)
1. Solve problems involving the time value of money		
2. Solve problems involving annuities with non-contingent payments		
3. Solve problems involving loans		
4. Solve problems involving bonds		
5. Solve problems involving general cash flows and portfolios		
6. Solve problems involving immunization		

(authored by V. Piercey, April 2016)

PROPOSED

MATH 451 Course Master Document

Course: MATH 451 - Problem Solving Strategies in Interest Theory (3 credits)

FSU catalog description: Review and practice for the Society of Actuaries Exam FM. Additional topics include financial derivatives and the concept of no-arbitrage as it relates to financial mathematics.

Prerequisite / Placement: MATH 450, with a C- or better.

Learning outcomes: Students who have completed Math 451 should:

1. be able to solve problems in financial mathematics, including problems from interest theory and financial economics (the latter includes general financial derivatives, options, forwards and futures contracts, swaps, hedging, and investment strategies);
2. have memorized requisite material for Exam FM;
3. have gained extensive practice with sample Actuarial Exam FM problems; and
4. have developed test-taking strategies relevant to Actuarial Exam FM, and learned general strategies to independently prepare for other actuarial examinations.

Textbook is at the instructor's discretion; the suggested text(s) is/are:

- *ACTEX SOA FM Study Manual, Volumes I and II*, December 2014 ed., by Hassett, Garcia, Ratliff, and Steeby (ACTEX, 2014)
- *Derivative Markets*, 3rd edition, by McDonald (Pearson, 2013); only needed for financial economics, and is quite expensive

Course content:

Review of material from Math 450
ACTEX SOA FM Study Manual: Modules 1 - 7 (Volume I)

Financial Economics
ACTEX SOA FM Study Manual: Modules 8 - 11 (Volume I), Modules 12 - 14 (Volume II)
Derivative Markets: Chapters 1 - 8, pp. 1 - 262

Practice Society of Actuaries Exam FM Problems
ACTEX SOA FM Study Manual: Practice Exams 1 - 12 (Volume II)

Development of test preparation and test-taking skills

Math 451 Assessment plan:

- Instructors should record below the number of students who have passed Exam FM while enrolled in Math 451 (or shortly after completing Math 451), and (b) the number of students, in addition to those who passed Exam FM, who have demonstrated ability to pass Exam FM by scoring at a sufficient level on practice tests;
- With regard to the chart at the bottom of the page below, success will be defined as earning a C- or higher;
- The instructor may use the assessment mechanism of their choice (exams, quizzes, homework, projects, etc.);
- The following information should be collected and turned in to the assessment committee. Please use counts rather than percentages.

SEMESTER:

TOTAL NUMBER OF STUDENTS ASSESSED:

 # OF STUDENTS WHO PASSED EXAM FM:

 # OF ADDITIONAL STUDENTS WITH ABILITY TO PASS EXAM FM AS DEMONSTRATED ON PRACTICE TESTS:

Math 451 learning outcomes	Number of students who successfully learned the outcome	Comments (optional)
1. Solve problems in financial mathematics		
2. Memorize requisite material for Exam FM		
3. Gain extensive practice with sample Exam FM problems		
4. Develop test-taking strategies relevant to Exam FM, and general strategies to independently prepare for other actuarial exams		

Appendix D

MARY ROSE BAXTER
429 E Edgerton St · P O Box 182 · Howard City, MI 49329
Home: 231- 937-9872 · Cell: 989-400-3165
mrb_bxtr@yahoo.com

PROFILE

Self-motivated, independent employee, with an ability to quickly adapt to and master new skills and/or associated software used to complete assigned tasks. Attentive to work assignments, completing them in a timely manner, yet always striving to maintain an enthusiastic disposition, consistently interacting with colleagues, students, and others in a polite, respectful manner. Equally accustomed to working cooperatively with others or working alone while following and/or giving written and oral instructions. Eager to learn new skills to enable more effective and efficient means of completing work assigned. Follow a self-imposed work ethic creating efficiency and high productivity.

EXPERIENCE

Ferris State University · September, 2008 – current
Level 2 Mathematics Adjunct

- Successfully taught various pre-algebra, algebra, and trigonometry courses
- Adept at the use of several on-line educational programs used to augment instruction
- Mentored in Inquiry Based Learning
- Proficient use of Microsoft Office 2013

United States Census Bureau · April – July, 2010
Crew Leader Assistant and Enumerator

- Completion of Enumerator Questionnaires within Assignment Areas
- Assisted Crew Leader in the supervision of enumerators
- Daily review of crew members' completed Enumerator Questionnaires and Daily Pay and Work Records for accuracy

Baxter Construction · September, 1999 – August, 2008
Clerical

- Payroll, including completing all forms to comply governmental regulations and deadlines, depositing payroll withholding taxes, managing time cards, writing payroll checks
- Accounts receivables and accounts payable
- Invoicing and mailings
- Preparing contracts and other bids
- Profit (loss) analysis for all completed contracts and bids
- Maintained Work Comp Insurance, Liability Insurance, and Medical Insurance records
- Preparing for annual audits
- Ledger preparation and budgeting
- Banking and balancing all accounts

Private Tutor/Home Educator · September, 1986 – December, 2007
Educator

- Tutored high school and college students in various levels of mathematics courses
- Home educator, K-12th grade all subjects

Ferris State College · September-November, 1980
Mathematics Adjunct

- Taught algebra and trigonometry courses
- Part-time assignment

Harrison Middle School · February, 1980 - June, 1980
Mathematics Teacher

- Taught seventh grade general mathematics
- Developed independent study modules for the rectangular coordinate system and basic geometric principles

Wolverine World Wide · June, 1975 – January, 1979

- Sewing machine operator
- Part-time job to defray the cost of college

EDUCATION

Central Michigan University-Mt. Pleasant, MI

- Bachelor of Science - Applied Arts and Sciences, May, 1979
  Mathematics major, Biology minor
- Secondary Education Teaching Certificate, December, 1979
- Elementary Education Certificate Endorsement coursework, July, 1980 - May, 1985

HONORS, AWARDS

Central Michigan University-Mt. Pleasant, MI

- CMU Co-Salutatorian, May, 1979, Graduating class
- CMU Richtmeyer-Foust Mathematics Award finalist-1979
- CMU Richtmeyer Mathematics Scholarship-1977
- CMU Mortar Board Freshman Women of the Year Award finalist-1976
- CMU Board of Trustees Honors Scholarship - Outstanding High School Graduate-1975

REFERENCES

Dr. Kirk Weller
College of Arts and Sciences - FSU
820 Campus Drive, ASC 2021
Big Rapids, MI 49307
(231) 591-2594

Cynthia Milligan
Mathematics Instructor - FSU
820 Campus Drive, ASC 2053
Big Rapids, MI 49307
(231) 591-3079

Paula Hagstrom
College of Allied Health Science – FSU
Associate Professor/Program Coordinator
200 Ferris Drive, VFS 400
Big Rapids, MI 49307
(231) 591-2316

Janet Romanowski-Newberry
Business Operations
Student Services Representative
1201 S State Street, CSS-101
Big Rapids, MI 49307
(231) 591-5244

Lauren R. Cavner Williams

Michigan State University
224 North Kedzie
354 Farm Lane
East Lansing, MI 48824

Residential Address & Phone:
1126 Billings CT SE APT 1A
Grand Rapids, MI 49508
Cell Phone: (616) 788-8756

Email Address:
cavnerla@msu.edu

Last updated: February 2016

EDUCATION

Doctor of Philosophy Student 2013-present
Program in Mathematics Education
Michigan State University, East Lansing, MI
Expected Date of Graduation: May 2017

Master of Science, Mathematics 2011-2013
Michigan State University, East Lansing, MI

Bachelor of Science, Mathematics 2007-2011
Michigan State University, East Lansing, MI

RESEARCH AND CURRICULUM EXPERIENCE

Graduate Assistant Spring 2014
Research Project on the Experience and Performance of Mathematics Teaching Majors for Elementary Education
Michigan State University
Supervisor: Dr. Brin Keller

- Collect syllabi of required courses
- Request data on student population
- Conduct interviews and distribute survey to student population
- Submit findings to PRIME faculty interested in Elementary Education

UNIVERSITY TEACHING EXPERIENCE

Adjunct Professor of Mathematics — Fall 2015 – Present
Ferris State University
Supervisor: Dr. Kirk Weller

- MATH 110 (Fundamentals of Algebra), MATH 115 (Intermediate Algebra), MATH 117 (Contemporary Mathematics), MATH 122 (Math Analysis for Business), MATH 318 (Probability and Statistics for Teachers)

Graduate Teaching Assistant — Fall 2014–Spring 2016
TE 801 (Grand Rapids) and TE 406 (Elementary Education Math Methods)
Michigan State University
Supervisor: Dr. Tonya Bartell

- Assigned readings, projects, and assignments to intern and senior level MSU students to help foster ideas about effective mathematics teaching
- Planned each week's lessons and activities
- Graded projects and assignments
- Some observations of intern level students in the field

Graduate Teaching Assistant — Fall 2015-Spring 2016
Elementary Education Field Instructor (Grand Rapids)
Michigan State University
Supervisor: Connie VanBelois

- Traveled to interns' schools in Grand Rapids for observations
- Lead debrief sessions between myself, intern, and mentor teacher
- Submitted informal and formal feedback from observations
- Prepared for, lead, and submitted intern evaluations/discussions and seminars with intern group

Graduate Teaching Assistant — Fall 2014-Spring 2015
Secondary Math Field Instructor (Grand Rapids)
Michigan State University
Supervisor: Dr. Kristin Bieda

- Traveled to interns' schools in Grand Rapids for observations
- Lead debrief sessions between myself, intern, and mentor teacher
- Submitted informal and formal feedback from observations
- Prepared for, lead, and submitted intern evaluations/discussions

Graduate Teaching Assistant (Shadowing Position) — Fall 2013-Spring 2014
TE 801 and TE 406 (Elementary Education Math Methods)

Michigan State University
Supervisors: Dr. Beth Herbel-Eisenmann and Dr. Tonya Bartell

- Observed Instruction from Dr. Lindsay Keazer (TE 801), Heejoo Suh (TE 801), Dr. Tonya Bartell (TE 406)
- Assisted in lesson planning and activities
- Assisted in grading and student evaluation

Graduate Teaching Assistant — Spring 2012-Fall 2013
MTH 201 and MTH 202 Instructor (Elementary Math for Teachers I & II)
Michigan State University
Supervisor: Lisa Keller

- Planned lessons and activities
- Created quizzes and exams
- Worked in Mathematics Learning Center

Graduate Teaching Assistant — Fall 2011
MTH 103 Instructor (College Algebra)
Michigan State University
Supervisor: Susan Allen

- Planned lessons and activities
- Created quizzes and exams
- Worked in Mathematics Learning Center

Undergraduate Teaching Assistant — Spring 2011
MTH 103 Recitation Instructor (College Algebra)
Michigan State University
Supervisor: Susan Allen and Daniel King

- Planned review lessons and activities, held office hours
- Created quizzes
- Worked in Mathematics Learning Center

Undergraduate Teaching Assistant — Fall 2010
MTH 116 Recitation Instructor (College Algebra & Trigonometry)
Michigan State University
Supervisor: Dr. Irina Kadyrova

- Planned review lessons and activities, held office hours
- Worked in Mathematics Learning Center

Undergraduate Learning Assistant — Fall 2009-Spring 2011
LB 118 & LB 119 Recitation Instructor (Calculus I & II)

Lyman Briggs College, Michigan State University
Supervisors: Hanni Nichols and Dr. Robert Bell

- Planned review lessons and activities, held office hours

K-12 TEACHING EXPERIENCE

AP Calculus Tutor — November 2012-April 2014
East Lansing, MI

- Reinforce calculus concepts
- Help student(s) through practice problems
- Homework support

Mathematics Teacher — May 2012-August 2012
Sylvan Learning Center, Rockford, MI

- Taught Pre-Algebra, Algebra I, Algebra II, and all levels of Elementary Mathematics for grades K-12
- Taught students study skills methods
- Lead ACT prep sessions
- Proctored student assessments
- Lead students through lessons that were a part of their prescribed program
- Incorporated the use of manipulatives into instruction
- Completed Sylvan Teacher Training to become a certified Sylvan Learning Center teacher

RELATED WORK EXPERIENCE

Resident Mentor (RM/RA) — August 2008-May 2011
Department of Residence Life, MSU, East Lansing, MI

- Provided 50 students on one floor in Holmes Hall at MSU with guidance, information, and support
- Improved multitasking skills, communication skills, and interaction with others

PROFESSIONAL AND SERVICE ACTIVITIES

PME-NA Conference Gift Organizer — Spring 2015-Fall 2015
PME-NA 37 Local Organizing Committee

PME-NA Research Proposal Reviewer — Spring 2015
PME-NA 37 Local Organizing Committee

Student Member — Fall 2013-Spring 2014
Mathematics Education Colloquium Committee

FELLOWSHIPS & AWARDS

Graduate Assistantship — August 2013 – present
Program in Mathematics Education, Michigan State University

Graduate Assistantship — August 2011 - May 2013
Mathematics Department, Michigan State University

SCOTT E. FOOS

13001 150th Avenue
Big Rapids, MI 49307

(231) 796-9505
fooss@ferris.edu

EDUCATION

2000 ME in Nuclear Engineering, University of Virginia, Charlottesville, VA
1982 BS in Applied Mathematics, Ferris State College, Big Rapids, MI (High Distinction)

ACADEMIC HONORS

1981 – 1982 Who's Who Among Students in American Universities and Colleges
1981 – 1982 Ferris State College Mathematics Award

TEACHING EXPERIENCE

2003 – Present Adjunct Mathematics Instructor **Ferris State University**

- Taught 15 different undergraduate level mathematics and computer science courses that included fundamentals of mathematics, introductory, intermediate, and advanced algebra, trigonometry, math analysis for business, applied calculus, calculus 1 & 2, business statistics and bio-statistics.
- Taught courses with full responsibility for lectures, exams, and grading of up to 32 students.
- Taught calculus 1 & 2 courses for the Math Science and Technology Center (MSTC).
- Taught physics labs in Physical Sciences Department.
- Currently teaching Statistics and Quantitative Measures for College of Business.
- Serving on the University Assessment Committee as a resource on assessment practices in the area of statistical analysis of data.
- Member of the Math 115 learning outcomes committee.

2002 – Present Adjunct Mathematics Instructor **Grand Rapids Community College**

- Taught 9 different undergraduate level mathematics courses with full responsibility for lectures, exams, and grading for up to 35 students.

MILITARY SERVICE

1998 – 2002 ASSISTANT DEPUTY FOR TRAINING & READINESS **SUBMARINE SQUADRON EIGHT**

Assistant Deputy Commander for Training in charge of all facets of submarine training and scheduling, including the development and implementation of tactically challenging certification scenarios for all deploying squadron submarines.

- Optimized employment of 8 ships to meet fleet operational tasking by maintaining an extremely high state of operational and training readiness saving untold days of high value fleet operations.
- Wrote and implemented more than 50 training scenarios that required intricate coordination with as many as 5 outside commands while dealing with the demands of a most dynamic schedule.
- Developed a unique long range Inter-Deployment Training Cycle (IDTC) for each submarine assigned supporting a recent CNO objective to reduce IDTC requirements by 25%.

SCOTT E. FOOS

13001 150th Avenue
Big Rapids, MI 49307

(231) 796-9505
fooss@ferris.edu

1993 – 1998 **FORCE PROTECTION OFFICER** **COMMANDER SUBMARINE FORCE ATLANTIC**

Responsible for policy and oversight of the Submarine Force Protection and Security Program.

- Coordinated the establishment of the new Force Security Organization and acted as the principal point of contact on all matters relating to submarine force security.
- Generated and managed the day-to-day targeting commitment of the submarine launched missiles.
- Created and presented Power Point briefs to the Commander In Chief US Atlantic Fleet.

1990 – 1993 **OPERATIONS OFFICER & NAVIGATOR** **USS MONTPELIER**

Directed all operations, exercises and safe navigation of a fast attack submarine.

- Qualified for Command at Sea of Nuclear Powered Submarines.
- Directly responsible for the training, planning and safe navigation of a 6,000 ton nuclear fast attack submarine and its 130 man crew, including the training and briefing of all key personnel prior to ships movement evolutions.
- Developed and conducted weekly training for all 15 officers assigned. Responsible for the professional development of over 30 enlisted men through training, counseling and evaluations.

1987 – 1990 **OPERATIONS OFFICER** **SUBMARINE SQUADRON EIGHTEEN**

Coordinated engineering system training, trials, tests, and inspections with cognizant department heads.

- Technical expertise directly resulted in strategic assets meeting their operational commitments on time.
- Conducted frequent inspections of assigned ships to ensure radiological safeguards, reactor operations and conventional navigation monitoring and training were in accordance with directives.
- Implemented a computer generated hurricane tracking program for submarine commanders minimizing all dangers of Hurricane Hugo.

1984 – 1987 **DIVISION OFFICER** **USS GEORGE BANCROFT**

Principle assistant to the Engineer Officer for the training, operation and maintenance of the ship's reactor control system.

- Supervised and trained a division of over 20 men responsible for extensive maintenance, trouble-shooting, and repair of vital hydraulic, atmospheric control, diesel and communications equipment.
- Passed certification exam administered by the U.S. Department of Energy and qualified as Engineer Officer of Naval Nuclear Propulsion Plants.
- Supervised and conducted training for initial control rod testing and testing of all reactor protection equipment following refueling.
- Responsible for all training aspects of reactor plant chemistry, steam plant chemistry, and radiological controls.
- Upgraded and implemented extensive administrative procedures and practices in support of all ship's

13001 150th Avenue
Big Rapids, MI 49307

(231) 796-9505
fooss@ferris.edu

electrical systems.

Laura J. Forbes
5300 170th Ave., Stanwood, MI 49346
Home Phone: (231) 823-2856
Cell Phone: (616) 291-6088
Email: mrsforbesgomohawks@yahoo.com OR forb5@ferris.edu

TEACHING EXPERIENCE

Ferris State University Mathematics (& Physical Sciences) Department

Faculty Adjunct Fall 2012-present

Classes taught include Math 010 (Pre-Algebra), Math 110 (College Algebra 1), Math 115 (College Algebra 2), Math 120 (Business Math), Math 116 / Math 126 (Engineering Tech Algebra / Trig series), Physics 130 laboratories; also started the Super STEM Saturdays this past winter semester, 2016

St Peter's Lutheran Day School

7/8 Grade Math & Science Teacher 2013-1014 School Year

Mecosta Osceola ISD Math Science Center

Science and Math Instructor Fall 2008- June 2012 (program discontinued)
Science Outreach Facilitator (part time) Fall 2012- Spring 2015
Contract employee for Michigan Project WET's Water Festival 2011-Present

- As MSTC instructor, provided instruction to highly motivated, accelerated students in grade 9-10 Biology, Physics, Chemistry, Earth Science, and Intro to Research, with the addition of Statistics, Trigonometry, Algebra II, and PreCalculus during the final year of MSTC, using hands on activities to support learning outcomes throughout each course.
- Prepared and accompanied all research students annually to the Michigan High School Math and Science Symposium (MHSMSS) at Grand Valley State University, and twice on research vessel trips through the Annis Water Research Institute (AWRI).
- Prepared and accompanied winning regional high school students to the Intel ISEF three of four MSTC teaching years (2009 Reno, NV; 2011 Los Angeles, CA; 2012 Pittsburgh, PA)
- Coordinated the following science outreach events:
  - 2012 and 2013 Mecosta-Osceola Regional Science Fair (Fair Director 2013) – grades 5-12
  - 2012 and 2013 Mecosta-Osceola Family Engineering Nights (the first two of their kind in the area) – grades K-5
  - 10^{th} – 14^{th} Annual Big Rapids Project WET Water Festivals (3^{rd} grade outreach)

Morley Stanwood High School

Biology and Math Instructor Fall 2003-Summer 2008

Taught grades 9-12 Biology, Anatomy & Physiology, & Mathematics (Also Physics 2003-2005)

Ferris State University Biology Department

Faculty Adjunct & Structured Learning Assistance (SLA) Facilitator Summer 2001-2005

Taught laboratories and assisting in various classrooms in and for the Biology Department, includir

- SLA Facilitator for Dr. Robert Friar's Anatomy & Physiology (Bio 205) Fall 01-03, and Dr. Walter Hoeksema's Medical Microbiology (Bio 108), Fall 02
- Laboratory Instructor for Dr. R. Friar's Anatomy & Physiology for non-majors (Bio 109), Fall 02
- Laboratory Instructor for Dr. P. Watson's Forensic Biology DNA unit, Winter 2002
- Instructor for Ferris State University hosted High School biotechnology workshops, both one day and full week durations, Summer 2001-2005.
- TA & Lab Instructor for Forensic Pathology Lab - Thursday evenings, Winter 2005

All American Youth Activities

Karate Instructor September 2000-2002

Reed City and Big Rapids Community Education

Taught kids' karate and stranger danger self-defense techniques; ages 4-15

Mecosta-Osceola County & Newaygo County School Districts

Substitute Teacher Nov 1999-Jun 2003

SCIENTIFIC EXPERIENCE

Infigen, Inc

Cell Biologist April 1999-November 1999

Research Associate, specializing in cell culture related to cattle and pig cloning technology

Abbott Laboratories, PPRD

Antimitotics July 1997-March 1999

Associate Cell/Molecular Biologist, Grade 13

Vasoactive Agents 1994-July 1997

Associate Cell/Molecular Biologist, Grade 13

NOS Project 1991-1994

Assistant Cell/Molecular Biologist, Grade 11

All three areas of work for Abbott Labs involved use of Cell & Molecular Biology

University of Wisconsin Comprehensive Cancer Center

Department of Human Oncology June 1989 - October 1991

Research Specialist, Multidrug Resistance for Marilyn M. Cornwell, PhD, specializing in Cell & Molecular Biology

EDUCATION

8/1-8/5/12	Physics of Atomic Nuclei Teacher's camp, MSU
8/10-5/12	Physics Minor, MCCT passed 7/09/11, *Ferris State University*
1/01-12/03	Degree: Masters of Education in Curriculum and Instruction with Biology/Math Secondary Education Certifications *Ferris State University*
1986 - 1988	Degree: Bachelor of Science, Natural Science (Received December, 1988) Major: Bacteriology *University of Wisconsin-Madison*
Fall 1985	*College of Lake County* Grayslake, IL
Fall 1983 - Spring 1985	*Illinois Wesleyan University* Bloomington, IL

LICENSES / CERTIFICATIONS

Michigan Professional Teaching Certificates in:
- Secondary Biology
- Secondary Math
- Secondary Physics

HONORS

Academic Honors & Deans List, Ferris State University
Presidential Award for Academic Excellence (4.0 GPA), Ferris State University
Black Belt in Japanese Karate, earned 8/91

Megan Elizabeth Gibson, PhD

(989) 824-0635
meg2154@columbia.edu

TEACHING EXPERIENCE

2011-present *Instructor* **Ferris State University**

Postdoctoral Teaching Fellowship for Mathematics

Taught Math 110 (Introductory Algebra), Math 115 (Intermediate Algebra), Math 117 (Contemporary Mathematics), Math 122 (Mathematics Analysis for Business), Math 218 (Mathematics for Elementary Teachers I), Math 219 (Mathematics for Elementary Teachers II), Math 317 (Geometry for Teachers), Math 318 (Probability and Statistics for Teachers), Math 326 (Discrete Mathematics for Teachers), and Math 418 (Teaching Elementary and Middle School Mathematics) courses

Taught Math 110 to area high school students as part of the Woodbridge Promise program

2012-2013 *Instructor* **Alma College**

Taught Math 110 (Liberal Arts Mathematics) and Math 112 (Precalculus) courses

2008-2011 *Teacher* **New Heights Academy Charter School**

Taught Mathematics B (an integrated course used in New York State that combined geometry and advanced algebra), Algebra II and Trigonometry, Integrated Mathematics II (an algebra skills course), and Precalculus

Taught Advisory course, with a focus on character development

Used Smartboard, Senteo, and TI Smartview technology

Developed curriculum using Understanding by Design

Administered Interim Assessments, and adjusted instruction accordingly

2003-2007 *Teaching Assistant* **Alma College**

Held office hours for tutoring college students in mathematics and graded homework assignments for professors

EDUCATION

Doctor of Philosophy, Mathematics Education, 2013
Teachers College, Columbia University, New York, NY
Dissertation title: Motivation and Study Habits of College Calculus Students: Does Studying Calculus in High School Make a Difference?

Master of Arts, Mathematics Education, 2008
Teachers College, Columbia University, New York, NY

Bachelor of Science, Mathematics, 2007
Alma College, Alma, MI
Minors in physics, biology, and chemistry

CERTIFICATIONS AND AWARDS

2007 Math for America Fellow

New York State teaching certification in Secondary Mathematics

PRESENTATIONS

"Math in the BIG Apple," a Colloquium presentation on February 20, 2012 at Alma College

CONFERENCES

Attended Scholarship of Teaching and Learning Academy conference in Grand Rapids, MI May 19-21, 2013

PROFESSIONAL DEVELOPMENT AND TRAINING

Attended New Faculty Orientation at Ferris State University in August 2011

Attended Academic Advising seminars sponsored by the Faculty Center for Teaching and Learning at Ferris State University during the 2012-2013 academic year

Attended Clicker training sponsored by the Faculty Center for Teaching and Learning at Ferris State University during the 2013-2014 academic year

Attended the Course Design Institute sponsored by the Faculty Center for Teaching and Learning at Ferris State University in June 2015

HARVEY HANNA II

18888 16 Mile Road
Big Rapids, Michigan 49307
hannah@ferris.edu | 231.631.5825 (cell)

EDUCATION:

Eastern Michigan University — Ypsilanti, Mi.
M.A. in Mathematics (with departmental honors) (Apr. 2001) — GPA 4.0

University of Michigan — Ann Arbor, Mi.
Bachelor of Science with High Distinction (Aug. 1969) — GPA 3.67
Major: Pure Mathematics Minor: Physics
Phi Beta Kappa and Phi Kappa Phi Honor Societies

CERTIFICATION: **Michigan Professional Education Certificate**
9-12 Mathematics (EX) … 9-12 Physics (DE) … 9-12 Science (DX) … 7-8 All Subjects

TEACHING EXPERIENCE:

Mathematics Instructor — Aug. 2006 - Present
Ferris State University : Mathematics Instructor — Big Rapids, Mi.
Taught :
- Beginning Algebra
- Intermediate Algebra
- Trigonometry
- College Algebra – PreCalculus
- Elementary Statstics / Probabilty
- Calulus I, II, and III
- Elementary Linear Algebra
- Differential Equations
- Discrete Mathematics

Mathematics / Physics Coordinator — July 1993 - June 1995
Ferris State Univ.: Math – Science - Technology Center — Big Rapids, Mi.
Developed jointly by Ferris State Univ. and Mecosta-Osceola ISD.

Developed and taught Math, Physics curriculum and computer software including Word and Excel.

Taught Physics Labs at Ferris.

Developed and conducted **many** professional development seminars for secondary math, science, and computer teachers in the ISD. Topics included: Computer Based Math/Science Labs; the latest Math and Physics software; and Surfing the Internet.

Math / Physics Instructor — Aug.1992- June 1993
Big Rapids High School — Big Rapids Mi.

Very successful return to teaching. Was recruited for new "pull out" school for subsequent years.

Part-Time Mathematics Instructor — Aug-Dec 1988
Washtenaw Community College, Ann Arbor, Michigan

Taught in Math Tutorial Lab and a section of Linear Algebra with a Calculus prerequisite. Received an 8 of a possible 9 rating from students when evaluated as their instructor.

Math / Physics Instructor — Aug.1969- Dec.1971
West Bloomfield High School — West Bloomfield, Mi.

Very successful start. Left to pursue business opportunity.

OTHER RELEVANT EXPERIENCES:

Lead Mathematician / Researcher — Apr. 2002 – Jan. 2006
Impact Labs, Inc. of Columbia Maryland — R and D Division in Benzonia, Mich.
Vidware, Inc. (outgrowth of Impact – same kind of work) — Grawn, Mich.

Developed several unique computer algorithms for dividing a video "stream" into a group of 4, 9, or 16 substreams. Also developed recombination algorithms which could reconstitute the video images with excellent fidelity even when a majority of substreams may be lost, delayed or corrupted in the transmission network.

Prototype programmer for "proof of concept" development of an H.264/MPEG4 Part 10 compliant video codec. Primary responsibility was to interpret the Standard, connect the various sections of the Standard, and to develop algorithms to code and/or decode a video stream. Rapid Prototyping was accomplished in MATLAB language. Coded a complete encoder/decoder pair for I frames including the deblocking filter algorithms. Coded a complete decoder for P frames including motion estimation and compensation for interpredicting macroblocks.

Sales of SONY Education Systems — June 1995 – Apr. 2002
Howard and Smith, Inc. Dealer for SONY Integrated Multimedia Learning Systems. (integrated computer, audio, and video systems)

Received National recognition at Nov. '99 Annual SONY Education Systems Sales Meeting as being the most creative and innovative dealer rep. First time such recognition was given.

Create and deliver formal sales presentations / demonstrations for staff and administrators.

Create and deliver "informative" PowerPoint presentations and equipment demonstrations at annual conferences of both the Michigan and Indiana Associations of Foreign Language Teachers.

Conduct staff training sessions with materials developed by me.

Sr. Electronics Field Service Technician — Oct. 1988-Aug. 1992
Highland Superstores — Plymouth, Mi.

Handled tough technical and/or "P.R." cases and trained new technicians.

President/Owner — Aug.1974-Oct.1988
Harve's Electronics Service, Inc. — Ann Arbor, Mi.

Kenneth H. Main
17060 Apollo Drive
Big Rapids, MI 49307
1-231-796-3038
mainkh@hotmail.com
KenMain@ferris.edu

EDUCATION

- 1988 Master of Arts, Educational Administration, Central Michigan University
- 1979 Bachelor of Science in Education, Mathematics, Central Michigan University
- 1975 High School Diploma, Reed City Community Schools

WORK EXPERIENCE

2013 - Ferris State University
Adjunct Instructor of Mathematics

1982 – 2012 Morley Stanwood Community Schools, Morley Michigan

Teacher of Mathematics
Teacher of Chemistry
Science Department Chair
Mathematics Department Chair
Supervisory Teacher, Student Teachers, FSU and CMU

1982 – 2009 Coach, Interscholastic Athletics

Football, Basketball, Golf
Tournament Manager, Golf, 1995 – 2009
State Golf Committee, MHSAA, 2000 – 2001

2001 – Morley Stanwood Education Association

Financial Analyst
Chief Negotiator

1981 – 1982 Reed City Community Schools, Reed City Michigan

Teacher of GED
Substitute Teacher

1980 – 1981 Bath Community Schools, Bath Michigan

Teacher of Mathematics

EDUCATIONAL AWARDS

2010	Morley Stanwood High School Hero's Banquet
2001	Morley Stanwood High School Hero's Banquet
1997	Mecosta County Intermediate School District Hero's Banquet
1997-95,-94	Who's Who among America's Teachers
1995	Morley Stanwood High School Hero's Banquet

INTERSCHOLASTIC ATHLETIC AWARDS

2003	MIGCA, Boys' Regional Golf Coach of the Year
1995	MIGCA, Boys' Regional Golf Coach of the Year
1994	MIGCA, Boys' Regional Golf Coach of the Year

COMMUNITY SERVICE

2009 –	Interscholastic Academics, CSAA Quiz Bowl, Moderator
1997– 2001	Founding Member, Mecosta County Junior Golf Program
	Golf Instructor, Mecosta County Junior Golf Program

PROFESSIONAL REFERENCES

Mr. Mike Colby, Superintendent, Morley Stanwood Community Schools

Mr. Dennis Szczerowski, Principal, Morley Stanwood Community Schools

Mr. Bill VanSickle, Teacher, Morley Stanwood Community Schools

Please refer to the FSU Electron Employment Application for additional information for my professional references.

Matthew McCullen
19651 Golfview Drive
Big Rapids, MI 49307
(231) 796 – 2327
mmcculle@brps.org

Education

B.S., Electrical Engineering
Michigan Technological University

Teaching Certificate, Math major; Physics minor
Western Michigan University

M.A., Educational Administration
Central Michigan University

Additional 30 hours of credits in teaching methods courses beyond Masters Degree
Marygrove College; Ferris State University

Employment

Big Rapids High School - Math teacher since 1989
Department Chair since 2003

Ferris State University - Adjunct math faculty - Fall 2007 to present, as needed
Have taught various sections of Math 110, 116, and 120.

Mid Michigan Community College - Adjunct math faculty - Winter 2015 to present
Teach MAT 124 (precalculus)

Ferris State University - Game worker
Shot clock worker at basketball games since 1998
Clock worker, announcer, spotter (different years) at football games since 2006

School Committees and Activities

Math Department Chair
School Improvement Math Team
District Math Team
Volunteer at many sporting events

References furnished upon request

Cynthia Milligan
6190 Cottonwood Ave
Big Rapids, MI 49307
(231)414 - 4160

June 14, 2016

Ferris State University
Department of Mathematics
820 Campus Dr.
A.S.C. 2021
Big Rapids, MI 49307

I am currently a non-tenure track faculty at Ferris State University. Previous to teaching at Ferris I was a substitute teacher at the Tri County Middle School and the Tri County High School. From 1989 to 1995 I taught one evening class a semester for Delta College. I usually taught Intermediate Algebra, except for one semester I taught Trigonometry. I was a Teaching Assistant while I was at Syracuse University. For the 1985 – 1986 school year I lead recitation classes for a pre-algebra class. For each of the following three semesters (1986-1987 school year and fall 1987) I taught an algebra class.

I devoted 13 years to raising my two boys. During that time I stayed active in the education field by volunteering extensively in their school. I was a classroom volunteer and also the Volunteer Coordinator for several schools. Being active in the public school system has helped me understand the background most of our students have coming into their college life. Once my boys reached Middle School, I was less involved in volunteering and resumed my career at Ferris State University.

Sincerely,

Cynthia Milligan

Cynthia Milligan
6190 Cottonwood Ave.
Big Rapids, MI 49307
(231)414 – 4160

Experience

2002 – 2016	Non-Tenure Track faculty at Ferris State University
2002 – 2002	Substitute Teacher
2001 – 2002	Substitute Teacher Aide
2000	Census Bureau
1996 – 2013	Volunteer and Board Member of Helping Hands food pantry (Howard City)
1996 – 2002	Weekly Classroom volunteer
1997 – 2002	AWANA Leader First Baptist Church, Howard City
1989 – 1995	Instructor for Delta College
1985 – 1987	Teaching Assistant at Syracuse University

Education

1985 – 1987	MS Mathematics Syracuse University
1982 – 1985	BS Mathematics Ferris State University
1982	Graduate of Big Rapids High School

ALICE J. ROUTLEY
219 Finley Avenue
Big Rapids, MI 49307
Phone: (231) 592-9906
Email: routleya@ccabr.org

EDUCATION

2000-2005 Masters of Education in Curriculum and Instruction. Ferris State University. Big Rapids, Michigan.

1979-1983 Bachelor of Science. Mathematics Major, Communication Minor. Western Michigan University. Kalamazoo, Michigan.

EMPLOYMENT

2002-Present Teacher. Crossroads Charter Academy. Big Rapids, Michigan. Two years as a self-contained seventh grade classroom teacher. Taught Mathematics, English, Spelling. Monitored Accelerated Math and Accelerated Reader Goals. Twelve years as a High School Mathematics and Speech Teacher. Taught Pre-Algebra, Algebra 1, Algebra 2, PreCalculus, Calculus 1, and Public Speaking. Class Advisor and Student Council Advisor. MATHCOUNTS Coach for 2 years. Attended Algebra 4 All, E-Maths, Project PRIME conferences. One year as Student Services Coordinator. In charge of student schedules, ACT testing.

2015-Present Direct Credit Instructor. Baker College. Taught courses concurrently with CCA courses to provide college credit for high school students.

1985-Present Instructor. Adjunct faculty, Mathematics Department, Ferris State University. Big Rapids, Michigan. Taught many full and partial loads of Pre-Algebra, Elementary Algebra, Intermediate Algebra, and Trigonometry.

2001-2002 Teacher. St. Mary's Catholic School. Big Rapids, Michigan. Taught sixth through eighth grade Mathematics, Science, and Spelling.

1996-2001 Workshop Facilitator. Structured Learning Assistance Department, Ferris State University. Big Rapids, Michigan. Ran workshops connected with courses in Elementary Algebra, Intermediate Algebra, and Trigonometry.

1985-1986 Long-term Substitute Teacher (1 year), Pine River Jr./Sr. High School. Tustin, Michigan. Taught eighth grade Mathematics, Pre-Algebra, and Algebra 1.

1984-1985 Substitute Teacher. Mecosta/Osceola School Districts.

1984 Long-term Substitute Teacher (1 semester), Hesperia High School. Hesperia, Michigan. Taught ninth grade Mathematics, Journalism 1 and 2. Advised newspaper and yearbook. Member of Curriculum Review Committee.

Mrs. Dharma Laxmi P. Shetty
14580 Tomahawk Lane
Big Rapids, MI 49307
(231) 796 1362

Date of Birth: August 18, 1961

Education:

M.A. in Mathematics, December 2006
Central Michigan University
Mt. Pleasant, MI 48859

B.S. in Applied Mathematics, May 2004
Ferris State University
Big Rapids, Mi 49307

M.A. in Economics, May/1983
University of Bombay
Bombay, India.
Principal Topics- Industrial and International Economics.

B.A. in Economics, May/1981
University of Bombay
Bombay, India.

High School, April/1976
The Little Angels English Secondary School
Bombay, India.

Employment

08/05 to date: Temporary/Full-time Adjunct Mathematics Faculty
Ferris State University
Big Rapids, MI 49307
Teaching Responsibilities:
MATH 010 (Fundamentals of Mathematics)
MATH 110 (Fundamentals of Algebra)
MATH 115 (Intermediate Algebra)
MATH 116 (Intermediate Algebra & Numerical Trigonometry)
MATH 120 (Trigonometry)
MATH 122 (Mathematical Analysis for Business)
MATH 126 (Algebra and Analytical Trigonometry)
Math 130 (Advanced Algebra-Analytical Trigonometry)
Math 135 (Calculus for Life Sciences)

01/07 to date: Adjunct Mathematics Instructor
The Art Institute of Pittsburgh-Online Division
1400 Penn Avenue
Pittsburgh, PA 15222
Teaching Responsibility:
MTH 099 (Transitional Mathematics)
MTH 100 (Elementary Algebra)
MTH 1010 (College Math I)
MTH 2010 (College Geometry)

01/2005 to 06/06: Graduate Teaching Assistant. Central Michigan University, Mount Pleasant, MI 48858.
Teaching responsibility:
2 sections of MTH 105(Intermediate Algebra) per semester

01/2004-12/2004: SLA facilitator for Math 110 (2 semesters), FSU, Big Rapids, MI 49307.

01/2003-05/2003: SLA facilitator for MATH 010 (1 semester), FSU, Big Rapids, Mi 49307.

08/2002-12/2004: SLA Facilitator for ECON 221(5 semesters), FSU, Big Rapids, MI 49307.

2001-2002: Substitute Teacher (one academic year) at Big Rapids Public Schools.

1991-1993: volunteer at the
Fellowship Preschool, Perry Street
Big Rapids, MI 49307

08/1984 - 10/1985: Lecturer at
Maniben Shah College, Bombay, India.
Teaching responsibilities: Teaching Fundamental concepts in economics to freshmen and sophomores.

Presentation:

"Matrix Lie Groups, Lie Algebras and Exponential Mappings"
4/11/2006 at Central Michigan University.

Professional Activities

Attended "Mind Tap Math Foundations Workshop" facilitated by representatives from Cengage Learning, at FSU, 5/25/16

Attended the McGraw Hill presentation of using Smart Book technology for Developmental courses at FSU, 3/18/16

Member of the Inquiry Based Learning Reading Group 11/2015- to date. Members review literature items and teaching practices related to inquiry based learning.

Attended Math Colloquium on "The Many Faces of Inquiry-Based Learning at University Of Michigan" Speaker: Ralf Spatzier, at FSU, 11/05/15

Attended Math Colloquium on "Effective Math Teaching", Speakers: Prof. Allegretto, Prof. McCullough and Prof. Shepler, at FSU, 08/18/08

Participated in a seminar on Student Persistence (WebEx), Speaker: Prof. Minor, at AIO, 2/12/08

Participated in a seminar on Critical Thinking (WebEx), Speaker: Prof. Minor, at Art Institute Online Division, 1/28/08 and 2/5/08

Attended Math Colloquium on "Sputnik-50 years later", Speaker: Prof. McCllough, at FSU, 10/4/07

Attended Math Colloquium on "Solution to Problem # 3126", Speaker: Dr. Kanecny, FSU, 9/27/07

Attended Math Colloquium on "Contemporary Mathematics-The New Online Course for MATH 117", Speaker: Prof. Jiao, At FSU, 9/21/06

Jean M. Walling, M.S.

9893 Sunset Dr.
Canadian Lakes, MI 49346
231.359.1335

EDUCATION

University of Arizona, Department of Exercise and Sport Science, Tucson, AZ. Master of Science Degree, August 1987. Concentration in Exercise Physiology: fitness and rehabilitation.

University of Michigan, School of Education, Ann Arbor, MI. Bachelor of Science in Education, December 1983. Majors: Mathematics and Physical Education.

PROFESSIONAL EMPLOYMENT

Mathematics Instructor, Ferris State University. September 1995 to present. Duties include teaching students the fundamentals of mathematics in the following courses:

- MTH 010
- MTH 110
- MTH 115
- MTH 116
- MTH 117
- MTH 120
- MTH 126
- MTH 130

Exercise Physiologist, Botsford General Hospital, Farmington Hills, MI. November 1993 to August 1994. Duties included:

- Supervising thallium, Dobutamine and stress echo graded exercise tests.
- Prescribing exercise programs for monitored and unmonitored patients.
- Leading exercise classes for monitored patients.

Exercise Physiologist, Houston Northwest Medical Center, Houston, TX. August 1992 to September 1993. Duties included:

- Prescribing exercise programs for monitored and unmonitored patients.
- Teaching in-patient cardiac patients the fundamentals of exercise.
- Leading exercise classes for monitored patients.
- Teaching employee and community CPR classes.

Mathematics Instructor, Kingwood College, Kingwood, TX. January 1992 to July 1993. Duties included:

- Teaching students the fundamentals of pre-algebra and algebra.
- Tutoring students in math: pre-algebra through calculus.

Exercise Physiologist, Director of Cardiac Rehabilitation, Cypress Fairbanks Cardiac Fitness Center, Houston, TX. October 1990 to February 1992. Duties included:

- Administration of all exercise programs for monitored and unmonitored patients.
- Supervising Exercise Physiology Interns while performing semester rotations through the cardiac rehabilitation clinic.
- Administration of stress tests, pulmonary function tests and Holter monitors.
- Instituting cardiac educational programs for patients and community.

Exercise Physiologist, University of Michigan MedSport Clinic, Ann Arbor, MI. October 1988 to October 1990. Duties included:

- Administration of maximal exercise stress tests and maximal oxygen uptake tests.
- Supervising exercise classes for Phase II and Phase III cardiac rehabilitation.
- Providing in-patient education for post-surgical cardiac patients.
- Conducting fitness testing including body fat, strength and flexibility.

Mathematics Teacher, Brandon Schools, Ortonville, MI. August 1987 to October 1988. Duties included:

- Teaching students general math, geometry, trigonometry, and analytical geometry.

Tennis and Track Coach, Brandon High School, Ortonville, MI. August 1987 to October 1988. Duties included:

- Supervising players and practices, coordinating tennis matches and track meets with other high schools.

Exercise Physiology Intern, Cardiac Rehabilitation, Heart Institute of Tucson, Tucson, AZ. January 1987 to May 1987. Duties included:

- Supervising patients during exercise sessions, monitoring electrocardiogram strips, and adjusting exercise prescriptions.
- Assisting director with administrative duties such as patient orientation, daily charting, filing, patient follow-up and designing home exercise programs.

Graduate Research Assistant, Department of Pediatric Cardiology, University Medical Center, Tucson, AZ. October 1985 to May 1987. Duties included:

- Performing maximal upright and supine cycle ergometer tests on patients with congenital heart disease and on healthy children.
- Compiling and analyzing data collected for ongoing research in congenital heart disease.

Graduate Teaching Assistant, Department of Exercise and Sport Sciences, University of Arizona, Tucson, AZ. August 1985 to May 1987. Duties included:

- Planning and conducting undergraduate activity classes in jogging, swimming, tennis and gymnastics.
- Performing fitness testing in the Adult Fitness Program including hydrostatic weighing, skinfold measurements, lung function and maximal treadmill tests.
- Assisting in phases III and IV of the out-patient cardiac rehabilitation program.
- Conducting stress tests on in-patients and out-patients at the University Medical Center.

Mathematics Teacher, Grosse Pointe South High School, Grosse Pointe, MI. September 1984 to June 1985. Duties included:

- Teaching classes in Algebra I, Algebra II, and Geometry.

JOSEPH "JB" WATTERS III

927 Marion, Big Rapids MI 49307 | 231-796-6731 | jbwatters@stmarybr.org

SUMMARY

I have had a variety of experience in education in both large schools and small schools, public and catholic, traditional and virtual. In every school, I have recruited, selected, and developed strong candidates for teaching and administrative positions. I have been able to lead and motivate teachers toward a productive result. I have created customized presentations, training and group facilitation to meet specific professional development needs and have moved teachers to their "learning edge" to develop new thinking and innovative educational practices.

In every situation, we established Professional Learning Communities that have the ability and desire to make data driven decisions with regards to the education of the students. Our School Improvement Team was established with the ability to communicate positive vision for school improvement. We have designed and implemented a balanced budget with the emphasis on student achievement.

EDUCATION

Keiser University **Ph. D. in Educational Leadership**	**Ongoing**
Sam Houston State University **Master of Education in Administration**	**2008**
Central Michigan University **Bachelor of Science** Physical Education, Mathematics	**1982**

CERTIFICATES

Texas Principal Certificate	**2010**
Texas Teaching Certificate –Provisional	**1984**
Michigan Teaching Certificate –Provisional	**1984**

GRANTS

Professional Development Grant	**June 2012-June 2013**
Virtual High School Grant, Dow Corning	**May 2007 – May 2010**
Professional Development Grant	**August 2007 – November 2008**
Center for Excellence in Mathematics Teaching	**August 2008 – November 2008**

PROFESSIONAL EXPERIENCE

St. Mary Catholic School, Principal	**July 2012-current**
St. Johns School, Principal	**July 2011-June 2012**
Saint Michael the Archangel High School, Principal	**December 2008-June 2010**
All Saints Central High School, Principal	**August 2006-December 2008**
Cy-Fair High School, Academic Achievement Specialist/ Mathematics	**February 2002-July 2006**
Texas Educational Consulting and Software, Owner	**November 1996-February 2002**
Regency Educational Systems, Training, Sales, Support	**August 1992-November 1996**
Houston Independent School District, Technology Trainer/Mathematics	**August 1982- July 1992**

SPECIFIC SKILLS

Awards

Awarded the "Key to the City" for outstanding tests scores
Honorable Mention National Catholic High School Honor Roll 2008
Grants from several sources to assist in special projects

Curriculum

Analyzed data to determine trends and make predictions about results
Coordinated all standardized tests including Advanced Placement
Increased test scores at each school as principal
Supervised curriculum development and alignment for all subjects
Taught all levels of high school mathematics, including special populations
Worked with special education to determine student eligibility and design interventions

Development

Participated in Capitol Campaign to fund new Boiler System
Wrote grants for developing special programs
Acquired community participation in several major fundraising projects
Coordinated nation-wide fundraising effort for new curriculum

Human Resources

Analyzed future needs for staffing
Ensure appropriate staffing qualifications including fingerprinting and VIRTUS training
Supervise and evaluate teachers on a regular basis.
Established opportunities for Individual development of deficient areas

Leadership

Lead the successful accreditation team
Promoted the School-wide Stem program
Lead the successful implementation of the parent communication/grade book program
Established a Virtual High School lab to address the need for more Advanced Placement
Supervised and managed construction project for new classrooms
Supervised the development of a School Improvement Team and Plan

Professional Development

Established process for continuing professional development
Assist teachers in making appropriate opportunities for individual learning differences.
Develop the faculty/staff and in particular in the orientation of new teachers and staff members.
Developed Professional Training programs for teachers
Developed/encouraged a Professional Learning Communities

PROFESSIONAL AFFILIATIONS

American Association of School Administrators
Association of Supervision and Curriculum Development
American Education Research Association
National Council of Teachers of Mathematics

Sandra Kay Brigance
820 Campus Drive, ASC 2040, Big Rapids, MI 49307
231-591-5032
SandraBrigance@ferris.edu

EDUCATION

Capella University, Minneapolis, MN *2014*
Ph.D. in Education, Specialization in Instructional Design for Online Learning
Dissertation: "ADIT (Asynchronous Discussion Instructional Tool): A tool for designing asynchronous online discussions."

Western Michigan University, Kalamazoo, MI *2000*
M.A. in Mathematics

Western Michigan University, Kalamazoo, MI *1995*
B.S. in Secondary Mathematics Education
Minor: Spanish

DISTINCTIONS AND CERTIFICATION

- 2012 Promoted from Assistant to Associate Professor at Ferris State University
- 2007 Awarded Merit in Teaching at Ferris State University
- 2006 Awarded Tenure at Ferris State University
- 2000 Professional Certification – Michigan Secondary Education with EX (Mathematics) and FF (Spanish) endorsements (Provisional Certification 1995-2000)

TEACHING EXPERIENCE

Ferris State University, Big Rapids, MI *2001 - present*
Associate Professor of Mathematics - I use discussion-based, problem-based, and project-based learner-centered teaching strategies, requiring collaborative learning, in designing instruction and teaching the following courses (formats included):

Courses taught:

- MATH 010: Fundamentals of Mathematics (face-to-face)
- MATH 110: Fundamentals of Algebra (face-to-face, computer-mediated)
- MATH 115: Intermediate Algebra (face-to-face, computer-mediated)
- MATH 116: Intermediate Algebra and Numerical Trigonometry (fully online)
- MATH 117: Contemporary Mathematics (fully online)
- MATH 120: Trigonometry (face-to-face)
- MATH 122: Math Analysis for Business (face-to-face)
- MATH 126: Algebra-Analytic Trigonometry (fully online)
- MATH 130: Advanced Algebra and Analytical Trigonometry (face-to-face, Math Science Center)
- MATH 132: Calculus for Business (face-to-face, blended)
- MATH 218: Math for Elementary Teachers 1 (face-to-face, blended)
- MATH 219: Math for Elementary Teachers 2 (face-to-face, blended)
- MATH 220: Analytical Geometry-Calculus 1 (face-to-face)
- MATH 319: Mathematical Modeling and Problem Solving (fully online)
- MATH 322: Linear Algebra (fully online)
- MATH 326: Discrete Mathematics for Teachers (face-to-face)

- MATH 418: Teaching of Elementary-Middle School Mathematics (face-to-face)
- MATH 438: Teaching and Learning of High School Mathematics (face-to-face)

Kalamazoo Valley Community College, Kalamazoo, MI *2000 - 2001*
Adjunct Mathematics Instructor - Taught Developmental Mathematics and College Algebra.

Western Michigan University, Kalamazoo, MI *2000 - 2001*
Adjunct Mathematics Instructor - Taught Pre-Calculus.

Lansing Community College, Lansing, MI *Summer of 2000*
Adjunct Mathematics Instructor - Taught Calculus II.

Western Michigan University, Kalamazoo, MI *1998 - 2000*
Graduate Assistant – Conducted recitation sections for Developmental Mathematics through Pre-Calculus and tutored for developmental mathematics through Calculus II.

Foothill High School, Kern High School District, Bakersfield, CA *1995 - 1998*
High School Math Teacher - Taught Integrated Math I, II, & III.

PROFESSIONAL SERVICE

I have taken an active role in each of the following:

At Ferris State University, Big Rapids, MI:

- *Academic Advisor for Elementary Education Math Minors, 2010 – Present:*
  I provide academic advising for Elementary Education Math Minors and recruit Elementary Education Majors into the math minor program.
- *Elementary Education Departmental Committee, 2004 – Present (Chair, 2010 – Present):*
  Includes efforts in keeping materials, textbooks, and activities up-to-date with state and national teaching standards and expectations for courses in the Elementary Education Math Minor program.
- *27th Annual Equity Within the Classroom Conference Planning Committee, 2016 – Present:*
  Working in a team to plan the call for proposals, review of proposals, and selection of presenters.
- *Academic Affairs Assessment Committee, 2008 – 2011 & 2016 – Present (Chair, 2010 – 2011):*
  Served as Academic Affairs Assessment Coordinator (2010 – 2011). We organized assessment efforts during the Higher Learning Commission (HLC) of the North Central Association of Colleges and Schools reaccreditation process in 2010. This included implementing and training faculty in using a new university-wide assessment database (TRACDAT) as part of our goal in making assessment of courses and programs transparent. Currently assisting in ongoing university-wide assessment of learning in courses and programs and in preparing for the HLC 2020 reaccreditation visit.
- *Mathematics Department Assessment Committee, 2008 – Present*
  Currently working on ensuring that assessment data is being collected and reviewed on learning outcomes in all mathematics courses.
- *Mathematics Department Scheduling Committee, 2014 – Present*
- *Tenure Committee for New Faculty Member, 2009 – 2014:*
  Faculty member earned tenure in 2014.
- *Mathematics Secondary Teaching and Revision Task Committee (MSTART), 2009 – 2013:*
  Worked on team that updated the Secondary Education Mathematics Major and Minor Programs to better align with state and national standards and expectations for future secondary teachers. This included revisions to current courses and development of new courses to better prepare students in these programs.
- *Mathematics Department Assessment Coordinator, 2008 – 2011:*
  As assessment coordinator, I worked closely with math faculty in writing and revising program and course learning outcomes and assessment plans; and collecting, recording, and evaluating assessment data for mathematics and computer science programs and courses.
- *College of Arts & Sciences Assessment Committee, 2008 – 2010:*

We organized assessment efforts in preparation for reaccreditation. Our major projects involved assisting departments in writing learning outcomes and assessment plans for our programs and courses.

- *Academic Advisor for Pre-Pharmacy Students, 2002 – 2010*
- *Algebraic Departmental Committee, 2001 – 2010*
- *Developmental Mathematics Committee, 2001 – 2010*
- *Elementary Education Mathematics Minor Restructuring Committee, 2004 – 2009:*
  We revised the curriculum for the elementary education math minor to better meet state process standards and requirements.
- *Departmental Physical Environment Strategic Planning Committee, 2008 – 2009 (Chair)*
- *Mathematics Faculty Search & Screen Committee, 2008 – 2009*
- *Administrative Assistant to Interim Mathematics Department Head, 2007 – 2008:*
  In this role, I was responsible for course scheduling, evaluating adjunct math instructors, evaluating courses from other institutions for transfer credit, and acting as a liaison to program coordinators throughout the university for the mathematics service and general education courses.
- *Mathematics Faculty Search & Screen Committee, 2007 – 2008*
- *College of Arts & Sciences Representative of Ferris Faculty Association Executive Board, 2007 – 2008*
- *Mathematics Placement Exam Committee, August 2003 to May 2005*
- *Mathematics Faculty Search Committee, 2002 – 2003*

At Foothill High School, Kern High School District, Bakersfield, CA:

- *Integrated Mathematics Curriculum Revision Committee, 1997 – 1998:*
  We revised the high school mathematics curriculum to a uniform integrated mathematics curriculum for all schools in the district.
- *Coach of Academic Decathlon Team, 1997 – 1998*
- *Assistant Coach of Academic Decathlon Team, 1996 – 1997*

PUBLICATIONS AND PRESENTATIONS

- "The design and development of the Asynchronous Discussion Instruction Tool." 2014 Presentation of dissertation at Association for Educational Communications and Technology (AECT) 2014 International Convention, Jacksonville, FL.
- "The design and development of the Asynchronous Discussion Instruction Tool (ADIT)." Dissertation published by ProQuest LLC, 2014.
- "Leadership in online learning in higher education: Why instructional designers for online learning should lead the way." 2011 Publication in *Performance Improvement, 50* (10), 43-48. doi:10.1002/pfi.20262
- "Integrating information literacy into mathematics courses for preservice elementary teachers." 2011 Presentation at *Twenty-Third Annual International Conference on Technology in Collegiate Mathematics (ICTCM)*, Denver, CO.
- "Engaging your students with learner-centered rubrics." 2010 Presentation at *Lilly Conference on College & University Teaching*, Traverse City, MI.
- "Best Practices in Establishing Collaborative Working Groups in the Classroom." 2010 Informal Presentation at the *Great Teachers Seminar*, Whitehall, MI.
- "Student learning through asynchronous online discussions." 2010 Presentation at *Great Lakes Conference on Teaching & Learning*, Mt. Pleasant, MI.
- "Student learning through asynchronous online discussions." 2010 Presentation at *Scholarship of Teaching & Learning (SOTL) Conference*, Ypsilanti, MI.

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

- Association for Educational Communications and Technology (AECT) since 2011.
- National Council of Teachers of Mathematics (NCTM) since 1995.

- National Association for Developmental Education (NADE) 2002 - 2007.

PROFESSIONAL DEVELOPMENT

In addition to earning a doctoral degree in education, I have attended the following conferences and workshops to enrich my pedagogy.

- *Inquiry-Based Learning Discussion Group, Ferris State University, 2015 – present.*
- *Ferris' Kick-Off Week and other various Workshops through the Faculty Center for Teaching and Learning (FCTL) at Ferris State University, 2001 – present.*
- *26th Annual Equity within the Classroom Conference, Troy, MI, 2016.*
- *Association for Educational Communications and Technology (AECT) Accelerate Learning: Racing Into The Future International Convention, Indianapolis, IN, 2015.*
- *25th Annual Equity within the Classroom Conference, Grand Rapids MI, 2015.*
- *AECT Learning, Design, and Technology International Convention, Jacksonville, FL, 2014.*
- *24th Annual Equity within the Classroom Conference, Ann Arbor, MI, 2014.*
- *Mathematics Workshop, Big Rapids, MI, 2013.*
- *Quality Matters Workshop, Big Rapids, MI, 2013.*
- *AECT Learning in the Age of Globalization International Convention, Louisville, KY, 2012.*
- *Conversations Among Colleagues, Grand Rapids, MI, 2011.*
- *23rd Annual International Conference on Technology in Collegiate Mathematics (ICTCM), Denver, CO, 2011.*
- *10th Annual Lilly North Conference on College & University Teaching, Traverse City, MI, 2010.*
- *Great Teachers Seminar, Whitehall, MI, 2010.*
- *Great Lakes Conference on Teaching & Learning, Mt. Pleasant, MI, 2010.*
- *Scholarship of Teaching & Learning (SOTL) Conference, Ypsilanti, MI, 2010.*
- *22nd Annual International Conference on Technology in Collegiate Mathematics (ICTCM), Chicago, IL, 2010.*
- *8th Annual Lilly North Conference on College and University Teaching, Traverse City, MI, 2008.*
- *Higher Learning Commission (HLC) Assessment Workshop, Lisle, IL, 2008*
- *86th Annual National Council of Teachers of Mathematics (NCTM) Becoming Certain about Uncertainty Conference, Salt Lake City, UT, 2008.*
- *8th – 14th Annual Mathematics Education Seminars, Big Rapids, MI, 2002 – 2008.*
- *22nd Annual Michigan Developmental Education Consortium (MDEC) Bridges Between High School & College, Detroit, MI 2007.*
- *84th Annual NCTM Asking Questions – Generating Solutions Conference, St. Louis, MO, 2006.*
- *Rethinking Teaching in Higher Education: Designing a Learner-Centered Course Workshop, Big Rapids, MI, 2004.*
- *82nd Annual NCTM Defining Mathematics for All Conference, Philadelphia, PA, 2004.*
- *18th Annual MDEC Optimizing Opportunities: Politics and Practices, Lansing, MI, 2003.*
- *2nd Annual International Alliance of Teacher Scholars (IATS) Lilly North Conference, Big Rapids, MI, 2002.*
- *26th Annual National Association of Developmental Education (NADE) Reaching for the Stars Conference, Orlando, FL, 2002.*
- *8th Annual International Alliance of Teacher Scholars (IATS) Lilly South Conference on College and University Teaching, Athens, GA, 2002.*
- *Ferris Faculty Transition Program, Big Rapids, MI, 2001-2002.*
- *78th Annual NCTM Conference, Chicago, IL, 2000.*
- *74th Annual NCTM Conference, San Diego, CA, 1996.*

RESUME

Basic Personal Data	David Burns 610 Cypress Street Big Rapids, Michigan 49307 Phone 231-591-2302
Education	PhD in Mathematics, 1979 Western Michigan University Kalamazoo, Michigan
	SpA in Mathematics, 1976 Western Michigan University Kalamazoo, Michigan
	MA in Mathematics, 1972 Western Michigan University Kalamazoo, Michigan
	BS in Mathematics, 1970 University of Michigan Ann Arbor, Michigan
	Doctoral Preliminary Exams completed In Algebra, Analysis, and Graph Theory
	Specialist in Arts Preliminary Exams completed In Algebra, Analysis, and Graph Theory
Employment	1989-present: Professor of Mathematics Ferris State University
	1984-1988: Associate Professor of Mathematics Ferris State University
	1980-1983: Assistant Professor of Mathematics Ferris State University
	1977-1979: Graduate Student – PhD Program Western Michigan University

1975-1976:
Graduate Student – SpA Program
Western Michigan University

1973-1974:
Computer Programmer specializing in support of bank trust departments
Great Lakes Computer Center
Kalamazoo, Michigan

1970-1972:
Graduate Student – MA Program
Western Michigan University

1970-1977:
Commissioned Officer, U.S. Army Reserve
Field Artillery and Medical Service

University Committee and Service work 3

Mathematics Department level

1. 12 quarters of service as Coordinator of the Applied Mathematics Degree Program and Chairman of the Applied Mathematics Committee. Half of this work done without released time.
2. 23 quarters and 11 semesters of service as a member of the Applied Mathematics Committee. No overlap with number 1 above.
3. 20 quarters of service as a member of the Faculty Development Committee.
4. 6 quarters of service as Chairman of the Computer Science Committee.
5. 5 quarters of service as a member of the Computer Science Committee. No overlap with number 4 above.
6. 15 quarters and 2 semesters of service as a member of the Faculty Search Committee.
7. 5 quarters of service as a member of the Planning Committee.
8. 7 quarters of service as a member of the Department Head Search Committee.
9. 6 quarters and 5 semesters of service as a member of the Tenure Review Committee for Professor Arthur Sherwood.
10. 1 quarter of service as Chairman of the Master of Science in Applied Mathematics degree Study Committee.
11. Participated in Parent's Day weekend for 7 years.
12. Participated in Michigan Mathematics Prize grading for 4 years.
13. Team taught a 5 day summer computer science seminar for public school teachers.
14. Team taught a 5 day summer computer science seminar for people from business and industry.
15. Taught a one day computer science class for elementary school age students.
16. Presented a brief lecture on careers in mathematics during career day at Big Rapids High School.
17. Testified to the Academic Senate regarding our proposed minor in mathematics.
18. Presented a 1 hour lecture/demonstration with Professor Robert Boufford to the Big Rapids Lions Club regarding uses of computers in business.
19. Presented a 1 hour lecture to FSU faculty regarding an application of graph theory to computer science.
20. Presented a brief talk to the FSU Board of Control regarding possible new degrees to be offered by our Department.
21. Volunteered 8 times to teach Math 499 Independent Study in Mathematics. No compensation received for this work.
22. Volunteered 4 times to teach/supervise Math 450 Math Internship. No compensation received for this work.
23. Volunteered to work with a student to apply for an FSU student research grant. I then supervised the work done on this project.
24. Volunteered to teach a special six week math class for students working for the Hayworth Corporation.

25. Volunteered for approximately 2 hours per day for 2 weeks to demonstrate computer science programs and techniques to a group of engineers visiting FSU from the Philippine Islands.
26. Volunteered to participate in computer science demonstrations as a part of orientation week.
27. Volunteered to do telephone recruiting for the Applied Mathematics Program.
28. Volunteered with others to prepare application for the C.A.U.S.E. Federal Grant.
29. Volunteered for 3 semesters of service as a member of the Applied Mathematics Division. Served as Chairman for one of these semesters.
30. Volunteered for 22 semesters of service as a member of the Theoretical Committee.
31. Volunteered for 19 semesters of service as a member of the Applied Committee
32. 3 semesters of work as a member of the Physical Environment Group within the Strategic Planning Committee.

College of Arts and Sciences level

1. 8 quarters of service as Chairman of the General Education Study Committee.
2. 4 quarters of service as Chairman of the Natural Sciences Area Group within the General Education Study Committee. No overlap with number 1 above.
3. 2 quarters service as a member of the General Education Analysis Committee. This is different from 1 and 2 above.
4. 7 quarters of service as a member of the Honors Program Study Committee.
5. 3 quarters of service as a member of the Science Building Reorganization Committee.
6. 1 quarter of service as Chairman of the Sabbatical Leave Committee.
7. 13 semesters and 1 quarter of service as a member of the Sabbatical Leave Committee. No overlap with number 6 above.
8. 7 quarters of service as a member of the Academic Standards and Policies Committee.
9. 9 semesters and 3 quarters of service as a member of the Faculty Support Committee.

University level

1. 2 semesters and 3 quarters of service as a member of the Faculty Research Committee.
2. 3 quarters of service as a member of the Historical Archival Committee.
3. 1 quarter of service as a member of the Sabbatical Leave Committee.
4. 10 semesters of service as a member of the Professional Development Committee.
5. 2 semesters of service as a member of the Distinguished Teacher Award Committee.
6. 1 semester of service as a member of the Disabilities Services Review Panel.
7. 6 semesters of service as a member of the Student Life Committee.

5

Courses taught at Ferris State University

Math 110 Fundamentals of Algebra (large sized)
Math 110 Fundamentals of Algebra (regular sized)
Math 111 Fundamentals of Algebra (large sized)
Math 111 Fundamentals of Algebra (regular sized)
Math 115 Intermediate Algebra (large sized)
Math 115 Intermediate Algebra (regular sized)
Math 116 Data Processing Mathematics
Math 121 Intermediate Algebra (large sized)
Math 121 Intermediate Algebra (regular sized)
Math 124 Numerical Trigonometry
Math 125 Advanced Algebra and Analytical Trigonometry
Math 128 Mathematical Analysis for Business 1
Math 130 Advanced Algebra and Analytical Trigonometry
Math 132 Calculus for Business
Math 135 Calculus for the Life Sciences
Computer Science 140 Introduction to BASIC and the Microcomputer
Computer Science 150 Introduction to Computer Science
Math 216 Applied Calculus
Math 230 Analytical Geometry and Calculus 2
Math 231 Analytic Geometry and Calculus 1
Math 232 Analytic Geometry and Calculus 2
Math 233 Analytic Geometry and Calculus 3
Math 234 Analytic Geometry and Calculus 4
Math 241 Numerical Methods
Math 322 Linear Algebra
Math 324 Fundamental Concepts in Mathematics (I taught discrete structures under this title)
Math 400 Operations Research
Math 401 Mathematical Modeling
Math 450 Applied Mathematics Internship
Math 499 Special Studies in Mathematics

In addition, I have taught college algebra, introductory calculus, third semester calculus, linear algebra, and graph theory (this last at both undergraduate and graduate levels) at Western Michigan University as a Graduate Teaching Assistant, Doctoral Associate, Doctoral Fellow, and Instructor at that institution.

D. Burns Writings

1. D. Burns and S. Schuster "Every (p,p-2) graph is contained in its complement", Journal of Graph Theory, 1(1977) 277-279.
2. D. Burns and S. Schuster "Embedding (p,p-1) graphs in their complements", Israel Journal of Mathematics, 30(1978) 313-320.
3. D. Burns, "Uniform factorizations of graphs", Doctoral dissertation, Western Michigan University, 1979.
4. D. Burns and S.F. Kapoor, "A procedure to determine connectedness in orientations of graphs". Research report, Mathematics Department, Western Michigan University, July 1979.
5. A review of "A new definition for the eulericity of a graph". Review completed in June 1980 for the Journal of Graph Theory.
6. A review of "A note on path and cycle decompositions of graphs". Review completed in April 1980 for the Journal of Graph Theory.
7. D. Burns, S.F. Kapoor, and P.A. Ostrand "Edge Cosymmetric Graphs", Discrete Mathematics, 32(1980) 99-103.
8. D. Burns and S.F. Kapoor, "One way orientations of graphs", Pi Mu Epsilon, 7(1980) 176-179.
9. D. Burns, G. Chartrand, S.F. Kapoor, and F. Saba "Randomly k-axial graphs" Bulletin of the Australian Mathematical Society, 23(1981) 143-156.
10. D. Burns, "Graph Theory", Encyclopedia of Statistical Sciences, Volume 3 (1983) 517-522.
11. D. Burns, S.F. Kapoor, and P.A. Ostrand, "On line-symmetric graphs", Fundamenta Mathematicae, CXXII(1984) 1-21.
12. D. Burns, "Biregular edge-symmetric graphs", Colloquium Mathematicum, XLIX(1984) 137-140.
13. D. Burns, "The n-minimal chromatic multiplicity of a graph", Colloquium Mathematicum, XLIX(1984) 131-135.
14. D, Burns, S.F. Kapoor, and P.A. Ostrand, "Uniquely edge extendible graphs", Fundamenta Mathematicae, CXXV(1985) 125-131.
15. A review of "On cliques in uniform intersection graphs" by T. Galliguez. Review completed in September 1987 for Mathematical Reviews, AMS.
16. A review of "Two theorems on packings of graphs" by S.K. Teo and H.P. Yap, Review completed in October 1987 for Mathematical Reviews, AMS.
17. A review of "Clique partitions of triangulated graphs" by M. Shaoan and W.D. Wallis. Review completed in October 1987 for Mathematical Reviews, AMS.
18. A review of "Intermediate Algebra" by Welch and Peter. Review completed in December 1989 for Scott Foresman Co.
19. D. Burns "Graph Multiplicities". Research project funded by a faculty research grant from Ferris State University in April 1990.
20. A review of a revision of "Intermediate Algebra" by Welch and Peter. Review completed in November 1990 for Scott Foresman Co.
21. A review of "Clique-transversal sets of line graphs and complements of line graphs" by T. Andreae , M. Schughart, and Z. Tuza. Review completed in July 1991 for Mathematical Reviews, AMS.

22. A review of "Graphs with k odd cycle lengths" by A. Gyarfas. Review completed in September 1992 for Mathematical Reviews, AMS.
23. A review of "Covering the cliques of a graph with vertices" by P. Erdos, T. Gallai, and Z. Tuza. Review completed in January 1993 for Mathematical Reviews, AMS.
24. A review of "The sum number of complete bipartite graphs" by N. Hartsfield and W. F. Smyth. Review completed in May 1993 for Mathematical Reviews, AMS.
25. A review of "Triple placement of graphs" by M. Wozniak and A.P. Wojda. Review completed in July 1993 for Mathematical Reviews, AMS.
26. A review of "Unboundedness for generalized odd cycle transversality" by I.J.Dejter and L.V. Neumann. Review completed in August 1993 for Mathematical Reviews, AMS.
27. A review of "Most unbreakable murky graphs are bull-free" by A. Hertz. Review completed in September 1993 for Mathematical Reviews, AMS.
28. D. Burns, "Packing n-chromatic graphs". Research project supported by a sabbatical leave from Ferris State University. Project completed in May 1994.
29. A review of "Embedding graphs of small size" by M. Wozniak. Review completed in August 1994 for Mathematical Reviews, AMS.
30. A review of "A note on colouring of complete graphs" by L. Sun. Review completed in August 1995 for Mathematical Reviews, AMS.
31. A review of "A min-max relation for K(3)-covers in graphs noncontractible to K(5)-e" by A.R. Mahjoub. Review completed in December 1995 for Mathematical Reviews, AMS.
32. A review of "The number of labeled graphs placeable by a given permutation" by T. Hasunuma and Y. Shibata. Review completed in February 1996 for Mathematical Reviews, AMS.
33. A review of "Generalized list colourings of graphs" by M. Borowiecki and E. Drgas-Burchardt. Review completed in May 1996 for Mathematical Reviews, AMS.
34. A review of "Packing three trees" by M. Wozniak. Review completed in September 1996 for Mathematical Reviews, AMS.
35. A review of "Subpath Acyclic Digraphs" by F.R. McMorris and H.M. Mulder. Review completed in September 1996 for Mathematical Reviews, AMS.
36. A review of "Edge-disjoint placement of trees" by M. Maheo, J. Sacle, and M. Wozniak. Review completed in October 1996 for Mathematical Reviews, AMS.
37. A review of "Graphs with given odd sets" by G. Chan, R.H. Shelp, and L. Soltes. Review completed in March 1997 for Mathematical Reviews, AMS.
38. A review of "The chromatic number of the two-packing of a forest" by H. Wang and N. Sauer. Review completed in March 1997 for Mathematical Reviews, AMS.
39. A review of "A note on packing of three forests" by J.F. Sacle and M. Wozniak. Review completed in April 1997 for Mathematical Reviews, AMS.
40. A review of "The maximum induced circumference of a graph" by C. Campbell, E. DeLaVina, and F. Harary. Review completed in June 1997 for Mathematical Reviews, AMS.

41. A review of "Knapsack graphs" by T. Robinson. Review completed in August 1997 for Mathematical Reviews, AMS.
42. A review of "Graphs related to diameter and center" by F. Gliviak and P. Kys. Review completed in January 1998 for Mathematical Reviews, AMS.
43. A review of "Minimum weight (T,d)-joins and multi-joins" by M. Burlet and V. Karzanov. Review completed in May 1998 for Mathematical Reviews, AMS.
44. A review of "Edge-irreducible quartic graphs" by Y. Tsukui. Review completed in September 1998 for Mathematical Reviews, AMS.
45. A review of "A note on the tree decompositions of graphs" by S. Minyong. Review completed in November 1998 for Mathematical Reviews, AMS.
46. A review of "A note on uniquely embeddable graphs" by M. Wozniak. Review completed in December 1998 for Mathematical Reviews, AMS.
47. A review of "Hajos constructions of critical graphs" by T. Jensen and G. Royle. Review completed in February 1999 for Mathematical Reviews, AMS.
48. A review of "Some results on packing graphs in their complements" by T. Gangopadhyay. Review completed in May 1999 for Mathematical Reviews, AMS.
49. A review of "The search for symmetric Venn diagrams" by B. Grunbaum. Review completed in July 1999 for Mathematical Reviews, AMS.
50. A review of "On vertex-disjoint complete bipartite subgraphs in a bipartite graph" by H. Wang. Review completed in February 2000 for Mathematical Reviews, AMS.
51. A review of "Triangle-free graphs that are signable without even holes" by M. Conforti, G. Cornuejols, and K. Vuskovic. Review completed in August 2000 for Mathematical Reviews, AMS.
52. A review of "Analysis of Venn diagrams using cycles in graphs" by K. Chilakamarri, P. Hamburger, and R. Pippert. Review completed in February 2001 for Mathematical Reviews, AMS.
53. A review of "F-continuous graphs" by G. Chartrand, E. Jarrett, F. Saba, E. Salehi, and P. Zhang. Review completed in September 2001 for Mathematical Reviews, AMS.
54. A review of "Odd wheels in graphs" by Xu, Jin, and Lin. Review completed in June 2002 for Mathematical Reviews, AMS.
55. A review of "Bipartite graphs without a skew star" by V. Lozin. Review completed in January 2003 for Mathematical Reviews, AMS.
56. A review of "Self-complementary graphs with minimum degree two" by K. Ando and A. Nakamoto. Review completed in January 2003 for Mathematical Reviews, AMS.
57. A review of "Classification of certain subgraphs of the 3-dimensional grid" by J. Haugland. Review completed in February 2003 for Mathematical Reviews, AMS.
58. A review of "Slice two-colorings that forbid monochromatic translates of many doubletons" by P. Johnson. Review completed in July of 2003 for Mathematical Reviews, AMS.
59. A review of "On the largest eigenvalue of a tree with perfect matchings" by A. Chang. Review completed in September 2003.

60. A review of "On rs(k)-perfect graphs" by D. Rantenbach. Review completed in November of 2003 for Mathematical Reviews, AMS.
61. A review of "Stratification and domination in graphs" by G. Chartrand, T. Hayes, M. Henning, and P. Zhang. Review completed in January of 2004 for Mathematical Reviews, AMS.
62. A review of "Semi-regular graphs of minimum independence number" by P. Nelson and A. Radcliff. Review completed in March 2004 for Mathematical Reviews, AMS.
63. A review of "Stratification and domination in graphs" by M. Henning and J. Maritz. Review completed in November 2004 for Mathematical Reviews, AMS.
64. A review of "On self-complementary supergraphs of (n,n)-graphs" by P. Wojda, M. Wozniak, and I. Zioto. Review completed in June of 2005 for Mathematical Reviews, AMS.
65. A review of "On the Boolean function graph of a graph and its complement" by T. Janakiraman and S. Muthammai. Review completed in September of 2005 for Mathematical Reviews, AMS.
66. A review of "Domination numbers on the Boolean function graph of a graph" by T. Janakiraman, S. Muthammai, and M. Bhanumathi. Review completed in September of 2005 for Mathematical Reviews, AMS.
67. A review of "Remarks on spectral radius and lapacian eigenvalues of a graph" by B. Zhou and H. Cho. Review completed in September 2005 for Mathematical Reviews, AMS.
68. A review of "On simply structured bases of tree kernels" by J. Sander and T. Sander. Review completed in December of 2005 for Mathematical Reviews, AMS.
69. A review of "Cycle embedding in star graphs with edge faults" by T. Li. Review completed in December of 2005 for Mathematical Reviews, AMS.
70. A review of "Two new classes of trees embeddable in hypercubes" by M. Nekri and A. Berrachedi. Review completed in January of 2006 for Mathematical Reviews, AMS.
71. A review of "Face antimagic labelings for a special class of plane graphs" by M. Baca, E. Baskoro, and Y. Cholily. Review completed in March of 2006 for Mathematical Reviews, AMS.
72. A review of "On almost self-complementary graphs" by P. Potocnik and M. Sajna. Review completed in April 2006 for Mathematical Reviews, AMS.
73. A review of "Automated conjectures on upper bounds for the largest Laplacian eigenvalue of graphs" by Brankov, Hansen, and Stevanovic. Review completed in June 2006 for Mathematical Reviews, AMS.
74. A review of "Weak embedding of planar graphs" by W. Erling and L. Yanpei. Review completed in July of 2006 for Mathematical Reviews, AMS.
75. A review of "More fun with symmetric Venn diagrams" by F. Ruskey and M. Weston. Review completed in August of 2006 for Mathematical Reviews, AMS.
75. A review of "Profile minimization on products of graphs" by Y. Tsao and G. Chang. Review completed in September of 2006 for Mathematical Reviews, AMS.
76. A review of "Connected geodomination in graphs" by D. Mojeh and N. Rad. Review completed in September of 2006 for Mathematical Reviews, AMS.
77. A review of "The average degree in a vertex-magic graph" by A. Beardon. Review completed in October of 2006 for Mathematical Reviews, AMS.

78. A review of "Hamiltonian connectedness and the partially square graphs" by A. Ainouche and S. Lapiqnonne. Review completed in October 2006 for Mathematical Reviews, AMS.
79. A review of "Some bounds on the p-domination number in trees" by M. Blidia, M. Chellali, and L. Volkmann. Review completed in November 2006 for Mathematical Reviews, AMS.
80. A review of "Algorithmic aspects of minus total k-subdomination in graphs" by L. Harris, J. Hattingh, and M. Henning. Review completed in January of 2007 for Mathematical Reviews, AMS.
81. A review of "Constrained switchings in cubic graphs" by A. Chantasartrassmee and N. Punnim. Review completed in February of 2007 for Mathematical Reviews, AMS.
82. A review of "Extremal cut-width problem for graphs" by J. Hao and A. Yang. Review completed in March of 2007 for Mathematical Reviews, AMS.
83. A review of "More about singular line graphs" by M. Marino, I. Sciriha, S. Simic, and D. Tosic. Review completed in March 2007 for Mathematical Reviews, AMS.
84. A review of "Symmetrical path-cycle covers and polygonal graphs" by C. Li, and A. Seress. Review completed in March 2007 for Mathematical Reviews, AMS.
85. A review of "Symmetric squares of graphs" by K. Audenaert, C. Godsil, G. Roye, and T. Rudolph. Review completed in March 2007 for Mathematical Reviews, AMS.
86. A review of "Spectral radii of graphs with a given chromatic number" by L. Feng, Q. Li, and X. Zhans. Review completed in April 2007 for Mathematical Reviews, AMS.
87. A review of "On the Loebl-Komlos-Sos conjecture" by L. Sun. Review completed in April of 2007 for Mathematical Reviews, AMS.
88. A review of "Lower bound on the weakly connected domination number of a tree" by M. Lemanska. Review completed in April 2007 for Mathematical Reviews, AMS.
89. A review of "Pentagons and cycle coverings" by H. Wang. Review completed in May of 2007 for Mathematical Reviews, AMS.
90. A review of "On geometric properties of directed vertex-symmetric graphs" by V. Trofimov. Review completed in May of 2007 for Mathematical Reviews, AMS.
91. A review of "Doubly transitive 2-factorizations" by A. Bonisoli, M. Burahi, and G. Mazzuocolo. Review completed in May 2007 for Mathematical Reviews, AMS.
92. A review of "Using determining sets to distinguish Kneser graphs" by M. Albertson and D. Boutin. Review completed in June of 2007 for Mathematical Reviews, AMS.
93. A review of "Monochromatic Fibonacci numbers of graphs" by I. Wloch and A. Wloch. Review completed in June of 2007 for Mathematical Reviews, AMS.
94. A review of "On strong (weak) independent sets and vertex coverings of a graph" by S. Kmath and R. Bhart. Review completed in June of 2007 for Mathematical Reviews, AMS.
95. A review of "Ratios of some domination parameters in graphs and claw-free graphs" by M. Blindia, M. Chellali, and O. Favaron. Review completed in June of 2007 for Mathematical Reviews, AMS.
96. A review of "A new construction technique of a triangle-free 3-colored K16" by J. Jaam. Review completed in July of 2007 for Mathematical Reviews, AMS.
97. A review of "On perfect neighborhood and irredundant sets in trees" by T. Xie, B. Zhong, and T. Pend. Review completed in July 2007 for Mathematical Reviews, AMS.

98. A review of "On the maximum number of edges in quasi-planar graphs" by E. Ackerman. Review completed in July of 2007 for Mathematical Reviews, AMS.
99. A review of "On potentially Kr(1),r(2),...,r(m)-graphic sequences" by J. Yin and G. Chen. Review completed in July 2007 for Mathematical Reviews, AMS.
100. A review of "Fixed-point free embeddings of digraphs with small size" by A. Gorlich, M.Pilsniak, M.Wozniak, and I. Ziolo. Review completed in July of 2007 for Mathematical Reviews, AMS.
101. A review of "The minimal spectral radius of graphs with a given diameter" by E. VanDam. Review completed in August 2007 for Mathematical Reviews, AMS.
102. A review of "A note on packing of two copies of a hypergraph" by M. Pilsniak and M. Wozniak. Review completed in September 2007 for Mathematical Reviews, AMS.
103. A review of "On Potentially kCl-graphic sequences" by J. Yin and G. Chen. Review completed in September 2007 for Mathematical Reviews, AMS.
104. A review of "Minimax relations for cyclically ordered digraphs" by A. Sebo. Review completed in October 2007 for Mathematical Reviews, AMS.
105. A review of "On stratification and domination in graphs" by R. Gera and P. Zhang. Review completed in October 2007 for Mathematical Reviews, AMS.
106. A review of "Global alliances in planar graphs" by J. Rodriquez-Valazquez and J. Sigarreta. Review completed in October 2007 for Mathematical Reviews, AMS.
107. A review of "K-perfect geodominating sets in graphs" by D. Mojdeh and N. Rad. Review completed in November 2007 for Mathematical Reviews, AMS.
108. A review of "On friendly index sets of root-unions of stars by cycles" by Y. Ho, S. Lee, and H. Ng. Review completed in November 2007 for Mathematical Reviews, AMS.
109. A review of "Matchings of cycles and paths in directed graphs" by G. Pap and L. Szego. Review completed in December 2007 for Mathematical Reviews, AMS.
110. A review of "On directed triangles in digraphs" by P. Hamburger, P. Haxell, and A. Kostochka. Review completed in February of 2008 for Mathematical Reviews, AMS.
111. A review of "Triangular Embeddings of complete graphs from graceful labellings of paths" by L. Goddyn, R. Richter, and J. Siran. Review completed in February of 2008 for Mathematical Reviews, AMS.
112. A review of "Vertex disjoint equivalent subgraphs of order 3" by T. Nakamigawa. Review completed in February of 2008 for Mathematical Reviews, AMS.
113. A review of "Randomly C(n)UC(m) graphs" by H. Pavel and M. Pokorny. Review completed in March 2008 for Mathematical Reviews, AMS.
114. A review of "Random 2C(n) graphs" by H. Pavel and M. Pokorny. Review completed in April 2008 for Mathematical Reviews, AMS.
115. A review of "The binding number of a graph" by G. Xu, X. Li, and S. Zhang. Review completed in April 2008 for Mathematical Reviews, AMS.
116. A review of "On realizations of point determining graphs and obstructions to full homomorphisms" by T. Feder and P. Hell. Review completed in June 2008 for Mathematical Reviews, AMS.
117. A review of "A classification of regular embeddings of hypergraphs Q(2m) with m odd" by J. Xu. Review completed in July 2008 for Mathematical Reviews, AMS.
118. A review of "Degree constrained subgraphs" by L. Addario-Berry, K. Dalal, and B. Reed. Review completed in July of 2008 for Mathematical Reviews, AMS.

119. A review of "The Cycle-Complete graph Ramsey number r(C(9),K(8))" by M. Jaradat and B. Alzaleg. Review completed in August of 2008.
120. A review of "On Mark sequences in 2-digraphs" by S. Pirzada, A. Merajuddin and U. Samee. Review completed in September 2008.
121. A review of "Independent dominating sets and Hamiltonian cycles" by P. Haxell, B. Seamore, and J. Verstraete. Review completed in September 2008.
Number 122 skipped to correct for using number 75 twice earlier by mistake.
123. A review of "On irregularity of graphs" by B. Zhou and W. Luo. Completed in October 2008.
124. A review of "Strong geodomination of graphs" by N. Rad and D. Mojdeh. Completed in Nevember 2008.
125. A review of "Ordering trees with n vertices and matching number q by their largest Laplacian eigenvalues" by S. G. Guo. Review completed in November 2008.
126. A review of "Efficient edge domination in regular graphs" by D.M. Cardoso, J.O. Delorme, and P.C. Silva. Review completed in February 2009.
127. A review of "2-list-coloring planar graphs without monochromatic triangles" by C. Thomassen. Completed in March 2009.
128. A review of "Brick assignments and homogeneously almost self-complementary graphs" by P. Potocnik and M. Sajna. Completed in March 2009.
129. A review of "Graphs of unitary matrices" by S. Severini. Completed in June 2009.
130. A review of "The minimal Laplacian spectral radius of trees with a given diameter" by R. Liu, J. Shu, and Z. Lu. Completed in August 2009.
131. A review of "An application of graph labeling to Root Systems" by G.R. Vijayakumar. Completed in October 2009.
132. A review of "On Hamiltonicity of P3-dominated graphs" by H.J. Broersma and E. Vumar. Completed in November 2009.
133. A review of "Planar graphs without 5-cycles or without 6-cycles" by Q. Ma. Completed in December 2009.
134. A review of "On certain spanning subgraphs of embeddings with applications to domination" by M. Plummer and X. Zha. Completed in March 2010.
135. A review of "Independent domination by monochromatic paths in arc colored bipartite tournaments" by H.G. Galena-Sanchez and R. Rojas-Monroy. Completed in April 2010.
136. A review of "Solution of a conjecture of Volkmann on longest paths through an arc in strongly connected in-tournaments" by D. Meierling. Completed in April 2010.
137. A review of "Hall number for list colorings of graphs: Extremal results" by Z. Tuza. Completed in May 2010.
138. A review of "More spectral bounds on the clique and independence numbers" by V. Nikiforou. Completed in June 2010.
139. A review of "On the Laplacian spectral radii of trees with perfect matchings" by X. Yuan, J. Shao and C. He. Completed in August 2010.
140. A review of "A sufficient condition on upper embeddability of graphs" by J.L. Cai, G.H. Dong, and Y.P. Liu. Completed in October 2010.
141. A review of "Proof of Ding's conjecture on maximal stable sets and maximal cliques in planar graphs" by J. Sun and Z. Hu. Completed in November 2010.

142. A review of "A bound on the tree width of planar even-hole-free graphs" by A. Silva, A. daSilva, and C. Sales. Completed in December 2010.

143. A review of "Associated primes of monomial ideals and odd holes in graphs" by C.A. Francisco, H. Ha, and A. Tutl. Completed in December 2010.

144. A review of "Growth constants of minor-closed classes of graphs" by O. Bernardi, M. Noy, and D. Welsh. Completed in February 2011.

145. A review of "Continuous k-to-1 functions between complete graphs whose orders are of a different parity" by J.B. Gauci and A.J.W. Hilton. Completed in February 2011.

146. A review of "Counting the regions in a regular drawing of K(n,n)" by M. Griffiths. Completed in April 2011.

147. A review of "Complete minors and independence number" by J. Fox. Completed in June 2011.

148. A review of "The number of edges in a bipartite graph of given radius" by P. Dankelmann, H. Swart, and P. Vandenberg. Completed in September 2011.

149. A review of "Acyclic orientation of drawings" by E. Ackermann, K. Buchin, C. Knaur, and G. Rote. Completed in September 2011.

150. A review of ""Nonorientatable regular embeddings of graphs of order pq" by F.R. Wang and S.F. Du. Completed in October 2011.

151. A review of "Vertex coloring complete multipartite graphs from random lists of size 2" by C.J. Casselgren. Completed in November 2011.

152. A review of "A theorem on incidence matrices and quasirandom hypergraphs" by D. Dellamonica jr, P Frankl, and V. Rodl. Completed in November 2011.

153. A review of "The structure of hereditary properties and 2-coloured multigraphs" by E. Marchant and A. Thomason. Completed in March 2012.

154. A review of "Karp-Sipser on random graphs with a fixed degree sequence" by T. Bohman and A. Frieze. Completed in March 2012.

155. A review of "Dot product representation of planar graphs" by R.J. Kang, L. Lovasz, T. Mulla, and E.R. Scheinaman. Completed in May 2012.

156. A review of "Symmetrized induced Ramsey theory" by S. Geschke and M. Kojman. Completed in May 2012.

157. A review of "Disjoint Hamiltonian cycles in the random geometric graph" by T. Muller, X. Perez-Gimenez and N. Wormald. Completed in June 2012.

158. A review of "An acyclic hypergraph decomposition problem motivated by data base theory" by Y.M. Chee, L. Ji, and A.K.H. Tung. Completed in July 2012. 15

159. A review of "Approximate Hamiltonian decompositions of random graphs" by F. Knox, D. Kuhn, and D. Osthus. Completed in August 2012.

160. A review of "Supersaturation for hereditary properties" by D. Saxton. Completed in August 2012

(A modified version of the abstract used for this review).

161. A review of "Monochromatic cycles in 2-coloured graphs" by F.S. Benevides, T. Luczak, A. Scott, J. Skokan, and M. White. Completed in September 2012.

162. A review of "Testability of minimum balanced multiway cut densities" by M. Bolla, T. Koi, and A. Kramli. Completed in September 2012.

163. A review of "Overlap number of graphs " by D. Crenston, N. Korula, T. LaSaulnier, K. Milans, C. Stocker, J. Vandenbussche, and D. West. Completed in October 2012.

164. A review of "A corrected version of Meyniel's conjecture" by H. Galena-Sanchez, M. Manrique, and M. Stehlik. Completed in October 2012.

165. A review of "Quasi-randomness of graph balanced cut properties" by H. Huang and C. Lee. Completed in December of 2012.

166. A review of "An oriented hypergraphic approach to algebraic graph theory" by N. Reff and L. Rusnak. Completed in December of 2012.

167. A review of "Spanning trees in 3-connected K(3,t)-minor-free graphs" by K. Ota and K. Ozeki. Completed in January of 2013.

168. A review of "Perfect graphs of fixed density: counting and homogeneous sets" by J. Bottcher, A. Taraz, and A. Wurfl. Completed in January 2013. (A modified version of the abstract used for this review).

169. A review of "On edge-sets of bicycles in graphs" by M. Groshaus, P. Hell, and J. Stacho. Completed in February 2013.

170. A review of "Disjoint 5-cycles in a graph" by H. Wang. Completed in February of 2013.

171. A review of "Adjacency properties of graphs and a conjecture of Erdos" by A. Bonato and A. Costea. Completed in March 2013.

172. A review of "Sharp bounds for the number of matchings in generalized-theta-graphs" by A. Dolati and S. Golalizadeh. Completed in April 2013.

173. A review of “Maximum r-regular induced subgraph problem: fast exponential algorithms and combinatorial bounds” by S. Gupta, V. Raman, and S. Saurabh. Completed in May 2113.

174. A review of “Rainbow connection of sparse random graphs” by A. Friezeand C.F. Tsourakakkis. Completed in May 2013.

175. A review of “Large 2-colored matchings in 3-colored complete hypergraphs” by T. Terpal. Completed in May 2013.

176. A review of “Tournaments with kernals by monochromatic paths” by H. Gelena-Sanchez and E. O’Reilly-Regueiro. Completed in June 2013.

177. A review of “Perfect matchings in random intersection graphs” by M. Blcznelis and T. Lucak. Completed in June 2013. A modified version of the abstract was used for this review.

178. A review of “Chain-making games in grid-like posets” by D. Cranston, W. Kinnersley, K. Milans, G. Puleo, and D. West. Completed in July 2013.

179. A review of “Stirling numbers of forests and cycles” by D. Calvin and D.T. Thanh. Completed in August 2013.

180. A review of “Enumeration of unlabeled directed hypergraphs” by J. Qian. Completed in August 2013.

181. A review of “Kings in hypertournaments” by D. Drcanov, V. Petrovic, and M, Tremi. Completed in September 2013.

182. A review of “Linear 2-arboricity of planar graphs with neither 3-cycles nor adjacent 4-cycles” by H. Niu and J. Cai. Completed in September 2013.

183. A review of “On the iterated biclique operator” by M. Groshaus and L.P. Montero. Completed in September 2013.

184. A review of “A note on spanning trees and totally cyclic orientations of 3-connected graphs”by F. Liu. Completed in September 2013.

185. A review of “Degree and clustering coefficient in sparse random intersection graphs” by M. Bloznelis. Completed in October 2013. A modified version of the abstract was used for this review.

186. A review of “On the Page number of upward planar directed acyclic graphs” by F. Frati, R. Fulek and A, Ruiz-Vargas. Completed in November 2013. A modified version of the abstract was used for this review.

187. A review of “Coloring planar homothets and three-dimensional hypergraphs” by J. Cardinal and M, Korman. Completed in November 2013.

188. A review of “Which exterior powers are balanced?” by D. Mallory and A. Raz. Completed in December 2013.

189. A review of “On the non-planarity of a random subgraph” by A. Frieze and M. Krivelevich. Completed in December 2013.

190. A review of "2-edge-Hamiltonian-connectedness of 4-connected plane graphs" by K. Ozeki and P. Urana. Completed in January 2014.

191. A review of "Almost spanning subgraphs of random graphs after adversarial edge removal" by J. Bottcher, Y. Kohayakawa, and A. Taraz. Completed in January 2014.

192. A review of "Bounds on the signed 2-independence number in graphs" by L. Volkmann. Completed in February 2014.

193. A review of "Colouring clique-hypergraphs of circulant graphs" by C. Campos, S. Dantas, and C.P. DeMello. Completed in February 2014.

194. A review of "On the connectedness and diameter of a geometric Johnson graph" by C. Bautista-Santiago et. al. Completed in March 2014.

195. A review of "Chromatic number and complete graph substructures for degree sequences" by Z. Dvorak and B. Mohar. Completed in March 2014.

196. A review of "Confluent Hasse diagrams" by D. Eppstein and J.A. Simons. Completed in April 2014.

197. A review of "Dominating induced matchings for P7-free graphs in linear time" by A. Brandstadt and R. Mosca. Completed in May 2014.

198. A review of "Constructions of independent sets in random intersection graphs" by K. Rybarczyk. Completed in May 2014.

199. A review of "Rao's degree sequence conjecture" by M. Chudnovsky and P. Seymour. Completed in May 2014.

200. A review of "Counting spanning trees using modular decomposition" by S.D. Nikolopoulos, L. Palios, and C. Papadopoulos. Completed in May 2014.

201. A review of "Long paths and cycles in random subgraphs of H-free graphs" by M. Krivelevich and W. Samotij. Completed in June 2014.

202. A review of "On the number of orientations of random graphs with no directed cycles of a given length" by P. Allen, Y. Yohayakawa, G.O. Mota, and R.F. Parente. Completed in June 2014.

203. A review of "Weighted popular matchings" by J. Mestre. Completed in July 2014.

204. A review of "The Harary index of ordinary and generalized quasi-tree graphs" by K. Xu, J. Wang, and H. Liu. Completed in July 2014.

205. A review of "On a new cyclicity measure of graphs – the global cyclicity index" by Y. Yang. Completed in July 2014.

206. A review of "Optimization problems in dotted interval graphs" by D. Hermelin, J. Mestre, and D. Rawitz. Completed in August 2014.

207. A review of "Connectivity and Tree structure in finite graphs" by J. Carmesin, R. Diestel, F. Hundermark, and M. Stein. Completed in August 2014.

208. A review of "Convex geometric (k+2)-quasi planar representations of semi-bar k-visibility graphs" by J. Geneson, T. Khovanova, and J. Tidor. Completed in October 2014.

209. A review of "Excluded vertex-minors for graphs of linear rank-width at most k" by J. Jeong, O. Kwon, and S. Oum. Completed in October, 2014.

210. A review of "Grid minors in damaged grids" by D. Eppstein. Completed in December 2014.

211. A review of "Separating path systems" by V. Falgas, T. Kittpascorn, D. Korandi, S. Letzter, and B. Narayanan. Completed in January 2015.

212. A review of "Interactions of random hypergraphs and tournaments" by B. Bollobas and A. Scott. Completed in February 2015.

213. A review of "An involution on bicubic maps and B(0,1)-trees" by A. Claesson and S. Kitaev. Completed in March 2015.

214. A review of "5-stars of low weight in normal plane maps with minimum degree 5" by O. Borodin, A. Ivanova, and T. Jensen. Completed in March 2015.

215. A review of "Enumeration of finite topologies associated with a finite simple graph" by D. Kim, Y. Kwon, and J. Lee. Completed in May 2015.

216. A review of "Graph homomorphisms between trees" by P. Csikvari and Z. Lin. Completed in May 2015.

217. A review of "A generalization of the quadrangulation relation to constellations and hypermaps" by W. Fang. Completed in June 2015.

218. A review of "Linear embeddings of graphs and graph limits" by H. Chrangpishit, M. Chandehari, M. Hurshman, J. Jansen, and N. Kalyaniwalla. Completed in August 2015.

219. A review of "Scaling limits of random planar maps with a unique large face" by S. Janson and S. Stefansson. Completed in August 2015.

220. A review of "Framed 4-valent graph minor theory I: Introduction. A panarity criterion and linkless embeddability" by V. Manturov. Completed in August 2015.

221. A review of "Decentralized global connectivity maintenance for interconnected Lagrangian systems in the presence of data corruption" by C. Secchi, L. Sabattini, and C. Fantuzzi. Completed in August of 2015.

222. A review of "List edge coloring of planar graphs without non-induced 6-cycles" by J. Cai. Completed in August 2015.

223. A review of "Describing tight descriptions of 3-paths in triangle-free normal plane maps" by O. Borodin and A. Iranova. Completed in September 2015.

224. A review of "The degree-diameter problem for sparse graph classes" by G. Pineda-Villavicencio and D. Wood. Completed in September 2015.

225. A review of "On the structure of graphs with given odd girth and large minimum degree" by S. Messoti and M. Schacht. Completed in October 2015.

226. A review of "Orientability thresholds for random hypergraphs" by P. Gao and N. Wormald. Completed in October 2015.

227. A review of "Matrices and their Kirchhoff graphs" by J. Fehribach. Completed in November 2015.

228. A review of "Ordered Ramsey theory and track representations of graphs" by K. Mitans, D. Stolee, and D. West. Completed in November 2015.

229. A review of "The double competition hypergraph of a digraph" by J. Park and Y. Sano. Completed in November 2015.

230. A review of "Distance k-domination, distance k-guarding, and distance k-vertex cover of maximal outerplanar graphs" by S. Dantas and D. Rautenbach. Completed in November 2015.

231. A review of "Hadwiger's Conjecture for inflations of 3-chromatic graphs" by C. Casselgren and A. Pederson. Completed in December 2015.

232. A review of "On isomorphism classes of generalized Fibonacci cubes" by J. Azarija, S. Klavzar, J. Lee, and J. Pantone. Completed in December 2015.

233. A review of "On the geometric Ramsey numbers of trees" by P. Gao. Completed in January 2016.

234. A review of "Partial list coloring of certain graphs" by J. Jansen, R. Mathew, and D. Rajendrapased. Completed in February of 2016.

235. A review of "Rainbow tetrahedra in Cayley graphs" by I. Dejter. Completed in February 2016.

236. A review of "The crossing number of chordal ring networks" by M. Imran and M. Salman. Completed in February 2016.

237. A review of "Bipartite minors" by M. Chudnovsky, G. Kalai, E. Nevo, and I. Novik. Completed in March 2016.

238. A review of "Positive graphs" by O. Camarena, E. Czoka, T. Hubai, G. Lipper, and L. Lovasz. Completed in March 2016.

239. A review of "Polynomial-time algorithms for subgraph isomorphism in small graph classes of perfect graphs" by M. Konagaya, Y. Otachi, and R. Vehara. Completed in March 2016.

240. A review of "Edge routing with ordered bundles" by S. Pupyrev, L. Nachmanson, S. Bereg, and A. Holroyd. Completed in April 2016.

241. A review of "On the length of a random minimum spanning tree" by C. Cooper, A. Frieze, N. Ince, S. Janson, and J. Spencer. Completed in April 2016.

241-134.

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MICHAEL J. DEKKER, Ph.D.

(231) 591-2566 (office)
(616) 452-4717 (home)
(616) 648-2015 (cell)

Department of Mathematics
Ferris State University
Big Rapids, MI 49307

dekkerm@ferris.edu

EDUCATION

Ph.D. Mathematics, University of Notre Dame — 2004

M.S. Mathematics, University of Notre Dame — 2000

B.S. Mathematics (Honors) and Physics, Calvin College, Grand Rapids, Michigan — 1998

TEACHING

Ferris State University

Professor of Mathematics — 2012 – present
Associate Professor of Mathematics — 2006 – 2012
Assistant Professor of Mathematics — 2003 – 2006

Courses Taught (special delivery methods noted):

- MATH 110 – Beginning Algebra
- MATH 115 – Intermediate Algebra
- MATH 117 – Contemporary Mathematics (online)
- MATH 120 – Trigonometry
- MATH 126 – Algebra and Analytic Trigonometry (online)
- MATH 135 – Calculus for the Life Sciences
- MATH 216 – Applied Calculus
- MATH 220 – Calculus and Analytic Geometry
- MATH 314 – Probability (via ITV and Tegrity)
- MATH 317 – Geometry for Teachers
- MATH 318 – Statistics and Probability for Teachers
- MATH 322 – Linear Algebra (via ITV)
- MATH 324 – Fundamental Concepts of Mathematics
  (via ITV, Tegrity, and developed online)
- MATH 325 – College Geometry
  (via ITV, Tegrity, and developed online)
- MATH 326 – Discrete Mathematics for Teachers
- MATH 397 – Independent Study in Topology (twice, 7 students total)
- MATH 397 – Complex Analysis (4 students)
- MATH 420 – Abstract Algebra (via Tegrity)
- MATH 430 – Advanced Calculus

University of Notre Dame

Instructor and Teaching Assistant, Mathematics Department — 1999 – 2003
Instructor, Balfour-Hesburgh Scholars Program — 2001 – 2003

PRESENTATIONS

"It's Knot Theory!" — Feb 2012
Mathematics Department Colloquium, Ferris State University

"Highlights from the First 150 Problems of the Week" — Sept 2011
Mathematics Department Colloquium, Ferris State University

"Non-Euclidean Geometry" — April 2011, 2013, 2014
MATH 325 (guest lecturer)

"Tegrity" — Oct 2010
Mathematics Department Colloquium, Ferris State University

"The United States of Mathematics Presidential Debate" – Coordinator Mathematics Department Colloquium, Ferris State University	Dec 2009
"Pi vs. e Debate" – Coordinator Mathematics Department Colloquium, Ferris State University	Nov 2008
"Squaring the Square"	
Mathematics Department Colloquium, Calvin College	March 2011
Ferris State Math Club Colloquium	Nov 2009
Michigan Section Meeting of the MAA, Grand Valley St. Univ.	May 2008
Mathematics Department End of the Year Party	April 2008
"Common Exam Experience" Mathematics Department Colloquium, Ferris State University	Feb 2007
"College Geometry as an Online Course"	
Michigan Section Meeting of the MAA, Calvin College	May 2006
Mathematics Department Colloquium, Ferris State University	Feb 2006
"A Brief Tour of Topology" Mathematics Department Colloquium, Ferris State University	Nov 2004
"Manifold Mania" Mathematics Department Colloquium, Calvin College	Feb 2003

SERVICE ACTIVITIES

Mathematics Department:	
Scheduling Committee	2005 – present
Chair	2010 – present
Tenure Committee for J. Trouba (Chair)	2009 – 2014
Tenure Committee for V. Piercey	2013 – present
Tenure Committee for D. McClendon	2013 – present
Course Committees: Elementary Education, Theoretical	2005 – present
Quantitative Skills Committee	Fall 2006
Designer of Math 317, New El. Ed. Geometry Course	Spring 2006
Mathematics Secondary Education Committee	2007 – present
Mathematics Department Head Search Committee	2007 – 2008
Mathematics Faculty Search Committee	2008-09, 2011-12
Faculty Advisor for Math & Actuarial Sciences RSO	2009 – present
Assistant Faculty Advisor for the MATH Challenge	2003 – 2010
Faculty Advisor for the Lower Michigan Math Competition	2005 – 2011
Problem of the Week Founder and Coordinator	2005 – present
SLA Program Participant	2004 – 2006
Author of Numerous Student Reference Letters	2005 – present
Accompany MATH RSO Students to Chicago	Fall 2014, 2015
College of Arts and Sciences	
Pre-pharmacy Program Advisor	2004 – 2014
Faculty Steering Committee for Online Development	2005 – 2006
Special Grants Committee	2007 – present
Chair	2013 – present
Summer Orientation and Registration, Faculty Advisor	2011 – present
Mecosta-Osceloa ISD Math-Science-Technology Center	
Research Project Mentor	Fall 2008
College of Education	
Thesis Committee Member for Master's Degree Student	Spring 2010

PROFESSIONAL MEMBERSHIPS

Mathematical Association of America	2004 – present
National Council of Teachers of Mathematics	2010 – 2013

PROFESSIONAL ACTIVITIES (since 2006)

Blackboard Learn Training	Oct 2011
Conversations Among Colleagues, Grand Valley State University	Feb 2011
Michigan Undergraduate Mathematics Conference	
Grand Valley State University	Oct 2010
Wayne State University	Oct 2009
MathFest 2008, Madison, WI	July 2008
Meeting of the Michigan Section of the MAA, Grand Valley St. Univ.	May 2008
FerrisConnect Training	Feb 2008
Meeting of the Michigan Section of the MAA, UM-Dearborn	May 2007
Meeting of the Michigan Section of the MAA, Calvin College	May 2006
Learning Outcomes Assessment Workshop	Spring 2006

HONORS AND AWARDS

Semi-Finalist for the Distinguished Teacher Award	Spring 2009
Awarded Tenure	Fall 2008
Certified Online Instructor – Level 3	Spring 2007
Honors Senior Sendoff Banquet (invited by a student as a most influential professor)	2007, 2013
Outstanding Graduate Student Teacher Award for Excellence in Teaching, Kaneb Center for Teaching and Learning, University of Notre Dame	2001
William J. Rinck Memorial Prize in Mathematics, Calvin College	1998

Hengli Jiao, Ph.D.
Department of Mathematics
Ferris State University
Big Rapids, MI 49307
jiaoh@ferris.edu
(231) 591-2825

Curriculum Vitae

EDUCATION

Ph. D., Applied Mathematics, August 1996, Michigan State University, East Lansing, MI

M. S., Computational Mathematics, July 1988, Dalian University of Technology, Dalian, China

B. S., Applied Mathematics, 1985, Dalian University of Technology, Dalian, China

TEACHING

August 2010-Present

Professor of Mathematics, Ferris State University, Big Rapids, MI

Utilized creative teaching strategies

- Develop online mathematics courses.
- Encourage collaborative teaching and learning.
- Implement instruction in a way to balance traditional and technological methods.

Strengthened the Existing Courses

- Utilized technology to enhance students' learning in all my classes
- Developed supplemental material for students.

Courses Taught in the last four years

- Analytical Geometry-Calculus I and III, Contemporary Mathematics, and Fundamental of Algebra, Fall 2014
- Analytical Geometry-Calculus I and III, Applied Calculus, and Fundamentals of Algebra, Fall 2013
- Analytical Geometry-Calculus I and III, Applied Calculus, and Intermediate Algebra, Spring 2013
- Contemporary Mathematics Online, and three sections of Fundamental of Algebra, Fall 2012
- Analytical Geometry-Calculus II and III, Pre-calculus, and Contemporary Mathematics Spring 2012
- Linear Algebra, Analytical Geometry-Calculus II, and two sections of Contemporary Mathematics , Fall 2011
- Analytical Geometry-Calculus II and two sections of Contemporary Mathematics, Spring 2011
- Analytic Geometry and Calculus II, Pre-Calculus, and Contemporary Mathematics, Fall 2010
- Analytic Geometry and Calculus II and two sections of Fundamental of Algebras Spring 2010.

August 2005-2009

Associate Professor of Mathematics, Ferris State University, Big Rapids, MI

August 2001- August 2005

Assistant Professor of Mathematics, Ferris State University, Big Rapids, MI

August 1996 – July 2001

Assistant /Associate Professor of Mathematics, Jackson State University, Jackson, MS

January 1991 – August 1996

Teaching Assistant, Department of Mathematics, Michigan State University, E. Lansing, MI

SCHOLARLY ACTIVITIES

Publications and Presentations

- **Recent Development on Existence of Solutions to Nonlinear Wave Equations,** Department of Mathematics, Michigan State University, MI, May 14, 2013.
- **Undergraduate Research in A Teaching Institution, American Association of Mathematics Michigan Sectional Meeting**, Saginaw State University, MI, May 4, 2012.

- **Asymptotic Behavior Solutions of Semilinear Wave Equations**, Notre Dame University, Notre Dame, IN, November 5-7, 2010
- **What Can We Do for Our Students: An Overview of a NSF Funded Project**, Mathematics Colloquium, Ferris State University, October 22, 2009.
- **Online, Hybrid, or Traditional: An Experience in Teaching Contemporary Mathematics,** 8th Annul Lilly Conference on College and University Teaching, September 18-21, 2008, Traverse City, MI.
- **View Primary and Secondary Mathematics Educations in China through Examinations,** Mathematics Colloquium, Ferris State University, March 27, 2008.
- **Liberal Arts Mathematics Online, Mathematics Colloquium**, Ferris State University, September 21, 2006.
- **The WebWork Homework System, Mathematics Colloquium**, Ferris State University, April 21, 2005.
- **An Elementary Proof of Blow-up of Solutions for Semilinear Wave Equations in High Space Dimensions,** Journal of Differential Equations 189 (2003) 355-365.
- **Existence of a Global Solution to Semilinear Wave Equations in Five Space Dimensions, J. Math. Res. Exposition**, Vol 22, (2002) No. 3, 351-367.
- **Global Existence and Blow-up for Semilinear Wave Equations in High Space Dimensions, Mathematics Colloquium**, Ferris State University, November 27, 2001.
- **Enhancing College Algebra Instruction, 962nd AMS, New Orleans**, Louisiana, January 10-13, 2001.
- **Blow-up of Solutions for Semilinear Wave Equations in Higher Dimensional Spaces**, 935th American Mathematical Society, DePaul University, September 12-13, 1998.
- **Blow Up of Solutions for Nonlinear Wave Equations in High Dimensions**, 926th American Mathematical Society, Georgia Institute of Technology, October 17-19, 1997.
- **Several Proximinal Problems in Banach Spaces**, J. Math. Res. Exposition 10 (1990) No.1 221-226.
- **Approximation in Linear Topological Spaces**, J. Dalian Univ. Tech.28 (1988) No. 1, 107-110.
- **Best approximation in C(X, Y),** Proceedings of the Fourth Conference in Theory of Approximation, Zhengzhou, 1987, 50-55.

Conferences and Workshops on Teaching and Research

- **On Course Workshop**, Kirtland Community College, Roscommon, MI, August 11-13, 2014
- **Creating Environments that Engage, Inspire and Retain STEM Students,** Central Michigan University, Mount Pleasant, MI, March 22, 2014
- **Mathematica Virtual Workshops,** November, 2013
- **Lilly Conference Series on College and University Teaching and Learning,** Traverse City, MI, October 17-20, 2013
- **FerrisConnect Training Sessions,** Ferris State University, Fall Semester, 2012
- **Workshop on Modeling Early and Often in Undergraduate Calculus**, MAA Professional Enhancement Program, Calvin College, Grand Rapids, MI, July 9-13, 2012
- **The 4th Annual Scholarship of Teaching & Learning Academy Collaborative Engagement,** Grand Valley State University, Grand Rapids, Michigan, May 20-22, 2012.
- **Retention Summit,** Ferris State University, August 22-25, 2011
- **Instructional Technology Learning Training Sessions on Tegrity,** Ferris State University, Spring Semester, 2011
- **Exemplary Online Course Awards Orientation, Faculty Development Workshop** held by Faculty Center for Teaching and Learning, June 1, 2009.
- **8th Annual Lilly Conference on College and University Teaching,** September 18-21, 2008, Traverse City, MI.

- **Teaching Strategies That Produce Long-Term Learning**, Faculty Development Workshop held by Faculty Center for Teaching and Learning, June 10-11, 2008.
- **Smart Sympodium IT Learning Activity**, Faculty Development Workshop held by Faculty Center for Teaching and Learning, March 26, 2008.
- **33rd American Mathematical Association of Two-Year College**, November 1-4, 2007, Minneapolis, MN.
- **FerrisConnect: A Two-Day Intensive Workshop**, Faculty Development Workshop held by Faculty Center for Teaching & Learning, May 10-11, 2007.
- **32nd American Mathematical Association of Two-Year College**, November 1-4, 2006, Cincinnati, OH.
- **Delivering Video and Audio with Flash**, Faculty Development Workshop held by Faculty Center for Teaching & Learning, December 6, 2006.
- **American Mathematical Society Spring Central Sectional Meeting**, Notre Dame, IN, April 8-9, 2006.
- **Learner-Centered Teaching: A Three-day workshop**, Faculty Development Workshop held by Faculty Center for Teaching & Learning, May 16-18, 2006.
- **Respondus 3.5 Training Workshop**, May 9, 2006.
- **Designing and Developing Courses for Online Delivery**, Faculty Development Workshop held by Faculty Center for Teaching & Learning, January 3-5, 2006 , Ferris State University.
- **31st American Mathematical Association of Two-Year College**, November 10-13, 2005, San Diego, CA.
- **American Mathematical Society Regional Conference**, October 23-24, 2005 at Northwestern University, Evanston, IL.
- **Mathematical Association of America Michigan Sectional Annual Meeting**, May 1-2, 2004, at Oakland University.
- **Michigan Mathematical Association of Two Year Colleges Conference**, October 10-11, 2003.
- **The 3rd Annual Lilly-North Conference**, September 19-21, 2003.
- **The 2003 Joint Annual Meeting of the Michigan Section of the Mathematical Association of America and MichMATYC**, the Michigan Mathematical Association of Two Year Colleges, May 2–3, 2003, at Saginaw Valley State University.
- **The 2nd Annual Lilly-North Conference**, September 20-21, 2002 at Ferris State University.
- **Ferris Faculty Transition Workshops**, Fall 2001.

Other Activities

- **Advance Placement Calculus Reading,** sponsored by the Educational Testing Services, Kansas City, MO, June 2010, 2011, 2012, 2013, 2014
- **Academic Advising for Student Success Seminars,** Faculty Development Workshop held by Faculty Center for Teaching and Learning, September 27, 2012.
- **Grant Proposal Reviewer for the National Science Foundation,** the National Science Foundation, Arlington, VA, September 2011

GRANTS

- **Faculty Development Grant: Enhance Multivariable Calculus Teaching with Mathematica,** $5,350 funded by the Office of Academic Senate, Ferris State University, December 2013
- **Faculty Research Grant: Nonlinear Wave Equations: Asymptotic Behavior Solutions,** $6,040 funded by the Office of Academic Senate, Ferris State University, April 2012
- **Dean's Initiative Grant: Develop a proposal to seek fund from the National Science Foundation STEM program,** $1,500 funded by the Dean of College of Arts and Science, Ferris State University, October 2011.
- **Scholarships in Science, Technology, Engineering, and Mathematic at Ferris State University,** $499,968 funded by the National Science Foundation, December, January, 2007-June, 2011.

- **Dean's Initiative Grant: Develop a proposal to seek fund from the National Science Foundation STEP program**, $1,500 funded by the Dean of College of Arts and Science, Ferris State University, October 2008.
- **Ferris Exceptional Merit Grants: Web Homework Assessment System**, $2,500 funded by the Ferris Foundation, May 2005.
- **Faculty Research Grant: Existence of Periodic Solutions for Nonlinear Wave Equations**, $4,890 funded by the Office of Academic Senate, Ferris State University, April 2005.
- **Faculty Teaching and Learning Center Timme Grants**, $800 a piece funded Faculty Teaching and Learning Center, 2005, 2006, and 2007.
- **Dean's Initiative Grant: Improving Mathematics Learning for STEM Disciplines**, $1,000 funded by the Dean of College of Arts and Science, Ferris State University, October 2004.
- **Faculty Professional Development Grant: Pioneering the Computer Homework Assessment System**, $1,500 funded by the Office of Academic Senate, Ferris State University, April 2004.
- **Dean's Initiative Grant: A Proposal on Course, Curriculum, and Laboratory Improvement to the National Science Foundation**, $1,000 funded by the Dean of College of Arts and Science, Ferris State University, June 2003.
- **Faculty Grant Development Fund, $600 funded by the Office of the Vice President for Academic Affairs**, Ferris State University, May 2003.
- **Faculty Professional Development Grant: Promoting Mathematics Teaching and Research through Faculty Development Activities**, $1,500 funded by the Office of Academic Senate, Ferris State University, April 2003.
- **Faculty Research Grant: Asymptotic Behavior and Global Existence of Nonlinear Wave Equations**, $1,980 funded by the Office of Academic Senate, Ferris State University, April 2003.
- **Dean's Initiative Grant: Developing a Proposal to Seek CSEM Scholarships from the National Science Foundation**, $1,000 funded by the Dean of College of Arts and Science, Ferris State University May 2002.
- **Mathematics Instructions Using Dynamic Computer Technology**, $148,000 funded by the Department of Education, July 2000.
- **A Study on On-line Testing Using Internet Technology for Teaching and Learning Statistics**, $10,000 funded by Mississippi Urban Research Center, May 2000.

SERVICE

- A member of the University Student Fee Committee. 2009-present
- A member of the College Diversity Committee, 2007- present
- A member of the College Academic Standards and Policies, 2011-present
- A member of Academic Senate, 2012-2014
- A member of Academic Program Review Committee, 2011-2012
- A member of the College Promotion Committee, 2010-2013
- A member of the Department Head Search Committee, 2007
- The Chair of the Departmental Planning Committee 2006- 2008
- A member of the College Planning Committee 2006-2008
- A member of the Faculty Search Committee two times, 2006-2008
- Participated in the First Impression to help new students learn the campus, 2006 Fall
- Participated in the General Dawg Days to recruit prospective students, 2006-present.
- A member of President's Grant Task Force Committee, 2005-2006
- Advisor for Pre-Pharmacy Students, 2002-present
- A member of departmental committees such as Planning Committee, Applied Division Committee, Core Course Committee, and theoretical committees (2010-present)

Curriculum Vitae **David M. McClendon**

Academics

University of Maryland at College Park
Ph.D. in Mathematics, May 2006
Dissertation title: *Orbit discontinuities and topological models for Borel semiflows*
Advisor: Daniel J. Rudolph

University of North Carolina at Chapel Hill
B.S. with Highest Honors in Mathematics, May 2000
Undergraduate thesis title: *A study of the dynamics of a family of quadratic rational maps and its corresponding parameter space*
Advisor: Jane M. Hawkins

Professional Experience

Associate Professor Ferris State University (Fall 2015-present)
Assistant Professor Ferris State University (Fall 2012-Spring 2015)
Courses taught:
- Math 116 (Intermediate Algebra-Numerical Trigonometry)
- Math 120 (Trigonometry)
- Math 216 (Applied Calculus)
- Math 220 (Calculus I)
- Math 230 (Calculus II)
- Math 322 (Linear Algebra)
- Math 330 (Differential Equations)
- Math 414 (Mathematical Statistics I)
- Math 416 (Mathematical Statistics II)
- Math 417 (Problem Solving for Actuarial Exam P)
- Math 430 (Advanced Calculus)

Visiting Assistant Professor Swarthmore College (Fall 2010-Spring 2012)
Courses taught:
- Math 25 (Calculus II)
- Math 26 (Intensive Calculus II)
- Math 28S (First-Year Honors Seminar in Linear Algebra)
- Math 53 (Topics in Analysis - Dynamics, Chaos and Fractals)
- Math 63 (Real Analysis)

Boas Assistant Professor Northwestern University (Fall 2007-Spring 2010)
Lecturer Northwestern University (Fall 2006-Spring 2007)
Courses taught:
- Math 105-6 (Freshman Seminar - Philosophy of Mathematics)
- Math 202-0 (Finite Mathematics)
- Math 230-0 (Differential Calculus of Functions of Several Variables)
- Math 291-1 (MENU (Honors) Linear Algebra and Multivariable Calculus)
- Math 310-1,2,3 (Probability and Stochastic Processes I, II, III)
- Math 364-0 (Game Theory)

Professional Experience (Continued)

Teaching Assistant University of Maryland (Fall 2000-Spring 2006)
Courses taught:
- Math 110 (Finite Mathematics)
- Math 113 (College Algebra)
- Math 113T (College Algebra with Trigonometry)
- Math 115 (Precalculus)
- Math 211 (Topics in Geometry and Probability for Elementary Education Majors)

Teaching assistant for the following courses:
- Math 141 (Calculus II)
- Math 406 (Number Theory)
- Math 461 (Linear Algebra for Scientists and Engineers with MATLAB)
- Math 730 (Topology)
- Math 734 (Algebraic Topology)

Adjunct Instructor Colorado State University (Spring 2005)
Taught Math 160 (Calculus for Physical Scientists and Engineers I)

Substitute Teacher Polk County Public Schools, Bartow, FL (Summer 2000)
Taught high-school geometry full-time to summer school students

Tutor UNC-Chapel Hill Mathematics Department (Fall 1998-Spring 2000)
Tutored students in Calculus I, Calculus III, and Abstract Algebra

Tutor UNC-Chapel Hill Peer Tutoring Program (Fall 1998)
Tutored students in Trigonometry and Calculus

Research Interests

Ergodic theory and dynamical systems, in particular: symbolic dynamics and ergodic theory of amenable group actions; descriptive dynamics of semigroup actions; equivalence relations in ergodic theory; cocycles and group extensions; and complexity issues in ergodic Ramsey theory

Publications

- (with A.S.A. Johnson) **Speedups and orbit equivalence of finite extensions of ergodic $\mathbb{Z}^d$-actions**, *New York J. Math.* 21 (2015) 1371-1387.
- (with A.S.A. Johnson) **Speedups of ergodic group extensions of $\mathbb{Z}^d$-actions** *Dyn. Syst.* 29 (2014), 255-284.
- **An Ambrose-Kakutani representation theorem for countable-to-1 semiflows** *Discrete Contin. Dyn. Syst. Ser. S* 2 (2009), 251-268.
- **Continuity of conditional measures associated to measure-preserving semiflows** *Trans. AMS* 361 (2009), 331-341.
- **A study of the dynamics of a family of quadratic rational maps and its corresponding parameter space** UNC-Chapel Hill Undergraduate Honors Thesis (2000), cited in lit.

Undergraduate Research Projects and Independent Studies Directed

- Advising **Allie Wicklund**, Ferris State University undergraduate, on her undergraduate research project "A density-dependent sex-age model for white-tailed deer population incorporating annual harvest" (2016)
- Directed the independent study of **Allie Wicklund**, Ferris State University undergraduate, in "Mathematical biology" (2015)
- Directed the senior honors symposium of **Andrew Elenbaas**, Ferris State University undergraduate, on "The hot-hand fallacy" (2015)
- Directed the independent study of **Jaime Mullen**, Ferris State University undergraduate, in "Introduction to Measure Theory" (2014)
- Advised **Tyler George**, Ferris State University undergraduate, on his undergraduate research project "*E*-ergodicity and speedups of ergodic systems" (2014) (this paper appeared in *Rose-Hulman Undergraduate Mathematics Journal* **16** (2015))
- Directed the independent study of **Mickelle Bradley** and **Jaime Mullen**, Ferris State University undergraduates, in "Topics in Real Analysis" and on their poster presentation "The Raindrop Function: Looks can be Deceiving" (2014)
- Directed the independent study of **Joel McGorman**, Ferris State University undergraduate, in "Advanced Calculus II" (2013)
- Advised **Steve Crow** and **Tyler George**, Ferris State University undergraduates, on their colloquium talk and poster presentation "Dyamical systems and chaos" (2013)
- Advised **Yuwen Wang**, Swarthmore College undergraduate, on her summer project "A new approach to computing Weyl complexity" (2012)
- Advised **Keith Goldner**, Northwestern University undergraduate, on his thesis "A Markov model of American football" (2010) (this paper appeared in *Journal of Quantitative Analysis in Sports* 8 (2012))

Honors, Grants and Fellowships

Teaching-related:

- Ferris Foundation Exceptional Merit Grant "Student-centered, technology-based reform in calculus" (2013)
- Winner, Northwestern University Department of Mathematics Excellence in Teaching Award (2010)
- Nominated for University of Maryland Excellence in Teaching Award (2001, 2002, 2004)
- UNC-Chapel Hill Math Tutor of the Year (1999 and 2000)

Research-related:

- Jacob Timme Travel Grants (2015, 2013, 2012)
- Swarthmore College Research Grant (2011)
- Research Member, Mathematical Sciences Research Institute (2009)
- Winner, Monroe Martin Prize, University of Maryland Spotlight on Graduate Research Competition (2005)
- Jacob K. Goldhaber Travel Grant (2005)
- University of Maryland VIGRE Travel Grant (2004, 2005)
- University of Maryland Mathematics Department Fellowship (2002-2004)
- University of Maryland Graduate School Fellowship (2000-2002)
- Alfred Brauer Prize for excellence in Algebra and Number Theory (2000)

Lectures and Invited Talks

- AMS-MAA Joint Meetings-Special Session on Inquiry Based Teaching and Learning, Seattle, January 2016
- AMS Fall Central Section Meeting-Special Session on Ergodic Theory and Symbolic Dynamics of Amenable Group Actions, Chicago, October 2015
- Colloquium, Hope College, March 2015
- Pingree Park Dynamics Workshop, Fort Collins, CO, July 2014
- AMS-MAA Joint Meetings-Special Session on Ergodic Theory and Symbolic Dynamics, Baltimore, January 2014
- AMS Spring Southeastern Section Meeting-Special Session on Ergodic Theory and Fractal Geometry, Oxford, MS, March 2013
- Luncheon Speaker, Ferris State University Honors Program, November 2012
- Seminar, Oxford College of Emory University, February 2012
- Colloquium, Muskingum College, January 2012
- Colloquium, Ferris State University, January 2012
- AMS-MAA Joint Meetings, Boston, January 2012
- Guest Lecture, Delta Sigma Pi Business Fraternity, Northwestern University, April 2010
- Colloquium, Swarthmore College, March 2010
- Analysis Seminar, Luther College, January 2010
- Joint Meeting of the AMS and Korean Mathematical Society-Special Session on Ergodic Theory and Dynamical Systems, Seoul, December 2009
- Northwestern Undergraduate Math Society, October 2009
- Logic Seminar, University of Illinois at Chicago, April 2009
- Northwest Dynamics Symposium, Victoria, August 2008
- AMS Fall Central Section Meeting-Special Session on Ergodic Theory and Symbolic Dynamical Systems, Chicago, October 2007
- Joint Meeting of the AMS and Polish Mathematical Society-Special Session on Ergodic Theory and Topological Dynamics, Warsaw, August 2007
- Analysis Seminar, DePaul University, February 2007
- AMS-MAA Joint Meetings, New Orleans, January 2007
- AMS Fall Central Section Meeting-Special Session on Ergodic Theory, Cincinnati, October 2006
- Dynamical Systems Seminar, Northwestern University, October 2006
- Graduation Conference, University of Maryland, April 2006
- Maryland-Penn State Semi-Annual Workshop in Dynamical Systems, March 2006
- VIGRE Research Interaction Team in Symbolic Dynamics, University of Maryland, February 2006
- Canadian Mathematical Society Winter Meeting, Victoria, December 2005
- University of Maryland Spotlight on Graduate Research Competition, November 2005

Conferences and Summer Schools Attended

- MAA Michigan Section Meeting, Hillsdale College, April 2016
- AMS-MAA Joint Mathematics Meetings, Seattle, January 2016
- Gamma Iota Sigma International Conference, Rosemont, IL, October 2015
- AMS-MAA Fall Central Section Meeting, Chicago, October 2015
- MAA Michigan Section Meeting, Hope College, April 2015
- Pingree Park Dynamics Workshop, Fort Collins, CO, July 2014
- AMS-MAA Joint Mathematics Meetings, Baltimore, January 2014
- AMS Spring Southeastern Section Meeting, Oxford, MS, March 2013
- Michigan Undergraduate Mathematics Conference, Adrian, MI, February 2013
- Williams College Ergodic Theory Conference, July 2012
- AMS-MAA Joint Mathematics Meetings, Boston, January 2012
- MAA Eastern Pennsylvania and Delaware Section Meeting, Bryn Mawr, November 2011
- AMS-MAA Joint Mathematics Meetings, New Orleans, January 2011
- Oxtoby Centennial Conference, Bryn Mawr, October 2010
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, April 2010
- AMS-MAA Joint Mathematics Meetings, San Francisco, January 2010
- Joint Meeting of the American Mathematical Society and the Korean Mathematical Society, Seoul, December 2009
- Midwest Dynamical Systems Workshop, Chicago, November 2009
- Pingree Park Dynamics Workshop, Fort Collins, CO, August 2009
- Dynamical Systems and Randomness, IHP, Paris, May 2009
- Discrete Rigidity Phenomena in Additive Combinatorics, MSRI, November 2008
- Introduction to Ergodic Theory and Additive Combinatorics, MSRI, August 2008
- Northwest Dynamics Symposium, Victoria, August 2008
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2008
- AMS Fall Central Section Meeting, Chicago, October 2007
- Joint Meeting of the American Mathematical Society and the Polish Mathematical Society, Warsaw, August 2007
- Clay Mathematics Institute Summer School: Homogeneous Flows, Moduli Spaces and Arithmetic, Pisa, June 2007
- Workshop on "Set theory and the reals", University of Florida, May 2007
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2007
- AMS-MAA Joint Mathematics Meetings, New Orleans, January 2007
- AMS Fall Central Section Meeting, Cincinnati, October 2006
- BIRS Workshop on Measurable Dynamics, Theory and Applications, Banff, August 2006
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2006
- AMS-MAA Joint Mathematics Meetings, San Antonio, January 2006
- Canadian Mathematical Society Winter 2005 Meeting, Victoria, December 2005

Conferences and Summer Schools Attended (continued)

- Semi-annual Workshop in Dynamical Systems and Related Topics, Pennsylvania State University, October 2005
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2005
- Semi-annual Workshop in Dynamical Systems and Related Topics, Pennsylvania State University, October 2004
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2004

Service Activities

Department-level service activities:

- Hiring Committee, Mathematics tenure-track search, Ferris State University (2013-14, 2014-15)
- Mathematics Department Assessment Committee, Ferris State University (2012-present)
- Mathematics Department Core and Theoretical Division Committees, Ferris State University (2012-present)
- Conducted workshop series on the use of *Mathematica* as a teaching tool, Ferris State University (2013)
- Organized and conducted summer study sessions for Actuarial Exam P/1, Ferris State University (2013)
- Member, committee to develop proposal for new actuarial science major, Ferris State University (2013)
- First-year Mathematics Placement Advisor, Swarthmore College (2011-2012)
- MAA Liasion, Swarthmore College (2010-2011)
- Sponsor, 2010 Northwestern University COMAP Mathematical Contest in Modeling Team (team was selected Meritorious Winner)
- Organizer, Northwestern University Dynamical Systems Seminar (2007-2010)
- Interviewed candidates for Strauss Undergraduate TA Positions, Northwestern University (2008-2010)
- Organizer of inaugural University of Maryland Graduation Conference (2006)
- Student Helper at Maryland-Penn State Workshops on Dynamical Systems and Related Topics (2002-2006)
- Mentored undergraduate and beginning graduate students in Research Interaction Teams, University of Maryland (2002-2005)

College-level service activities:

- Planning Committee, College of Arts and Sciences, Ferris State University (2014-present)
- Undergraduate Academic Advisor, College of Arts and Sciences, Ferris State University (2013-present)
- Freshman Advisor, Weinberg College of Arts and Sciences, Northwestern University (2007)

Service Activities (continued)

University-wide service activities:

· Academic Affairs Assessment Committee, Ferris State University (2016-present)

· Professional Development Committee, Ferris State University (2015-present)

· Risk Management and Insurance Program Advisory Board, Ferris State University (2013-present)

· Faculty Sponsor, Gamma Iota Sigma actuarial science, risk management and insurance fraternity, Ferris State University (2012-present)

· Sponsor, Swarthmore College Bridge Club (2010-2012)

Service to the profession:

· Local Organizing Committee, 2017 MAA Michigan Section Meeting (2015-present)

· Referee for journals including *Annals of Probability, Memoirs of the AMS, Transactions of the AMS, Discrete and Continuous Dynamical Systems, PRIMUS* (2007-present)

Professional Memberships

· American Mathematical Society

· Mathematical Association of America

· Pi Mu Epsilon Honorary Mathematics Fraternity

· Sigma Xi Honorary Scientific Research Society

Erin Militzer, Ph.D. — Ferris State University

Contact Information

Erin R. Militzer
820 Campus Drive, ASC 2042
Big Rapids, MI 49307

Cell: (269) 598-6948

E-mail: militze@ferris.edu

Appointments

- Assistant Professor of Mathematics - Ferris State University - August 2014 to Present
- Assistant Professor of Mathematics - Bloomsburg University of Pennsylvania (2013-2014)
- Faculty Advisor for a NSF Research Experience for Undergraduates – Central Michigan University – Mount Pleasant, MI Topic: The Game of Cops and Robber on Graphs - Summer 2012
- Teaching Postdoctoral Fellow - University of Arizona - 2010-2013

Education

- Ph.D. Mathematics, University of Kentucky, May 2010
  "L^p Bounded Point Evaluations for the Polynomials and Uniform Rational Approximation" Advisor: J.E. Brennan
- M.A. Mathematics, University of Kentucky, May 2006
- B.S. Mathematics, Cum Laude, Central Michigan University, May 2004

Publications and Future Publications

- "Numerical ranges of 4-by-4 nilpotent matrices: flat portions on the boundary", with L. J. Patton, I.M. Spitkovsky, and M.-C. Tsai, Operator Theory Adv. Appl., accepted May 2016.
- Erin Militzer and Mehdi Razzaghi. *Basic Statistics (2nd edition)*. Kendall Hunt Publishing Company. Published 2016.
- Erin Militzer and Victor Piercey, "An Inquiry-Based Quantitative Reasoning Course for Business Students," PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, Special Issue: Inquiry-Based Learning in First-Year and Second-Year Courses, submitted June 2015.
- J.E. Brennan and E.R. Militzer, "L^p Bounded Point Evaluations for the Polynomials and Uniform Rational Approximation," Algebra and Analysis, St. Petersburg Math J., Vol 22 (2011), No. 1, p. 41-52.
- C. Berkesh, J. Ginn, E. Haller and E.R. Militzer, "A Survey of Relative Difference Sets," Rose Hulman Institute of Technology Undergraduate Math Journal, Volume 4, Issue 2, 2003.

Courses Taught

* online or hybrid

Graduate

- Algebra for Elementary & Middle School Teachers - Fall 2012*
- Algebra for Elementary and Middle School Teachers - Spring 2012
- Research on the Learning of Mathematics, Co-taught with Rebecca McGraw -Fall 2011

Upper Division

- Mathematics Concepts I and/or II (Elementary Education) - Fall 2013, Spring 2014, Fall 2014, Spring 2015, Fall 2015
- Linear Algebra Matrix Theory - Fall 2012

- Formal Mathematical Reasoning and Writing - Summer/Fall 2011
- Theory of Complex Variables - Spring 2011
- Understanding Elementary Mathematics - Spring 2011, Fall 2010
- Linear Algebra Matrix Theory, MA 322 - Spring 2009

Lower Division and Recitation

- Quantitative Reasoning for Education (Math 190) - Fall 2015, Spring 2016
- Quantitative Reasoning for Business (Math 190) - Spring 2015
- Precalculus (Math 130) - Fall 1014, Fall 2015, Spring 2016
- Mathematical Thinking (Liberal Arts) - Fall 2013
- Basic Statistics - Spring 2012/Summer 2013*/Fall 2013/Spring 2014
- Calculus I - Fall 2010, Spring 2016
- College Algebra - Spring 2010/Summer 2010/Fall 2009/Fall 2005
- Third Semester Calculus - Fall 2008
- Math Excel - Workshop Leader - www.mathexcel.org - Spring 2008/Fall 2007
- Recitation Leader - Calculus I & III - Spring 2005/Fall 2004

Teaching Fellowships, Training and Special Assignments

- Intel Math Instructor at Mecosta-Osceola Math/Science Center - July 2016 to July 2017
- Certified Intel Math Instructor as of Summer 2015 -Website
- Project NExT Fellow: 2010-2011 - Professional Development for recent Ph.D's - Website
- Algebra Cubed Fellow (2006-2007)
  NSF funded GK-12 fellowship at the University of Kentucky where graduate students created lessons and team taught with rural middle and high school mathematics teachers to improve the quality of mathematics education. I taught at Powell County Middle School in Stanton, KY. www.ms.uky.edu/algebracubed

Research and Programs

Mentoring

- Student Research Fellowship Mentor - Advisee Eleanor Ohm - Summer 2015
- Student Teacher University Supervisor for Ferris State University - Spring 2015
- Graduating Scholars Alumni Mentor (NSF DUE-1356253) for the University of Kentucky Mathematics Department. (2014-2019) https://math.as.uky.edu/gsm
- Enhancing Diversity in Graduate Education(EDGE), Pomona College Graduate Student Mentor, www.edgeforwomen.org, (Summer 2008)

Mathematical Programs – Participant

- AIM Workshop: Research Experience for Undergraduate Faculty, Summer 2011
- IBL Workshop, University of Michigan, May 21 - 25, 2011
- CaMeW: Career Mentoring Workshop for Women in Mathematics, Wheaton College, July 26-28th, 2009.
- EDGE Program, Spelman College, (Summer 2004).
  - A month long program for women ju[]CV2015.pdf st starting graduate school with intense instruction in both Algebra and Analysis. This program enhances efforts to keep women of all backgrounds in graduate school. It includes mentors of various states in graduate school and faculty members.
- NSF Research Experience for Undergraduates at Central Michigan University Summer 2003 and Summer 2002.

Awards and Honors

- Teaching and Service Award Recipient, University of Arizona, Spring 2012
- Arts and Sciences Certificate for Outstanding Teaching Award, 2008-2009
- University of Kentucky - Emeritus Faculty Fellowship Recipient, 2008-2009
- Richtmeyer-Foust, Whitmore Award Finalist, Central Michigan University – 2004

Departmental, College and University Committees

- MAA Regional Meeting Comittee Chair for the 2017 Regional Meeting
- Scheduling Committee, Assessment Committee, Algebra Committee and General Education Commiteee - Mathematics Department - Continuing
- Diversity Committee - College of Arts and Sciences - Fall 2015-Fall 2018
- Faculty Search Committee - Mathematics Department - Fall 2014 to Spring 2015
- Faculty Circles Committee - Chair and Designer - Bloomsburg University - 2013/1014
- Mathematics Curriculum (Mathematics Improvement) Committee - Bloomsburg University - 2013/1014
- Mathematics Education Committee - Bloomsburg University - 2013/1014
- Retention and Recruitment Committee - Bloomsburg University - 2013/1014
- Undergraduate Committee Member - Post Doctoral Representative - University of Arizona - 2012-2013

Professional Development and Other Services

- Certified Math Intel Instructor - Completed training in June 2015.
- New Faculty Transition Program - Fall 2015-Spring 2016
- Student Teacher Supervisor - Spring 2015
- Co-Organizer - MAA Southwestern Sectional Meeting - Tucson, AZ - March 30-31, 2012. Website
- Organizer for the Undergraduate Teaching Assistant program for upper division classes - University of Arizona - Spring 2011
- Graduate Student Orientation Panelist, University of Kentucky, August 21, 2009.
- Organizer of Noetherian Rings, a group designed for women graduate students in the department, University of Kentucky, 2009.
- Co-moderator for panel discussion, EDGE 2009, Spelman College.
- Organizer and moderator, panel discussion for Algebra Cubed initiation luncheon, August 2007.

Panels and Presentations

- "Teaching in Graduate School and Beyond" - Purdue University - June 24, 2016 - Invited Speaker.
- "Innovations in General Education: Quantitative Reasoning for Business." - Ferris State Mathematics Colloquium - April 2015.
- "Using and Contributing to Illustrativemathematics.org: Projects for Your Preservice and Inservice Teachers" - Joint Mathematics Meeting - Baltimore, MD - January 2014
- "How Can STEM Faculty Become Effective in the Advanced Training of Teachers?" - Math Science Partnership Learning Network Conference, January 23-24, 2012
- "Numerical Range of a Matrix" - Undergraduate Teaching Assistant Seminar - November 2011.
- Mathematical Games - Teachers Circle - University of Arizona, April 7th, 2011.
- "L^p Rational Approximation in the Complex Plane," Joint Mathematics Meeting, San Francisco, CA., January 2010.
- Graduate Student Poster, Mathfest 2009, Portland, OR.

- "L^p Bounded Point Evaluations and Uniform Rational Approximation," Joint Mathematics Meeting, Washington D.C., January 2009.
- "The Effects of a K-12 Classroom Experience on Graduate Fellows' Personal Pedagogies," Joint Math Meetings in San Diego, CA in January 2008.
- Presented information about the University of Kentucky Graduate program at The Seventh Annual Michigan Undergraduate Mathematical Conference, October 2004.
- "Randomly Decomposable Graphs in $K_m P_c$," Thirty-fifth South Eastern International Conference on Combinatorics, Graph Theory, and Computing, March 2004.
- "Randomly Decomposable Graphs in $K_m P_c$," Joint Math Meetings, Phoenix, AZ, January 2004.

Conferences

- Great Lakes Conference on Teaching and Learning - Central Michigan University - May 2015
- 2014 Student Success Summit at MSU - http://www.mcca.org/content.cfm?ID=149
- Recreational Mathematics - Museum of Mathematics, NYC - August 2013
- 16th Annual Legacy of R.L. Moore IBL Conference, June 2013
- Math Science Partnership Learning Network Conference, January 23-24, 2012.
- MAA - Math Fest, 2009, 2010 and 2011.
- Career Options for Women in Mathematical Sciences, IMA, April 2-4, 2009
- GK-12 National Conference, Washington D.C., March 2007 and March 2011
- AMS Joint Math Meeting 2005, 2007, 2008, 2009, 2010, 2011 and 2014.

Professional Memberships

- AMATYC
- American Mathematical Society
- Mathematical Association of American
- Association for Women in Mathematics

References

Recent References

- Theodore W. Laetsch, 617 N. Santa Rita Ave, P.O. Box 210089, Tucson, AZ 85721-0089, (520) 621-6860, laetsch@math.arizona.edu
- Jennifer Eli, The University of Arizona, 617 N. Santa Rita Ave, P.O. Box 210089, Tucson, AZ, 85721-0089, (520) 626-9294, jeli@math.arizona.edu
- William Velez, 617 N. Santa Rita Ave. P.O. Box 210089, Tucson, AZ 85721-0089, (520) 621-2259 velez@math.arizona.edu

References from Graduate School

- James E. Brennan, 949 Patterson Office Tower, University of Kentucky, Lexington, Ky, 40506, Phone: (859) 257-1057, brennan@ms.uky.edu
- Peter Perry (MathExcel), 755 Patterson Office Tower, University of Kentucky, Lexington, Ky, 40506, Phone: (859) 257-6794, perry@ms.uky.edu
- Richard Millman (Algebra Cubed), CEISMC, 760 Spring Street, Georgia Institute of Technology, Atlanta, GA 30332-0282, Phone: (404) 894-6179 richard.millman@ceismc.gatech.edu
- Ami Radunskya (EDGE), Pomona College, 610 N. College Ave., Claremont, CA 91711, Phone: (909) 621-8715, aer04747@pomona.edu

CURRICULUM VITAE

Personal:

Dr. Lakshmi Mukundan
Professor of Mathematics
Ferris State University
Big Rapids, MI 49307
Phone: Home: (231) 796 – 2703
Office: (231) 591 – 2567

Education:

Ph.D. (1991) North Carolina State University, Raleigh, NC.
Applied Mathematics with minor in Electrical Engineering.

M.Phil. (1982-84, Part-Time) Madras University, India.
Mathematics with Dissertation on Monotone Approximation.

M. Sc. (1968) Madras University, India.
Mathematics. Optional Subjects: Complex Variables & Topology.

B. Sc. (1966) Madras University, India.
Mathematics with Ancillary subjects: Statistics & Physics.

Employment:

2001- Present: Professor of Mathematics
Ferris State University, Big Rapids, MI.

1996- 2000: Associate Professor of Mathematics
Ferris State University, Big Rapids, MI.

1991-1995: Assistant Professor of Mathematics
Ferris State University, Big Rapids, MI.

1986-1991: Teaching / Research Assistant
North Carolina State University, Raleigh, NC.

1980-1985: Professor of Mathematics
Queen Mary's College, Madras, India.

1972-1980: Assistant Professor of Mathematics
Queen Mary's College, Madras, India.

1970-1972: Assistant Professor of Mathematics
Govt. Arts College for Women, Kumbakonam, Madras, India.

Computing Experience: Languages: Basic, Visual Basic, Pascal, Fortran 90, Visual C++.
Computer Algebra Systems: Derive, Maple, and Matlab.

Publications: C.T. Kelley and L. Mukundan: Convergence Analysis for the Harmonic Balance method, Journal of Nonlinear Analysis, Theory, Methods & Applications, Vol. 20, No. 4, pp. 365-380, 1993.

D. E. Stoneking, R. J Trew, and L.Mukundan: Simulation of the Variation and Sensitivity of GaAs MESFET Large-Signal Figures of Merit Due to Process and Bias Parameters, Proceedings IEEE/ Cornel Conference on Advanced Concepts in High Speed Semiconductor Devices and Circuits, 1989, pp 228-236.

Professional Memberships: Society of Industrial and Applied Mathematics.
Mathematical Association of America.
Member NCTM(National Council of Teachers of Mathematics).
Michigan Section of Mathematical Association of America.
Michigan Education Association.
Member of Beta Kappa Chapter of The Delta Kappa Gamma Society International in the State of Michigan.
Nominated to Michigan Mu Chapter of Pi Mu Epsilon, National Honorary Mathematics Society.

Conferences & Workshops:

Inducted as a member of Pi Mu Epsilon, National Honorary Mathematics Society on November 6, 2013.

Initiated on April 12, 2011 by Beta Kappa Chapter of the Delta Kappa Gamma Society International in the State Of Michigan as an Active Member and from April 2012 was elected as a co-treasurer.

Attended Conversation among Colleagues Conference at Grand Valley State University on February 5, 2011.

Attended four Workshops(Two in Fall 2009and Two in Spring 2010), Sponsored by Language and Literature's Online Teaching Committee, in which faculty work together to complete the first four levels of the Online Instructor Certification program of the Faculty Center for Teaching and Learning. I was awarded Certification for Level 1 and 2, and a PDI of $250 for the same in Fall 2010.

Attended Conversation among Colleagues Conference at Dearborn, Michigan, on March 21 , 2009 organized by University of Michigan, Dearborn.

Awarded PDI of $500 in March 2009 for attending Critical Thinking Level III Workshops.

Presented Critical Thinking Elements and Standards along with Prof. Mark DeKoster to the group of tutors on Dec. 1, 2008.

Presented Critical Thinking Elements and Standards to a group of Students of Prof. Donna Smith's class on Nov 21, 2008 and Dec. 5, 2008.

Attended 2008 Fall Central Section Meeting of the American Mathematical Society Special Session on Mathematical Knowledge for Teaching at Western Michigan University, Kalamazoo, Michigan from October 17 – 18, 2008.

Attended Accelerated Learning Workshop from August 12 – 14, 2008 At Ferris State University, Big Rapids, MI 49307.

Attended Conversation among Colleagues Conference at Kalamazoo, Michigan, on March 14 – 15 , 2008 organized by Western Michigan University.

Attended Critical Thinking Weekly Workshop(Level II) in Spring 2008, facilitated by George Nagel and Donna Smith, organized by Faculty Center of Teaching and Learning.

Attended a PREP (Professional Enhancement Program of the Mathematical association of America) Online Workshop on Exploring Multivariable Calculus using Maple from June 25 – June 29, 2007.

Attended Critical Thinking Weekly Workshop: " A Dynamite Classroom and a Delightful Teaching Experience" from January 22 – April 23, 2007, Facilitated by George Nagel and Donna Smith, organized by Faculty Center for Teaching and Learning. Awarded PDI of $750 for the same.

Attended Annual Spring Learning Institute on April 7, 2006 at Ferris State University, organized by CTLFD, Ferris State University.

Attended Conversations among Colleagues Conference at Ann Arbor, Michigan on March 24, 2006 organized by University of Michigan.

Attended and participated Faculty Learning Community-
Learner- Centered Teaching, January 23, 2006 – April 17, 2006.
Awarded PDI of $750 for the same.

Attended Martin Luther King Jr. Faculty-Staff In – Service on January 16, 2006 . The Theme for the day was " Wealth and Poverty". Faculty/Staff read poems, stories, presentations moderated by Dr. David Pilgrim.

Attended Conversations among Colleagues Conference at East Lansing on March 19, 2005, organized by Michigan State University

Attended Flash MX training from March 15 – April 26, 2005, conducted by William Knapp, organized by Faculty Center for Teaching & Learning.

Attended Annual Spring Learning Institute on April 2, 2004 at Ferris State University, organized by CTLFD, Ferris State University.

Attended Conversations among Colleagues Conference at Grand Rapids on March 20, 2004, organized by Grand Valley State University.

Attended Martin Luther King, Jr., Faculty-Staff In-Service, January 19, 2004 at Ferris State University, sponsored by the Diversity Counts! Committee.

Attended Mich MATYC conference at Lansing Community College on October 11, 2003.

Attended 79th Annual Meeting of The Michigan Section of the Mathematical Association of America and MichMATYC at Saginaw Valley State University, MI during May 2- 3, 2003.

Attended Second Annual Spring Learning Institute on March 28, 2003 at Ferris State University, organized by CTLFD, Ferris State University.

Attended Lilly North Conference at the Holiday Inn, Big Rapids on September 20 and 21 , 2002.

Presented the Topic: “Frechet Differentiability of the Substitution Operator” on Math Colloquium on April 25, 2002.

Attended Equity in the Classroom XII conference on April 12, 2002 at Soaring Eagle Casino & Resort in Mount Pleasant, MI, organized by Central Michigan University, MI.

Attended Annual Spring Learning Institute on March 22, 2002 at Ferris State University, organized by CTLFD, Ferris State University.

Attended live satellite teleconference on “ Teaching and Assessing for Critical Thinking and Deep Learning” featuring Tom Angelo, sponsored by Academic Affairs, Ferris State University, Feb. 22, 2002.

Attended “Test What You Teach – Teach What You Test ” Workshop organized by Center for Teaching, Learning & Faculty Development, Ferris State University, Big Rapids, MI. It was facilitated by Terry Doyle on Monday afternoons, 12:00 – 2:15p.m. from February 25 to April 29, 2002. Awarded $400 as S & E award.

Attended Martin Luther King, Jr., Faculty-Staff In-Service, January 21, 2002 at Ferris State University, sponsored by the Diversity Counts! Committee.

Participated in the panel for “ Contemporary Issues In Substance Abuse Prevention” on Faculty Development day on August 22, 2001.

Attended Equity in the Classroom XI Conference- Teaching and Learning in a Diverse Classroom: “Let America be America …”, March 22- 23, 2001, Ferris State University, Big Rapids, MI.

Attended International Conference on Technology in Collegiate Mathematics, November 16-19, 2000, Atlanta, Georgia.

Helped in organizing annual Mathematics Education Seminar, April 2000- 2004.

The Indian and Comparative Studies conference, April 2-3, 2000, organized by The Society of Indian Philosophy & Religion and

Ferris State University Arts and Lectures Committee.

Equity Within the Classroom X – Graduating Minority students Conference, March 16 – 17, 2000, Ypsilanti Marriott, Eastern Michigan University.

Revitalize Lectures with Power Point: Workshop offered by The Center For Teaching , Learning, & Faculty Development, Feb. 8, 2000.

Joint Mathematical Meetings(MAA, AMS, & SIAM), Jan. 19 –22, 2000, Washington D.C.

Web CT Module 4: Student management - Workshop offered by The Center For Teaching , Learning, & Faculty Development, Dec 3, 1999.

Grant Workshop: Developing Fundable Ideas, Oct. 20, 1999, Offered by Dr.Tamsey Andrews, Director of Grants.
Harassment/Sensitivity Training sponsored by the Office of Affirmative Action of Ferris State University on Sept. 30, 1999.

Faculty Show and Tell - Workshop offered by The Center For Teaching , Learning, & Faculty Development, Sept. 23, 1999.
Communication Club Events, Fall 1999, organized by the Center for Teaching, Learning, & Faculty Development.

Helped in organizing annual Mathematics Education Seminar, April 1999.

Connections Training Program: Feb. 15, Feb. 22, and Mar. 1, 1999, Organized by Ferris State University's Human Resource Development Department in coordination with the Center for Teaching, Learning, & Faculty Development.

Faculty Winter Institute, Jan. 4 – 8, 1999, "The Development of Web-based Instruction Using WebCT", organized by the Center for Teaching, Learning, & Faculty Development.

Attended the presentation on consulting opportunities by Jeff Specht of the Performance Place on April 17, 1998, organized by the Center for Teaching, Learning, & Faculty Development.

Helped in organizing annual Mathematics Education Seminar, April 1998.

Participated in the "Food & Thought " luncheon discussion series Discussing pedagogical topics during Fall 1997. This series is organized by the Center for Teaching, Learning, & Faculty Development.

Helped in organizing annual Mathematics Education Seminar, April 1997.

Participated in Program Assessment workshop on Mar. 15, 1997, Presented by Douglas J. Eder, Southern Illinois University, Edwardsville.

Presented Hands-on Sessions on Probability on March 11, 1995 At " Math, Science, Technology Access for All " Conference Organized by Mecosta Osceola Intermediate School District.

Equity Within the Classroom V – Graduating Minority Students Conference, March 24-25, 1995, Lansing.

Equity Within the Classroom IV – Graduating Minority Students Conference, March 25-26, 1994, Lansing.

Presented a talk on " Women and their Issues – Around World- With reference to India", March 3, 1994, under the auspices of Forum for the Healing Racism, Big Rapids.

Equity Within the Classroom III – Graduating Minority Students Conference, March 26-27, 1993, Lansing.

Fourth Annual Michigan Conference on College Mathematics: Calculus in Transition, March 23, 1993, at University of Michigan, Dearborn, MI.

Given a contributed talk in the Tenth Annual South Eastern Atlantic Regional Conference on Differential Equations, Nov. 17, 1990 at Virginia Polytechnic Institute and State University, Blacksburg, VA.

Assignments At Ferris:

Teaching

Mathematics 110	Fundamentals of Algebra
Mathematics 110	Fundamentals of Algebra(CMI) (Computer Mediated Instruction)
Mathematics 115	Intermediate Algebra
Mathematics 116	Intermediate Algebra & Numerical Trig. (Both Face to Face and Fully Online)
Mathematics 117	Contemporary Mathematics (Both Face to Face and Fully Online Using TEGRITY)
Mathematics 120	Trigonometry
Mathematics 122	Mathematical Analysis for Business I (Both on Campus & Off Camus in Traverse City)
Mathematics 126	Algebra & Analytical Trig. (Both Face to Face and Fully Online Using TEGRITY)
Mathematics 130	Adv. Algebra & Analytical Trig.
Mathematics 132	Calculus for Business
Mathematics 135	Calculus for Life Sciences
Mathematics 216	Applied Calculus
Mathematics 226	Fourier Series& Applied Diff. Equations
Mathematics 220	Analytical Geometry & Calculus I
Mathematics 230	Analytical Geometry & Calculus II
Mathematics 320	Analytical Geometry & Calculus III
Mathematics 251	Statistics for Life Sciences
Mathematics 314	Probability
Mathematics 322	Linear Algebra (Both in Class and Distance Learning)
Mathematics 328	Discrete Mathematics (Both in Class and Distance Learning)
Mathematics 340	Numerical Analysis
Mathematics 360	Operations Research
Mathematics 380	Applied Analysis
Mathematics 385	Prof. Actuarial Exam. 100
Mathematics 414	Mathematical Statistics I
Mathematics 416	Mathematical Statistics II

Computer Sci.150	Visual Basic Programming
Computer Sci. 244	Fortran Programming
Computer Sci. 200	Visual C++ Programming
FSUS100	Ferris State Univ. Seminar

Non Teaching

Judged Mathematics and Statistics related projects for Annual West Michigan Region Science and Engineering Fair May 1999, and April 2000, April 2001, March 2002, March 2003, March 2004, March 2005, and March 2006.

Participated in the telemarketing program through Enrollment Services for fall 1997-1998.

Participated in International Festival- April '93, '94, '95, '96, '97, and '98, organized by center for International Education, Ferris State University.

Assisted in Registration for Fall'92, Spring '93, Fall '93, Fall '94, and Fall '99, Winter 2002.

Passed the Actuarial Science Examination 100, Feb. '95 and Examination 110, May '95 conducted by the Society of Actuaries.

Recording Secretary for Department meetings during Winter '92-'93, Spring '93.

Advisor for Pre-Science students from Fall '93 to Winter 2001.

Advisor for Actuarial Science students from Fall 2001 to Present.

Advisor for Pre- Pharmacy students from Fall 2005.

Member of the team: 'Diversity Counts! Project '

Committee Service:

Recording Secretary for Mathematics Departmental Meetings - Spring 2015

Member of Department Faculty Search committee - 2013-2014
Member of Department Faculty Search committee - 2011-2012.

Dr. David McClendon's Tenure Review committee Chair.

Dr. James Nystrom's Tenure Review Committee Member.
Department Planning Committee member.

Department Faculty Development Committee member.

Mathematics Education Committee member.

Text Book and Course outline Committee member for the Following courses: Math 130,220,230,320,and 330.

Member for the following Departmental Divisions:
Core: Math 120, 130, 220,230,320.
Statistics: Math 251, 310,314, 385,414, 416,485.
Applied: Math 328, 330, 340,360, 380,440. Till Present

Computer Science: Cpsc 150, 200, 244, 300, 320, 326, 328, 340, 442. Till Present

Service: math 116,122, 126 132, 216, 226 – Till Present
Member of Department Search Committee for tenure-track faculty For Computer Science 2005-2006.

Member of College of Arts and Sciences Promotion Committee, 2001 – 2004.

Dr. Bakhodirzhon Siddikov's Tenure Review Committee Chair.

Dr. Hengli Jiao's Tenure Review Committee Member.

Member of Department Search Committee for tenure –track Faculty during 2001-2002.
University -Wide Substance Abuse Task Force Committee

Member for one year term – 2000-2001.

Dr. Kent Sun's Tenure Review Committee Member.

Member of Department Search Committee for tenure-track faculty during Winter 1998.

Member of College of Arts and Sciences Promotion Committee for 1996-98.

Member of College of Arts and Sciences Sabbatical Leave Committee for 1994-95, and 1995-96.

Chair of College of Arts and Sciences Sabbatical Leave Committee for 1995-96.

Member of the Advisory Committee and Conference Hand book Committee for the " Math, Science, Technology Access For All " Conference, March 1995, organized by Mecosta Osceolo Intermediate School District.

Curriculum Vitae

J.F. (Jim) Nystrom, Ph.D.
Associate Professor
Computer Science Coordinator
Department of Mathematics
College of Arts & Sciences
Ferris State University
Big Rapids, MI 49307 USA

Research Interest Areas

Algorithm design for time-domain simulations and visualizations, computational science and computational physics, computational electromagnetics, electromagnetic theory, the simulation argument, implications associated with the quantum mind, computational cosmography.

Professional Preparation

University of Idaho	Electrical Engineering	Ph.D.	2000
University of Idaho	Physics	M.S.	1996
University of Idaho	Computer Science	M.S.	1994
Texas A&M University	Electrical Engineering	B.S.	1986.

Appointments

Associate Professor	Ferris State University (CS & Math)	2010 -
Assistant Professor	Ferris State University (CS & Math)	2007 - 2010
Visiting Assistant Professor	Shepherd University (CS & Math)	2006 - 2007
Assistant Professor	University of Akureyri, Iceland (CS)	2004 - 2006
Assistant Professor	Texas A&M University - Corpus Christi (CS)	2001 - 2004
Visiting Assistant Professor	Adams State College (CS & Math)	2000 - 2001
Lecturer	University of Idaho (Physics)	2000
Lecturer	University of Idaho (Electrical Engineering)	1998 - 1999
Research Assistant	University of Idaho (Electrical Engineering)	1997 - 1999
Teaching Assistant	University of Idaho (Physics)	1994 - 1996
Teaching Assistant	University of Idaho (Computer Science)	1993 - 1994
Sr. Systems Engineer	3M Company (Austin, TX)	1987 - 1993.

Journal Publications

J.F. Nystrom, "High-Order Time-Stable Numerical Boundary Scheme for the Temporally Dependent Maxwell Equations in Two-Dimensions," *Journal of Computational Physics* **178**, 290-306 (2002).

J.F. Nystrom, "An Exact Finite Field Renormalization Group Calculation on a Two Dimensional Fractal Lattice," *Int. Journal of Modern Physics C* **11**, 257-275 (2000).

J.F. Nystrom and J.L. Young, "k-Space Transfer Function Design of Discrete Operators: Application to Maxwell's Time-Domain Equations," *Journal of Electromagnetic Waves and Applications* **13**, 781-806 (1999).

Refereed Conference Publications and Journal Proceedings

J.F. Nystrom and J.C. Robinson, "Random Walks of Tetrahedrons and Cubes," *CSC'10: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2010.

J.F. Nystrom, "Ontological musings on how nature computes," *ICCS 2010: Tenth International Conference on Computational Science*, Amsterdam, Netherlands, May 2010. [Published in *Procedia Computer Science* **1**, 77-86 (2010).]

J.F. Nystrom, "On the Random Walks of Geometrical Forms in Two-Dimensions," *CSC'08: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2008.

J.F. Nystrom and Carryn Bellomo, "Isotropic Vector Matrix Grid and Face-Centered Cubic Lattice Data Structures," (presented as a poster) *ICCS 2005: Fifth International Conference on Computational Science*, Atlanta, GA USA, May 2005.
[Published in *Lecture Notes in Computer Science* **3516**, 1096-1099 (2004).]

J.F. Nystrom, "On the Omni-directional Emergence of Form in Computation," (presented as a poster) *ACRI 2004: Sixth International Conference on Cellular Automata for Research and Industry*, Amsterdam, The Netherlands, October 2004.
[Published in *Lecture Notes in Computer Science* **3305**, 632-641 (2004).]

J.F. Nystrom, "Grid Construction and Boundary Condition Implementation for the Isotropic Vector Field Decomposition Methodology," *ACES 2003: 19th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA USA, March 2003.

J.F. Nystrom, "The Isotropic Vector Field Decomposition Methodology," *ACES 2002: 18th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA USA, March 2002.

J.F. Nystrom, "Tensional Computation: Further Musings on the Computational Cosmography," *7th Bellman Continuum*, Santa Fe, NM USA, May 1999.
[Published in *Applied Mathematics and Computation* **120**, 211-225 (2001).]

Other Conference Presentations, Abstracts and Posters

J.F. Nystrom, "On some theoretical problems with brain emulations," *Toward a Science of Consciousness: Brain · Mind · Reality*, Stockholm, Sweden, May 2011.

J.F. Nystrom, "Universe as Computation, Modern Aether Theory, and the Funda-Mentalistic Mind," *Toward a Science of Consciousness 2008*, Tucson, Arizona USA, April 2008. [Published in the Consciousness Research Abstracts of *Toward a Science of Consciousness 2008*, a service from the *Journal of Consciousness Studies*.]

J.F. Nystrom, "Teleological Mechanism for the Simulation Argument," (Abstract accepted, but not presented at) *Quantum Mind 2007*, Salzburg, Austria, July 2007. [Published in the Consciousness Research Abstracts of *Quantum Mind 2007*, a service from the *Journal of Consciousness Studies*.]

J.F. Nystrom, "On the Design of Diffusion Constants for Random Walks of Squares, Triangles and Cubes," *SIAM Conference on Computational Science & Engineering*, Costa Mesa, CA, February 2007.

J.F. Nystrom, "Moore's Law and the Visualization of Electromagnetic Quanta," *PIERS 2003 in Hawaii: Progress in Electromagnetics Research Symposium*, Honolulu, HI, October 2003.

J.F. Nystrom and C. Bellomo, "Efficient Grid Generation for the IVMCEM Solver," (presented by C. Bellomo) *PIERS 2003 in Hawaii: Progress in Electromagnetics Research Symposium*, Honolulu, HI, October 2003.

J.F. Nystrom, "In Search of a Geometrical Basis for the Ubiquitous Electromagnetic Energy," *PIERS 2002: Progress in Electromagnetics Research Symposium*, Boston, MA, July 2002.

J.F. Nystrom and J.L. Young, "High-Order, Finite-Difference Procedure for the Temporally Dependent Maxwell's Equations," *1998 AP-S International Symposium and URSI National Radio Science Meeting*, Atlanta, GA, June 1998.

J.L. Young and J.F. Nystrom, "Designing High-Order, Time-Domain Numerical Solvers for Maxwell's Equations," *1998 AP-S International Symposium and URSI National Radio Science Meeting*, Atlanta, GA, June 1998.

J.F. Nystrom, "In Search of: Computational Cosmography," *Pions and Beyond*, Moscow, ID, April 1998.

Seminars and Colloquium

"On some theoretical problems with brain emulation,"
University of Idaho Department of Physics Seminar, Moscow, ID, July 2011.

"On some theoretical problems with brain emulation,"
Ferris State University Math Colloquium, Big Rapids, MI, March 2011.

"An Omni-directional Curl Operator and the IVMCEM Method,"
Ferris State University Math Colloquium, Big Rapids, MI, March 2010.

"Ontological Musings Concerning How Nature Computes,"
Ferris State University Math Colloquium, Big Rapids, MI, March 2009.

"Random Walks of Tetrahedra and Octahedra,"
Michigan MAA Spring 2008 Meeting, Grand Rapids, MI, May 2008.

"On the Design of Diffusion Constants for Random Walks of Squares, Triangles and Cubes," *Ferris State University Math Colloquium*, Big Rapids, MI, November 2007.

"Mechanism for the Simulation Argument"
Nexus of Science and Spirit Lecture, Shepherdstown, WV, December 2006.

"computational cosmography & the isotropic vector field decomposition methodology"
Icelandic Centre of Excellence in Theoretical Computer Science Research Seminar, Reykjavik, Iceland, December 2005.

"computational cosmography & the isotropic vector field decomposition methodology"
Iceland Express Seminar in Advanced Computer Science, Akureyri, Iceland, March 2005.

"computational cosmography & the isotropic vector field decomposition methodology"
Texas A&M University - Corpus Christi Computing & Mathematical Sciences Department Seminar, Corpus Christi, TX, February 2003.

"On the Modeling and Computation of Physical Phenomena"
Adams State College Mathematics, Computer Science and Physics Department Seminar, Alamosa, CO, April 2000.

"Was that an electric or magnetic force pulling on me?"
University of Idaho Department of Electrical Engineering Research Colloquium, Moscow, ID, January 2000.

"Geometry in the Afternoon"
University of Idaho Department of Electrical Engineering Research Colloquium, Moscow, ID, August 1999.

"In Search of: Computational Cosmography"
University of Idaho Department of Physics Seminar, Moscow, ID, December 1996.

Panel Discussions

"Exploring the Science of the IVM/VE/Close Packing in Nature's Design,"
Third Biennial Design Science Symposium, Providence, RI USA, November 2011.

Ph.D. Dissertation

J.F. Nystrom (2000), *On the design of time-stable high-order Cartesian-based FDTD CEM methods*, University of Idaho (Electrical Engineering).

M.S. Thesis

J.F. Nystrom (1996), *An exact two-dimensional finite field real-space renormalization group calculation*, University of Idaho (Physics).

Patents

J.F. Nystrom, *Isotropic vector field decomposition method for use in scientific computations*, a U.S. Patent Application. (U.S. Application Publication Number 20030046043.)

Classes Taught/Teaching

Computer Science

Concurrent Computation/Parallel Programming, Computer Organization, Programming & Problem Solving (CS0), Fortran90 Programming, Compiler Construction, Operating Systems, Programming Language Theory, C++ Programming I, C++ Programming II, 8086 Assembly Language, Visual Basic Programming, Computer Literacy.

Mathematics

Numerical Analysis, Discrete Mathematics, Differential Equations, Calculus III, Finite Mathematics, Precalculus, Trigonometry, Intermediate Algebra, Algebra & Analytic Trigonometry, Technical Calculus.

Electrical Engineering, and Physics

Electromagnetic Theory, Introduction to Electrical Engineering, Fundamentals of Physics (a.k.a. "Physics for Poets").

Research and Institutional Funded Grant Activity

A Ferris State University *Timme Travel Grant* of $850 for the May 2010 *Tenth International Conference on Computational Science.*

A Ferris State University *Timme Travel Grant* of $800 for the April 2008 *Toward a Science of Consciousness 2008 Conference.*

"Computational Cosmography Initiative," a KEA University Fund 2005 grant, partially funded at $8,500 (conversion from 500,000 Icelandic krona).

"MII: Improving the Pipeline in Applied Computer Science," co-principal investigator with J.D. Fernandez, M. Garcia, D.C. Kar, and R.S. Dannelly, principal investigator. An NSF MII grant, 9/1/03 - 8/31/08, NSF MII 03-30822 for $1,350,000.

Student Research Supervision

2012 Timothy Reynhout, *Random Walks of A-module, B-module, Couplers and Mites.*

2012 Alex Breu, *Visualization of Random Walks of Geometrical Forms.*

2009 Brett Pacholka, *Visualization of Random Walks of Geometrical Forms.*

2008 Joseph Robinson, *Random Walks of Geometrical Forms.*

2004 Patrick Wilson, *Computational Electromagnetic Visualization.*

Institutional Service

2012 – 2015 Ferris State University Academic Senate Arts & Lectures Committee Member

2011 – 2013 Ferris State University Academic Senate Member

2010 Ferris Faculty Association Executive Board Leadership Council Representative

2010 – Ferris State University Mathematics Department Scheduling Committee Member

2010 – 2012 Ferris State University Academic Senate Academic Policy and Standards Committee Chair

2010 – 2012 Ferris State University College of Arts and Sciences Academic Standards and Policies Committee Chair

2009 – 2012 Ferris State University Academic Senate Academic Policy and Standards Committee Member

2009 – 2012 Ferris State University College of Arts and Sciences Academic Standards and Policies Committee Member

2009 – 2013 Ferris Faculty Association Executive Board Member

2008 – Ferris State University Mathematics Department Computer Science Division Committee Chair

2008 – Ferris State University Mathematics Department Computer Science Concentration Adviser

2008 Ferris State University Mathematics Department Ad Hoc Student Recruitment Committee Member

2007 – 2013 Ferris State University Mathematics Department Awards/Scholarships Selection Committee Member

2007 Ferris State University Mathematics Department Head Search Committee Member

2007 – Ferris State University Mathematics Department Computer Science Division Committee Member

2004 – 2006 Director of Postgraduate Affairs for the Faculty of Information Technology at the University of Akureyri, Iceland.

2002 – 2003 TAMU-CC Undergraduate Computer Science Program Review Committee

2002 – 2003 TAMU-CC Computer Science Introduction Sequence Committee Member

2002 TAMU-CC CS Faculty Search Committee Member

Professional Service

2013 Co-Editor (with Lou D'Alotto and William Spataro), Special Section on Cellular Automata, *Journal of Supercomputing* **65**, 612-722 (2013).

2011 Session Chair, *Toward a Science of Consciousness: Brain · Mind · Reality*, Stockholm, Sweden, May 2011.

2011 Workshop Co-Organizer and Co-Chair, *CA-CSC'11 Workshop - Cellular Automata, Theory and Applications*, part of the *CSC'11: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2011.

2010 Reviewer, *Journal of Supercomputing.*

2010 Program & Organizing Committee Member & Associate Editor, *CSC'10: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2010.

2010 Workshop Co-Organizer and Co-Chair, *CA-CSC'10 Workshop - Cellular Automata, Theory and Applications*, part of the *CSC'10: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2010.

2010 Session Chair, *FSC'10: International Conference on Foundations of Computer Science*, Las Vegas, NV USA, July 2010.

2010 Session Chair, *ICCS 2010: International Conference on Computational Science*, Amsterdam, The Netherlands, May 2010.

2009 Program & Organizing Committee Member, *CSC'09: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2009.

2009 Workshop Co-Organizer and Co-Chair, *CA-CSC'09 Workshop - Cellular Automata, Theory and Applications*, part of the *CSC'09: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2009.

2008 Program & Organizing Committee Member, *CSC'08: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2008.

2008 Session Chair, *CSC'08: International Conference on Scientific Computing*, Las Vegas, NV USA, July 2008.

2007 Session Chair, *SIAM Conference on Computational Science & Engineering*, Costa Mesa, CA, February 2007.

1999-2000 Reviewer, *IEEE Antennas & Propagation Society Magazine.*

Community Service

2011 Mayoral Write-in Candidate, Big Rapids

2011 3rd Grade Classroom Parent Helper, Riverview Elementary, Big Rapids

2009 Big Rapids City Commission Candidate

2009 Big Rapids U12 (Travel) Soccer Team Assistant Coach

2009 – 2010 2nd Grade Classroom Parent Helper, Riverview Elementary, Big Rapids

2009 Big Rapids Public Schools School Board Budget Advisory Committee Member

2009 Big Rapids U6 (Recreation) Soccer Team Head Coach

2007 – 2008 Kindergarten Classroom Parent Helper, Eastwood Early Childhood Center, Big Rapids

Awards

2011 Achievement Award
The 2011 World Congress in Computer Science, Computer Engineering, and Applied Computing *In Recognition and Appreciation of Service and Research Contributions to the Field of Computer Science.*

2010 Outstanding Achievement Award
The 2010 World Congress in Computer Science, Computer Engineering, and Applied Computing *In Recognition of His Leadership and Outstanding Research Contributions to the Field of Cellular Automata.*

1997 – 1998 Outstanding Graduate Student
University of Idaho Department of Electrical Engineering

Miscellaneous

University of Texas Management Institute Certificate, 1991-1992.

Email: `nystroj@ferris.edu`

Old Web site: `http://myhomepage.ferris.edu/~nystroj/`

Enumerated publication list: `http://myhomepage.ferris.edu/~nystroj/nys_pubs.pdf`

Victor I. Piercey

Contact Information

Associate Professor
Department of Mathematics
Ferris State University
820 Campus Drive, ASC 2021
Big Rapids, MI 49307

Mobile: (347) 623 - 6708
E-mail: piercev1@ferris.edu

Appointments

Associate Professor — July, 2015 to present
Assistant Professor — August, 2012 to July, 2015

Department of Mathematics, Ferris State University

- **Courses Taught**: Mathematical Theory of Interest, Advanced Calculus, Quantitative Reasoning for Business, Contemporary Mathematics, Fundamentals of Algebra, Precalculus, Statistics for Life Sciences, Calculus and Analytic Geometry 1, Freshman Seminar.
- **Courses Under Development**: Quantitative Reasoning for Professionals, Project-based version of Contemporary Mathematics
- **Studies in Progress**: Correlations and Changes in Affective Measures (anxiety, beliefs, learning styles), Affective Implications of Project-Based and Inquiry-Based Learning in General Education Mathematics Courses

Graduate Assistant — August, 2006 to May, 2012

Department of Mathematics, University of Arizona

- **Courses Taught**: Understanding Elementary Mathematics, Calculus 1 with Applications, Elements of Calculus, Preparation for Calculus, College Algebra

Adjunct Faculty — May, 2009 to May, 2012

Mathematics Division, Central Arizona College

- **Courses Taught**: Basic Arithmetic, Pre-Algebra, Introductory Algebra

Graduate Assistant — August, 2003 to May, 2006

Department of Mathematics, Michigan State University

- **Courses Taught**: College Algebra, Elementary Mathematics for Teachers 2, Calculus 2

Adjunct Faculty — August, 2005 to May, 2006

Mathematics and Computer Science Department, Lansing Community College

- **Courses Taught**: College Algebra

Attorney — September 2000 - November 2002

Weil, Gotshal & Manges LLP. New York, New York

Education

University of Arizona, Tucson, Arizona

Ph.D., Mathematics, May 2012

- Dissertation: *Resolving Collinearity among Four Points in* $\mathbb{P}^2$
- Adviser: Professor Yi Hu
- Area of Study: Algebraic Geometry

Michigan State University, East Lansing, Michigan

M.S., Mathematics, May, 2006

B.A., Interdisciplinary Humanities, May, 1997

- *High Honors*, Honors College
- Areas of Concentration: History, Economics, Russian

Columbia University, New York, New York

J.D., Law, May 2000

- Certificate in International and Comparative Law

SELECTED PRESENTATIONS

An Unlikely Adventure: Linked Math and English (with Roxanne Cullen), Michigan Section of the Mathematics Association of America, Hillsdale, MI, April 2016

Using Games to Teach Freshmen to Handle Mathematical and Professional Complications (with Andrew Peterson), Joint Mathematics Meeting, Seattle, WA, January 2016

Assessment Studies of an Experimental Mathematics Sequence (poster presentation), Joint Mathematics Meeting, Seattle, WA, January 2016

Data-Based Investigations into Police Corruption: A Case Study in Racial Profiling, All-Russian and International Dialogue on Action Against Corruption Conference, Kazan, Russia, November 2015

Teaching Inquiry and Autonomous Learning: Linked Math and English at Ferris State University, Institute of Economics, Management, and Law; Kazan, Russia, November 2015

Teaching Inquiry with Linked Classes: Developing Community and Autonomous Learning (with Roxanne Cullen), Lilly Conference on College and University Teaching and Learning, Traverse City, MI, October 2015

What Evidence Do You Have? Data-Based Investigations into Contemporary Race Relations, MathFest, Washington DC, August 2015

Linked Math and English in an Active Learning Classroom, MathFest, Washington DC, August 2015

Quantitative Reasoning for Professionals, Michigan Pathways Workshop, Petoskey, MI, June 2015

Curricular Innovation and the Scholarship of Teaching and Learning, Scholarship of Teaching and Learning Conference, Finlay, OH, May 2015

Affective Implications of Curriculum and Instruction Choices, Michigan Section of the Mathematics Association of America, Holland, MI, April 2015

Using Linked Courses and Classroom Configurations to Teach Mathematical Inquiry to Freshmen Business Students, Joint Mathematics Meeting, San Antonio, TX, January 2015

Inquiry-Based Learning in a Quantitative Reasoning Course for Business Students, Joint Mathematics Meeting, San Antonio, TX, January 2015

Quantitative Ethics: What Is It and Why Is It Important?, Joint Mathematics Meeting, San Antonio, TX, January 2015

An Inquiry-Based Approach to Using and Manipulating Formulas, Joint Mathematics Meeting, San Antonio, TX, January 2015

Reflection Session on Engaging Students, New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University, October 2014

Diversity in Perspectives on Mathematics (banner presentation, with Erin Militzer), BEYOND Diversity Five-Star Event, Ferris State University, October 2014

A Partnership for Creating a Quantitative Reasoning Materials Datatbase, MichMATYC Annual Meeting, Benton Harbor, MI, October 2014.

Active Learning Panel Discussion, New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University, September 2014

A Project-Based General Education Math Course, MathFest, Portland, OR, August 2014

Quantitative Reasoning for Business: An Inquiry-Based Approach, MathFest, Portland, OR, August 2014

Affective Implications of Inquiry-Based and Project-Based Learning in General Education (poster presentation), MathFest, Portland, OR, August 2014

Revising Inquiry-Based Learning Materials, Legacy of R.L. Moore Conference, Denver, CO, June 2014

Supporting Quantitative Literacy with Service Learning, Joint Mathematics Meeting, Baltimore, MD, January 2014

Assessment in a Quantitative Reasoning Course for Business Students, Joint Mathematics Meeting, Baltimore, MD, January 2014

Alternative Assessment with Projects for Quantitative Literacy, Joint Mathematics Meeting, Baltimore, MD, January 2014

Quantitative Reasoning for Business: An Inquiry-Based Approach (poster presentation), Joint Mathematics Meeting, Baltimore, MD, January 2014

Active Learning Panel Discussion, New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University, November 2013

Math Anxiety: From the Clinic to the Classroom (keytnote address, with Sheila Tobias), AMATYC National Conference, Anaheim, CA, November 2013

Success in Mathematics Workshop (invited speaker, with Sheila Tobias), Montana Tech of the University of Montana, Butte, MT, August 2013

Using Projects to Support Quantitative Literacy, MathFest, Hartford, CT, August 2013

The Gini Coefficient: A High School Precalculus Project, MathFest, Hartford, CT, Auguest 2013

The Road to Math Mental Health: What Can Educators Do? (invited talk, with Sheila Tobias), Baton Rouge Community College, Developmental Education Symposium, Baton Rouge, LA, April 2013

Building Intuition in Precalculus, Ferris State University Mathematics Colloquium, Big Rapids, MI, February 2013

Inquiry-Based Learning in Developmental Mathematics, Joint Mathematics Meeting, San Diego, CA, January 2013

Conferences and Professional Development

Michigan Section Meeting, Mathematics Association of America, Hillsdale, MI, April 2016

Joint Mathematics Meeting, American Mathematical Society and Mathematics Association of America, Seattle, WA, Jan. 2016

All-Russian International Dialogue on Action Against Corruption Conference, Kazan, Russia, November 2015

Lilly Conference on College and University Teaching and Learning, Traverse City, MI, October 2015

MathFest, Mathematics Association of America, Washington, DC, August 2015

Legacy of RL Moore and Inquiry-Based Learning Conference (co-organizer), Educational Advancement Foundation, Austin, TX, June 2015

Michigan Pathways Workshop, Charles A. Dana Center, Petoskey, MI, June 2015

Civic Learning and Democratic Engagement Conference, National Association of Student Personnel Administrators, New Orleans, LA, June 2015

Scholarship of Teaching and Learning Conference, Finlay, OH, May 2015

Michigan Section Meeting, Mathematics Association of America, Holland, MI, April 2015

Game-Based Learning Workshop, Institute of Play, Central Michigan University, Mount Pleasant, MI, Jan. 2015

Joint Mathematics Meeting, American Mathematical Society and Mathematics Association of America, San Antonio, TX, Jan. 2015

MichMATYC Annual Meeting, Michigan Mathematics Association of Two Year Colleges, Benton Harbor, MI, Oct. 2014

Student Success Summit, Michigan Student Success Network, East Lansing, MI, September 2014

MathFest, Mathematics Association of America, Portland, OR, August 2014

Legacy of R.L. Moore Conference, Academy of Inquiry-Based Learning, Denver, CO, June 2014

Joint Mathematics Meeting, American Mathematical Society and Mathematics Association of America, Baltimore, MD, Jan. 2014

AMATYC National Conference, Anaheim, CA, November 2013

Mathematics Success Workshop, Montana Tech of the University of Montana, Butte, MT, August 2013

MathFest, Mathematics Association of America, Hartford, CT, August 2013

Inquiry-Based Learning Workshop, Mathematics Association of America Professional Development, California Polytechnic University, San Luis Obispo, CA, June 2013

Naked Presenter Learning Community, Ferris State University, Big Rapids, MI, May 2013

Scholarship of Teaching and Learning Academy, Grand Valley State University, Grand Rapids, MI, May 2013

Developmental Education Symposium, Baton Rouge Community College, Baton Rouge, LA, April 2013

Surviving the Wild: Examining Student Conduct in Today's Classroom, Ferris State University, Big Rapids, MI, March 2013

Joint Mathematics Meeting, American Mathematical Society and Mathematics Association of America, San Diego, CA, January 2013

Roadmap to Course Redesign Learning Community, Ferris State University, Big Rapids, MI, November 2012

Presentation Zen Learning Community, Ferris State University, Big Rapids, MI October 2012

Pearson Navigators III, Monroe, MI, October 2012

Lilly Conference on Teaching and Learning, Traverse City, MI, September 2012

MAA Mathfest, Madison, WI, August 2012

Project NExT Workshop, Madison, WI, July 2012

PUBLICATIONS

[1] Victor Piercey and Roxanne Cullen. *Teaching Inquiry with Linked Classes and Learning Communities.* Problems, Resources, and Issues in Mathematics Undergraduate Studies. Upcoming special issue on Teaching Inquiry. (peer reviewed)

[2] Victor I. Piercey. *Data-Based Investigations into Police Corruption: A Case Study of Racial Profiling.* Proceedings of the All-Russian and International Conference on Dialogue for Action against Corruption Conference, Institute of Economics, Management, and Law, Kazan, Russia, November 2015, pg. 117

[3] Michelle Hine Armstrong, Victor I. Piercey, and Stephanie Green-Hunley. *A Tale of Two Stock Markets.* Mathematics Teaching in the Middle School, National Council of Teachers of Mathematics, Vol. 20, No. 9, May 2015, pgs. 522 - 530. (Peer reviewed)

[4] Scott Guth, Rob Kimball, Andrea Levy, Aaron Montgomery, Maura Mast, and Victor Piercey. *Quantitative Reasoning.* Charles A. Dana Center, New Mathways Project, Austin, TX, 2014. (Peer reviewed)

[5] Sheila Tobias and Victor Piercey. *Math Anxiety and the Common Core.* Ohio Journal of School Mathematics, No. 70, Fall 2014, pgs. 4 - 5. (Peer reviewed)

[6] Victor Piercey. *Thoughts on* $\sqrt{x^2+9}$. Mathematics Teacher, Vol. 107, No. 9, May 2014, pages 645 - 646.

[7] Victor Piercey. *Supporting Quantitative Literacy with Projects.* SIGMAA-QL Newsletter, MAA Special Interest Group on Quantitative Literacy, Volume 8, December 2013, pages 2 - 4.

[8] Sheila Tobias and Victor Piercey. *Banishing Math Anxiety.* Kendall-Hunt Publications, 2012.

[9] Victor Piercey. *Federalism and Land Use Regulation in Russia.* The Journal of Eastern European Law, East European Law Center, Columbia University School of Law, Vol. 6, 1996, pgs. 55 - 90.

Actuarial Science Exam Passes

SOA Exam P/CAS Exam 1: Probability. March, 2015

SOA Exam FM/CAS Exam 2: Financial Mathematics. April, 2016

Recent Service

Board Member and Treasurer, Our Brothers Keeper homeless shelter, Big Rapids, MI, April 2016 - present

Chair, SIGMAA-QL (Quantitative Literacy Special Interest Group of the Mathematics Association of America), February 2016 - present

Curriculum Proposal Creator and Champion: Actuarial Science Program Modifications, February 2016 - March 2016

Lead Guest Editor, Special Issue of PRIMUS on Interdisciplinary Conversations, January 2016 - present

Lead Organizer, Contributed Paper Session on Conversations with the Partner Disciplines, Joint Mathematics Meetings, Seattle WA, January 2016

Co-Organizer, Contributed Paper Session on Inquiry-Based Learning in Mathematics, Joint Mathematics Meetings, Seattle WA, January 2016

Co-Organizer, Contributed Paper Session on Quantitative Literacy in K-16 Education, Joint Mathematics Meetings, Seattle WA, January 2016

Organizer, Mathematics Department Reading Group on Inquiry-Based Learning, November 2015 - present

Member of Ferris State University delegation to the Institute of Economics, Management, and Law in Kazan, Russia, November 2015

Chair, Quantitative Literacy Subcommittee of the General Education Committee, Ferris State University, November 2015 - present

Newsletter Editor, Michigan Section of the Mathematics Association of America, October 2015 - present

Creator and Chair of Academic Interdisciplinary Collaboration Task Force, Ferris State University, September 2015 - present

Faculty Mentor for Harvey Hanna in MATH 190, Ferris State University, August 2015 - present (team-teaching supported by internal grant funding)

Member of the Steering Committee for BEYOND Globalization Initiative, August 2015 - present

Member of the Steering Committee for the Economic Inequality Initiative, August 2015 - present

Curriculum Proposal Creator and Champion: MATH 109 and MATH 114, August 2015 - January 2016

Member of the Diversity Plan Task Force, August 2015 - January 2016

Founding Member and Promoter for the Special Interest Group of the Mathematics Association of America on Inquiry-Based Learning in Mathematics (with Stan Yoshinobu and TJ Hitchman), Mathematics Association of America, July 2015 - present

Ferris Promesa, Mathematics Faculty Supervisor, Ferris State University, June 2015 - August 2015 (compensated)

Member of College of Arts and Sciences Dean Search Committee, Ferris State University, June 2015 - present

Board Member and Public Relations Committee Chair, Our Brothers Keeper homeless shelter, Big Rapids, MI, May 2015 - May 2016

Member of the Financial Aid, Pricing, and Financial Services Sub-Team for the Ferris State University Strategic Enrollment Plan, Ferris State University, February 2015 - present

Member of the Steering Committee for the Political Engagement Project, Ferris State University, February 2015 - present

Faculty Mentor for Erin Militzer in MATH 190, Ferris State University, January 2015 - May 2015 (compensated with release time)

Member of the Mathematics Association of America Committee on Curriculum Renewal Across the First Two Years (CRAFTY), January 2015 - January 2018

Chair, Algebra Committee, Ferris State University, Department of Mathematics, November 2014 - present

Member of Strategic Plan Measurement Team, Ferris State University, October 2014 - present

Search Committee Member, Department of Mathematics, Ferris State University, September 2014 - present

Board Member, Crossroads Charter Academy, Big Rapids, MI, September 2014 - present

Chair, Dissertation Committee for Barb Bouthillier in DCCL Program, Ferris State University, August 2014 - present

Member of Strategic Planning and Resource Council, Ferris State University, June 2014 - present

At-Large Member of the Faculty Senate Executive Board, Ferris State University, April 2014 - present

Legacy of R.L. Moore Conference Co-Organizer, Academy of Inquiry-Based Learning, June 2014 - present

Ferris Promesa, Mathematics Faculty Supervisor, Ferris State University, June 2014 - August 2014 (compensated)

Website and Newsletter Editor, SIGMAA-QL (Quantitative Literacy Special Interest Group of the Mathematics Association of America), January 2014 - January 2016

Mathematics Department General Education Task Force, chair, Ferris State University, November 2013 - present

University Curriculum Committee, Ferris State University, September 2013 - present

College of Arts and Sciences Curriculum Committee, Ferris State University, September 2013 - present

Search Committee Member, Department of Mathematics, Ferris State University, September 2013 - March 2014

Mathematics faculty member for linked MATH 190 and ENGL 150/250 sequence with Roxanne Cullen, includes mentoring of other faculty pairs to teach linked MATH/ENGL courses, Ferris State University, August 2013 - present

Editorial Board, Mathitudes Online Journal, August 2013 - present

Statistics Textbook Reviewer, Pearson, June 2013

Member of the Provost's Achievement Gaps Taskforce, May 2013 - May 2014

Member of the Faculty Senate, Ferris State University, April 2013 - present

Referee, PRIMUS Special Edition on Actuarial Science Education, April 2013 - August 2013

Actuarial Science Program Committee, Chair, Ferris State University, March 2013 - April 2013

College of Arts and Sciences Planning Committee, Ferris State University, September 2012 - April 2014

Mathematics/Business Common Core Committee, Ferris State University, September 2012 - April 2013

Senate Diversity Committee, Ferris State University, September 2012 - April 2013

SELECTED AWARDS

Timme Travel Grant, Faculty Center for Teaching and Learning, Ferris State University, November 2014 (to be used January 2015)

Junior Faculty Fellows Program, Cohort 1, Faculty Center for Teaching and Learning, Ferris State University, October 2014 - present

LearnLab Fellows, Cohort 1, Faculty Center for Teaching and Learning, Ferris State University, May 2014 - present

Focus on Student Success Grant, Faculty Center for Teaching and Learning, Ferris State University, January 2013 - May 2014

Timme Travel Grant, Faculty Center for Teaching and Learning, Ferris State University, November 2012 (used January 2013)

Project NExT Fellowship, Mathematics Association of America, August 2012 - August 2013

Galileo Circle Scholar, University of Arizona, April 2012

Centennial Achievement Graduate Student Award, Nominee, University of Arizona, December 2011

Graduate Student Outstanding Service Award, Mathematics Department, University of Arizona, April 2011

GK-12 Fellowship, National Science Foundation, May 2009 - May 2011

Outstanding Teaching Assistant Award, Mathematics Department, University of Arizona, April 2008

Phi Beta Kappa, April 1996

Professional Memberships

Mathematics Association of America

Special Interest Group of the Mathematics Association of America for Inquiry-Based Learning

Special Interest Group of the Mathematics Association of America for Quantitative Literacy

American Mathematical Association of Two Year Colleges

National Numeracy Network

New York State Bar Association (retired)

Holly Price
820 Campus Drive, ASC 2032
Big Rapids, MI 49307
(231) 591-3884 • priceh@ferris.edu

Experience

Associate Mathematics Professor
FERRIS STATE UNIVERSITY
8/2006 - PRESENT

Assistant Mathematics Professor
FERRIS STATE UNIVERSITY
8/2003 – 8/2006

Adjunct Mathematics Professor
FERRIS STATE UNIVERSITY
8/2002 – 8/2003

Statistical Consultant
VISTEON
8/2001 - 8/2002

Summer Research Fellow
GREAT LAKES ENVIRONMENTAL RESEARCH LAB (NOAA)
5/2001 – 8/2001

Graduate Student Instructor
UNIVERSITY OF MICHIGAN
8/2000 – 8/2001

Math Facilitator
FERRIS STATE UNIVERSITY
8/1999 – 5/2000

Education

Marketing Research Certificate
FERRIS STATE UNIVERSITY
9/2009

M.A. Applied Statistics
UNIVERSITY OF MICHIGAN
4/2002

- Dept. of Statistics Outstanding First Year Applied Master's Student Award (2001)
- Dept. of Statistics Outstanding Teaching Award (2001)

B.S. Applied Mathematics
FERRIS STATE UNIVERSITY
5/2000

- Ferris State University Applied Math/Actuarial Science Scholarship
- Dept. of Mathematics Outstanding Student in Applied Mathematics Award (2000)
- USAA All-American Scholar Collegiate Award
- Who's Who Among Students in American Universities and Colleges Award

Scholarly Activity and Professional Development:

- F.S.U. Merit Award (2016)
- Presented at the John N. Gardener Institute Gateway Course Experience Conference (Apr. 2016)
- Presented at the MI Student Success Conference (Feb. 2016)
- Inquiry Based Learning Colloquium (Nov. 2015)
- F.S.U. Retention and Student Success Math Studies (2014 - present)
- Concur Training (Fall 2012)
- Blackboard Training (Summer 2012)
- Distinguished Teacher Nominee (2011 - 2012)
- ALEKS Mid-West Regional Conference (Mar. 2012)
- TI-Nspire Statistics Online Workshop (Nov. 2011)
- TI-Nspire Common Core State Standards Online Workshop (Oct. 2011)
- F.S.U. Merit Award (2011)
- Math in Action/Conversations among Colleagues (Feb. 2011)
- Web Assign Experiment (2009 - 2010)
- Statistical Consultant to Math, Science, and Technology Center (2008 - 2011)
- Presented a SPSS Tutorial to the Math, Science, and Technology Center (Dec. 2008, 2009)
- F.S.U. Marketing Research Certificate (Dec. 2009)
- American Statistical Association Statistics Career Day at G.V.S.U. (Nov. 2005, 2008, 2011)
- MichMATYC Conference: Collaborating for Student Success (Oct. 2008)
- FerrisConnect Training (Oct. 2008)
- AP Statistics Reader (Jun. 2008, 2009, 2010, 2011)
- FSUS 100 Training (May 2007)
- Learner Centered Teaching Workshop (May 2007)
- 50 Ways to Assess Students Learning Workshop (May 2007)
- Presentation: A Discussion on Collaborative Testing, FSU (Feb. 2007)
- Learner Centered Teaching Colloquium (Nov. 2006)
- Lilly North Conference (Sept. 2006)
- Collaborative Testing Experiment (Fall 2006)
- Honorable Mention Award in the COMAP Modeling Competition, Advisor (2005)
- Six Sigma Training and Greenbelt Certification (Oct. 2005)
- Ferris State University Pat-On-The-Back Award (Jun. 2005)
- 15th Annual Equity in the Classroom Conference (Apr. 2005)
- SLA Training (Jan. 2005)
- WEBCT Training (Jan. 2005)
- Mathematics in Action: Data Analysis Throughout the Mathematics Curriculum (Feb. 2004)
- Conversations Among Colleagues: Collaborating to Improve the Mathematical Education of Our Students (Mar. 2004)
- Lilly West Conference: The Arts and Crafts of Teaching (Mar. 2003)
- Publication: Temperature Influence on Commercial Lake Whitefish Harvest in Eastern Lake Michigan published in the Journal of Great Lakes Research 29(2) : 296-300. (2003)
- Completed the CTLFD New Faculty Training (2002 - 2003)

Service:

- Math Coordinator: Curriculum Review of the Courses on the Path to Calculus (2015-present)
- Ferris Faculty Association Treasurer (2015 - present)
- Math Department Assessment Committee (2015 - present)
- Math 010/110/115/120/130 Curriculum Coordinator (2015 - present)
- Ferris Faculty Association Grievance Committee (2014 - 2015)
- Math Department Assistant Professor Search Committee (2014 - 2015)
- Actuarial Science Program Development Committee (2013 - 2014)
- United Way Department Volunteer (2013 - present)
- Data Analytics Program Development Committee (2012 - 2013)
- Business/Math Core Committee (2012 - 2013)
- Ferris Faculty Association Crisis Committee (2013)
- Ferris Faculty Association Insurance Manager (2013 - 2015)
- Ferris Faculty Association Insurance Committee (2004 - present)
- Ferris Faculty Association Arts & Sciences Representative (2010 - present)
- Ferris Faculty Association Negotiation Team Member (2010 - 2011)
- Math Department Algebra Division Committee; Chair (2010 - present)
- Math 115 Web Assign Experiment (2009 - 2010)
- Secondary Math Education Curriculum Assessment Subcommittee (2009 - 2012)
- Developed Math 318 - Statistics and Probability for Teachers (2006)
- Human Resources Contract Negotiations Subcommittee (2009 - 2011)
- SLA Panel Member (2009)
- Math, Science, and Technology Center Panel Member for Potential Recruits (April 2009)
- Pancakes with the President Volunteer (May 2008)
- Promotion and Merit Committee (2008 - 2010)
- Math Faculty Search Committee (2007 - 2008)
- Math Department Faculty Development Fund Committee, Chair (2007 - present)
- Elementary Education Department Division Committee (2007 - 2009)
- Math 110: Introductory Algebra Learning Outcomes Committee (2007)
- Quantitative Skills Statement Committee (2006)
- VPAA Faculty Award Selection Committee (2006 - 2008)
- SLA Coordinator Search Committee (Summer 2006)
- Math Department Head Search Committee (2005 - 2006)
- Health Care Committee for Ferris Faculty Association (2005 - 2010)
- Faculty Advisor for the COMAP Mathematical Contest in Modeling (2005)
- Judge at the Math, Science, and Technology Center Science Fair (2005)
- Mentor to J. Oaks Ferris State University Honors Program Project (Spring 2005)
- Math Department Scheduling Committee (2004 – present)
- Secretary to Department Meetings (2004 - 2005)
- Faculty Advisor to Alpha Xi Delta (2004 - 2008)
- Faculty Advisor to the Math Club (2004 - 2005)
- Dawg Days Recruitment Volunteer (2004 - 2005, 2007 - 2008)
- Presidential Task Force on Communication Participant (2004)
- Algebra Placement Exam Committee (2003 - 2005)
- Departmental Statistics Division Committee (2002 - present)
- Applied Math Program Review Committee (2002, 2008, 2015-present)

Courses Taught at F.S.U.:

•	Math 110:	Introduction to Algebra
•	Math 115:	Intermediate Algebra
•	Math 116:	Introduction to Algebra and Trigonometry
•	Math 117:	Contemporary Mathematics
•	Math 120:	Trigonometry
•	Math 126:	Algebra and Analytic Trigonometry
•	Math 130:	Pre-Calculus
•	Math 135:	Calculus for the Life Sciences
•	Math 251:	Statistics for the Life Sciences
•	Math 314:	Probability
•	Math 318:	Probability and Statistics for Teachers
•	Math 414:	Mathematical Statistics I
•	Math 416:	Mathematical Statistics II
•	Statistics Workshop:	Introductory Statistics Course (for the FSU Math, Science, and Technology Center Students)

KENT SUN

Ferris State University
ASC 2026 (Math Dept.) x2579
kentsun@ferris.edu

PERSONAL: Natural-born United States citizen

TEACHING BACKGROUND:

At Ferris State University

- Supervised independent Study in Linear Algebra (for Alex Capaldi)
- Orientation to Honors (Hnrs 100)
- Intermediate Algebra (Math 115)
- Contemporary Mathematics (Math 117)
- Trigonometry (Math 120)
- Algebra and Analytic Trigonometry (Math 126)
- Advanced Algebra and Analytical Trigonometry (Math 130)
- Calculus for Business (Math 132)
- Calculus for the Life Sciences (Math 135)
- Analytical Geometry and Calculus I (Math 220)
- Analytical Geometry and Calculus II (Math 230)
- Statistics for the Life Sciences (Math 251)
- Linear Models in Statistics (Math 310)
- Linear Algebra (Math 322)
- Differential Equations (Math 330)
- Actuarial Science Professional Exam Preparation I (Math 385)
- Mathematical Statistics I (Math 414)
- Mathematical Statistics II (Math 416)
- Introduction to Complex Variables (Math 435)

At Stony Brook University

- Introduction to Statistics
- Introduction to Finite Mathematics
- Fundamentals of Computing

HONORS:

- Member of Pi Mu Epsilon (National Honorary Math Society, 2012)
- Outstanding First-Year Advocate award (2010-2011)
- Honors Senior Sendoff Banquet (chosen by 11 students as their most influential professor) [2013 (5), 2011, 2010 (2), 2007 (2), 2005]
- Staff appreciation member for the FSU Bachelors of Science in Nursing (2010)
- RSO advisor award nominee (2011, 2009)
- Student-Athlete Advisory Committee (SAAC) faculty appreciation night (2008)
- Promotion to Full Professor (2008)
- Honorary Member of the Golden Key International Honour Society (2004)

Promotion to Associate Professor (2003)
Invited Speaker for Alexander Capaldi who won the Outstanding Scholar Award (Fall 2003)
Invited faculty member at the Second Student Athlete Advisory Council's Faculty Appreciation Night. (Spring 2003)
Outstanding Faculty Award (Spring 2003, Presented at the Honors Awards Night)
Invited faculty member at a Faculty Appreciation Night by the women's volleyball team (Fall 2002)
Invited faculty member at the First Student Athlete Advisory Council's Faculty Appreciation Night. (Spring 2002)
Memorandum acknowledging a positive student impact (Winter 2001)
Outstanding Teaching Award (Spring 1997)

COMMITTEE WORK:

University:

Golden Key International Honour Society RSO advisor (10 years, fall 05-spring 15)
Math and Actuarial Sciences RSO co-advisor (6 years, fall 09 – present)
Pi Mu Epsilon (Math National Honor Society) chapter advisor and permanent faculty correspondent (fall 12 - present)
Omicron Delta Kappa assistant (fall 15 - present)

From fall 2007 to spring 2012, I have been on 6 credits release time each semester as an Assistant Coordinator for the Honors Program.
For fall 2012, I have been on 12 credits release time for being the Interim Honors Coordinator.
Honors Program Council member (5 years, fall 07 to the fall 12)
Search committee member for Honors Director (fall 2012)
Statistician for the Honors Program's Academic Program Review (fall 2009)

Academic Senate member (8 years, fall 04 to spring 12)
- Student Fees committee member (10 years, spring 05 to 2015)
- Distinguished Teaching Award committee member (fall 11-spring 12)
- Academic Senate Elections chair (fall 2010-spring 2011)
- Senate committee member for revising the Senate Charter (fall 2009)

Arranged to bring the following speakers to give a presentation:
- Michelle Albright – Coordinator for Career Services (Are you LinkedIn?, fall 2014)
- Chris Place- Actuarial Scientist from Towers Watson (Seminar on the actuarial profession, his career, and Towers Watson, fall 2014)
- Marilyn Markel- recent alumna (Talk on her recent job hunting experiences as well as her present job at a realtor company, spring 2014)

Heidi Stern-Commercial Sales Manager at The Hartford Insurance Company (Seminar on insurance sales opportunities, spring 2011)

Alex Capaldi, Ph.D. – Assistant Professor of Mathematics at Valparaiso University (Seminar on his latest mathematical research, fall 2010)

Huntington Bank (Seminar on retirement planning, fall 2010)

Katrina Krevinghaus-Computer programmer at Auto Owners (Seminar on computer science opportunities, spring 2010)

Brandon Odell-Actuary at Blue Cross Blue Shield (Seminar on actuary science opportunities, spring 2010)

Amanda Glick-Graduate Student at Western Michigan University (Seminar on industrial engineering opportunities, spring 2010)

Caroline Stern, Ph.D. -Professor in Languages and Literature (Seminar on writing effective resumes and cover letters, fall 2010)

Jon Oaks, Ph.D. – Assistant Professor of Mathematics at Macomb Community College (Seminar on undergraduate math research opportunities, fall 2009)

Jennifer McGinnis – Actuary at Swiss Re (Seminar on actuary science opportunities, fall 2008)

S-STEM (Scholarships in Science, Technology, Engineering, and Mathematics) assistant at FSU (spring 07 to spring 11)

Academic Advising Committee Task Force member (08-09)

President's Academic Advising Task Force member (fall 06 - spring 07)

Faculty-in-residence search committee (2015)

Diversity Planning Committee member (spring 07 to spring 09)

Conversations Partner Application committee member (fall 11) (Created scholarships for Study Abroad programs)

Writings on the Wall committee member (fall 09)

Judge for the rising stars awards (spring 09)

Judge for the torchbearer awards (spring 08)

College:

Applied Math advisor (2013 – 2015)

Pre-Pharmacy advisor (10 years)

Advising Group Chair for Pre-Pharmacy (6 years, fall 04 to the fall 10)

Promotion/Merit committee member (fall 13-spring 15, fall 06-spring 07,)

Arts and Science Dean's Search committee member (fall 02)

Committee Member for revising the promotion/merit policy (spring 07)

Departmental:

Math Program Coordinator (2013-present)

Faculty Search committees
(2014, 2013, 2011, 2008, 2006, 2005, 2002, 2001, 2000)
Tenure committee member for David McClendon
Chair of the Math Scheduling committee (Until 2010)
Chair and advisor of the Statistics Departmental Division
Actuarial Science co-Advisor
Math Advisory Board committee member
Applied Math curriculum Departmental Division member
Data Mining Program committee member

Miscellaneous:

Brought five students to Accident Fund Holdings in Lansing, MI for informational sessions on actuarial science (fall 14, 15)

Brought students to Chicago, Il for a weekend of museums and other cultural activities (fall 15, fall 14, spring 14, spring 13)

MATH (Michigan Autumn Take Home) Challenge point person for Ferris (fall 13, 14, 15)

Honors Program Interim Coordinator (fall 12)

Honors Program Assistant Coordinator (fall 07 to spring 12)

Calculus the Musical, Grand Valley State University
Brought students to see the play. 3/30/12 and 4/6/10

Golden Key Honour Society – Detroit Institute of Art meeting 4/10/11

Lower Michigan Math Competition, Grand Valley State University
Brought 3 students down for the competition. 4/10/10

SEMINARS and WORKSHOPS ATTENDED:

Michigan Transfer Agreement 11/13/14

2011 Blackboard 9.1 LEARN training 12/1/11

Presentation Zen workshop on how to create effective powerpoint presentations fall 2010

2011 Spring Learning Institute 4/29/2011: Workshop by Dr. Todd Zakrajsek

AMATYC/ASA Web-Based Distance Learning Program 2/26/09
Emphasizing Conceptual Understanding in Statistics (Webinar)

Honors program meeting at Alma College

College of Arts and Sciences Outcomes-Assessment (11/06)
Biology of Learning (9/06 – 12/06)
Critical Thinking Panel, Faculty Development Day (8/06)
Teaching So Your Students Will Remember (8/06)
Spring Learning Institute 2006 (4/06)
What Grades Can't Tell Us, Assessing Student Learning (11/05)
Learner-Centered Teaching (9/05 – 12/05)
Making Course Assessment More Effective (8/05)
Utilizing Lotus Notes to the Max (5/05)
Topics in Teaching (10/04, 1/05, 2/05, 4/05)
Academic Advising Workshop (2/04 - 3/04)
Teaching and Student Retention (9/03)
Beginning Photoshop Elements (5/03)
Advanced Photoshop Elements (5/03)
Critical Thinking Workshop (5/03)
WebCT Workshop (5/03-6/03)
Learning and Teaching (2/02 - 4/02)
Test What You Teach, Teach What You Test (9/01 - 11/01)
Facilitating Student Learning Program (9/00 - 12/00)
New to Ferris Faculty (9/00 – 5/01) (required for all new faculty)

PRESENTATIONS:

Making the Wrong Decision? Not a chance! (Presented 4/21/16)

The Hunt for Pi (Presented 4/23/15)

Some Milestones in Math: it's (almost) all Greek to me (Presented 4/10/14)

Using Tegrity in Math Courses (with Michael Dekker, Presented 10/12/10)

A Discussion on Collaborative Testing (with Michael Dekker, Harvey Hanna, Holly Schalk, Presented 2/8/07)

Faculty Panel on Learner Centered Teaching (Presented 8/24/05)

A Tree Grows in Big Rapids: An Introduction to the Statistical Method of Recursive Partitioning (Presented 11/21/02)

PRESENTATIONS BY STUDENTS (guided by me):

Cardano and the Cubic Solution (Caitlin Carmody & Jaime Mullen, presented 4/18/13)

Moneyball (Poster presentation) (Brooke Hanson and Nathan Dykstra, spring 2013)

Fibonacci: it's as easy as 1, 1, 2, 3 (Megan Kuk and Marilyn Markel, presented 3/5/13)

History of e (Mickelle Bradley, presented 2/28/13)

PI: A Constant that Never Ends (Megan Kuk, presented 3/13/12)
A Brief History of e (Timothy Reynhout, presented 2/7/12)

Ant Colony Optimization and the Travelling Salesman Problem (Benjamin Piering, presented 11/30/10)

CONFERENCES:

Omicron Delta Kapp Conference 6/18/16 Grand Rapids, MI
Michigan Undergraduate Mathematics Conference spring 15, spring 13, fall 10, fall 09
Golden Key Honor Society Conference spring 13, 10, 09
SOTL (Scholarship of Teaching and Learning) 5/18/09-5/19/09 Yipsilanti, MI
Golden Key Honour Society Conference Chicago, IL 2/20/09 - 2/22/09
Honors Program Conference Mount Pleasant, MI 11/21/08
AMS (American Mathematical Association) Mathematical Knowledge for Teaching Kalamazoo, MI 10/18/08
NACADA (National Academic Advising Association) Conference (fall 2008)
Lilly North, Traverse City, MI 9/18/08-9/21/08
Equity Conference (Inclusion, Leadership and the Classroom: Making the Connection) (spring 2008)
NACADA (National Academic Advising Association) Conference in Chicago, IL 10/1/08
NACADA (National Academic Advising Association) 2008 Conference in Grand Rapids, MI 4/7/08

18th Annual Equity Conference (Inclusion, Leadership and the Classroom: Making the Connection) Big Rapids, MI 3/30/08-4/1/08

Midwest Numerical Analysis Day Conference (spring 2007)
MIACADA (Michigan Academic Advising Association) Conference "Putting the Pieces Together: Sharing Ideas and Best Practices" (spring 2007)
NACADA (National Academic Advising Association) Assessment of Academic Advising Institute Workshop (spring 2006)
Michigan MAA(Mathematical Association of America)/MichMATYC (Michigan Association of Two Year Colleges) Joint Conference (spring 2006)
Michigan MAA(Mathematical Association of America)/MichMATYC (Michigan Association of Two Year Colleges) Joint Conference (spring 2005)
Michigan Undergraduate Mathematics Conference (fall 2005)
Michigan MATYC Faculty (Michigan Association of Two Year Colleges) Conference (fall 2003)
Michigan MATYC (Michigan Association of Two Year Colleges) Faculty Conference (fall 2002)
Lilly Conference (fall 2002)
Lilly Conference (spring 2001)

Equity Conference (spring 2001)

EDUCATION:

Post-Doctoral Training in Biostatistics UNC at Chapel Hill
Training in biostatistics with an emphasis in clinical trials studies and recursive partitioning

Ph.D. Applied Mathematics & Statistics Stony Brook University
Dissertation Topic: Diffusion Problems in Fluid Flow Models
Advisor: Professor Reginald P. Tewarson

M.S. Applied Mathematics & Statistics Stony Brook University

M.S. Electrical Engineering Polytechnic University

B.S. Electrical Engineering Cornell University

PUBLICATIONS:

KU Aziz, B. Dennis, CE Davis, K Sun, G. Burke, T. Manolio, AMA Faruqui, H. Chagani, T. Ashraf, N. Patel, H. Jafery, S Ghauri, M. Faisal, AK Tareen. **Efficacy of CVD Risk Factors Modification in a Lower-Middle Class Community in Pakistan: The Metroville Health Study - A USA-Pakistan Cooperative Study**
Asia Pacific Journal of Public Health 15(1): 30-36, 2003

K. Sun, I.H. Moon, R.P. Tewarson, and J.L. Stephenson. **Parallel algorithms for multinephron renal medullary models.** *Computers math. with Applic., 33(6):37-45, 1997*

K. Sun, R.P. Tewarson, A.M. Weinstein, and J.L. Stephenson. **Numerical solution of differential and algebraic equations for a flow model with diffusion.** *Appl. Math. Letters, 8(4): 79-82, 1995*

INDUSTRIAL EXPERIENCE:

Research Assistant
Department of Physiology and Biophysics (Summer 1993, 1994)
Cornell University Medical College
Solved mathematical models of kidney functions using numerical methods.

Microwave Engineer Level II
Government Systems Division (1985-1990)
General Instrument
Designed, built, and tested discrete microwave components and integrated systems for radar detectors.

COMPUTER SKILLS:

Computer Languages

C, Fortran, Parallel programming, SAS

Operating Systems:

UNIX, OSF/1 UNIX (for parallel machines), Microsoft systems

Curriculum Vitae

Joseph S. Tripp

Mathematics Department
Ferris State University
Big Rapids, MI 49307
(231) 591-5893
JosephTripp@ferris.edu

17320 McKinley Road
Big Rapids, MI 49307
(231) 796-8586

Education

Doctor of Philosophy, Mathematics Education, Syracuse University, Syracuse, New York
Granted August 1999 Dissertation Title: An Investigation of Changes in College Students' Conceptions of Mathematics and Mathematics Learning During Participation in a Reform-based Developmental Mathematics Course

Master of Science, Mathematics Education, Syracuse University, Syracuse, New York
Granted June 1993

Bachelor of Arts, Double Major: Mathematics and Secondary Math Education, State University of New York (SUNY) College of Arts and Sciences at Plattsburgh, Plattsburgh, New York
Granted May 1991

Professional Experience

Professor (August 2009 to Present)
Associate Professor (August 2003 to August 2009)
Assistant Professor (August 1999 to August 2003)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for teaching mathematics courses to college-level students. Duties include planning for effective instruction of students, developing a syllabus for each course I teach, adapting instruction to meet student needs, designing and grading tests and homework assignments, evaluating student progress, tutoring individual students outside of regular class meetings, preparing accommodations for students with special needs, and holding office hours. Also responsible for attending department meetings, attending college meetings, writing letters of reference for students, and advising pre-pharmacy students. Responsibilities include working with structured learning assistance (SLA) workshop facilitators to enhance the learning experiences of my students, which includes meeting regularly with facilitators to discuss the best ways to help students who are struggling with their mathematics learning experiences.

Administrative Assistant (May 2006 – May 2007)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsibilities included preparing fall, spring and summer schedules of mathematics and computer science course offerings (including number of sections of each course to be offered, offering times and room assignments), monitoring enrollments during registration periods (opening new sections as needed and canceling sections with insufficient enrollments), working with faculty to assign teaching schedules, assisting the department head in the hiring of non-tenure track faculty to cover all sections of our courses, visiting each semester the classes of non-tenure track faculty and submitting an evaluation report to the department head for each visit, evaluating student transcripts (to determine math course equivalencies), evaluating courses from other institutions (to determine equivalencies with our courses), determining proper placement of students into math classes, exercising oversight of department committees to ensure committees are meeting as needed, working closely with constituencies across campus, and meeting regularly with the department head regarding departmental issues.

Courses Taught

Face to Face

Prealgebra (Math 010): Fall 1999, Winter 2000, Fall 2000, Winter 2001, Fall 2001, Winter 2002, Fall 2002, Winter 2003, Fall 2003, Winter 2004, Fall 2004, Fall 2007, Fall 2008, Fall 2009, Fall 2010
Orientation to Honors (HNRS 100): Fall 2013
Beginning Algebra (Math 110): Winter 2001, Winter 2003, Winter 2004, Fall 2004, Winter 2005, Summer 2005, Fall 2005, Spring 2006, Fall 2010, Summer 2011, Fall 2012, Spring 2013
Intermediate Algebra (Math 115): Fall 2002, Spring 2013, Fall 2013, Spring 2014, Fall 2015
Intermediate Algebra and Numerical Trigonometry (Math 116): Fall 2003, Spring 2013, Summer 2014, Summer 2015
Contemporary Mathematics (Math 117): Winter 2000, Winter 2002
Trigonometry (Math 120): Spring 2008, Spring 2009, Spring 2010, Summer 2010, Fall 2010
Mathematical Analysis for Business (Math 122): Summer 2001
Algebra and Analytic Trigonometry (Math 126): Spring 2012, Spring 2016
Advanced Algebra and Analytical Trigonometry (Math 130): Winter 2005, Summer 2005, Fall 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, Spring 2012, Fall 2011, Fall 2012, Spring 2013, Fall 2013, Spring 2014, Fall 2014, Spring 2015
Math for Elementary Teachers I (Math 218): Spring 2015, Fall 2015, Spring 2016
Analytical Geometry and Calculus I (Math 220): Fall 2001-Winter 2002, Spring 2008, Fall 2008-Spring 2009, Summer 2009, Fall 2009-Spring 2010, Fall 2014
Teaching Elementary and Middle School Mathematics (Math 418): Fall 2011

Online

Intermediate Algebra and Numerical Trigonometry (Math 116): Summer 2014, Summer 2015
Contemporary Mathematics (Math 117): Summer 2013
Algebra and Analytic Trigonometry (Math 126): Spring 2012

Innovative Teaching

In the interest of actively engaging my students in the learning and doing of mathematics I have employed various Homework Management Systems (MyMathLab, WebAssign, and WileyPlus) and an Adaptive Learning System (ALEKS). I have also employed materials developed by the Harvard Calculus Consortium that are more activity-based and concept-oriented than traditional materials. For example, in my Intermediate Algebra classes I have used the textbook, *Algebra: Form and Function*, by McCallum et al. along with Wiley Plus, a homework management system. In my Precalculus classes I have used *Functions Modeling Change* by Connally et al. along with WileyPlus and supplementary materials, including classroom activities. I have also taught with materials developed by the Consortium for Foundation Mathematics, namely, the textbook series *Mathematics in Action*.

My current efforts toward innovating in my classes is to experiment with using traditional materials with a non-traditional approach. The nature of this teaching approach is to shift my students' attention from an exclusive focus on content to the larger goal of developing essential workplace skills such as complex problem solving skills and critical thinking skills. My intention is to initiate this shift by turning our attention toward the concepts and processes embedded in the content of our course while also recognizing and making sense of important connections between and among concepts and processes.

Scholarship Activities

Research Projects

I recently concluded an investigation of the role students' dispositions play in the way they engage with mathematics problem solving situations. This study was conducted in the context of courses where concept-intensive instructional materials were being implemented. This study was based on an interest in engaging students in the classroom with concept-intensive mathematics problem solving situations, an interest that grew out of observing a reluctance on the part of many students to engage with concept-intensive problem situations.

I am currently in the early stages of a study intended to investigate how students' career goals can play a role in motivating them to engage with the demands of learning mathematics. This study involves turning students' attention toward their goals and toward the role a particular course can play in developing the skills needed to realize their goals.

Grant

Weller, Kirk; Tripp, Joseph; Piercey, Victor; Trouba, Jerome; (January 2014 – May 2016). Pilot Phase Projects in Support of Revision of the Developmental and General Education Mathematics Program. Faculty Center for Teaching and Learning, Ferris State University, $25,000

Sabbatical Leave

During the Spring 2011 semester, I reviewed literature, reflected on my teaching experience, and developed survey questions, discussion questions, and activities designed to facilitate my students' learning of mathematics.

Presentations

Tripp, J. S. (May 2016). Motivating Student Engagement Through a Shift in Focus from Content to an Experience of Learning Essential Workplace Skills. Research presented at the 7th Annual Scholarship of Teaching and Learning Academy, The University of Findlay, Findlay, Ohio

Tripp, J. S. & Rausch, K. (May 2015). Engaging Precalculus Students with Concept-Intensive Problem Situations. Research findings presented at the 6th Annual Scholarship of Teaching and Learning Academy, The University of Findlay, Findlay, Ohio

Tripp, J. S. & Rausch, K. (April 2014). Presented at a Mathematics Department Colloquium. Shared our experience implementing Functions Modeling Change materials in Precalculus classes over the past two years. Ferris State University, Big Rapids, Michigan.

Tripp, J. S. (February 2014). Presented a brief report to the Ferris State University Board of Trustees on my Sabbatical Leave and its impact on my teaching. Quarterly meeting of the Board of Trustees, Ferris State University, Big Rapids, Michigan.

Tripp, J. S. et al. (March 2008). Structured Learning Assistance (SLA) Faculty Panel Discussant. Several other faculty and I shared with symposium attendees our experiences working with the SLA program and our impressions of its effectiveness. SLA Symposium, Ferris State University, Big Rapids, Michigan.

Forintos, M. & Tripp, J. S. (March 2005). The Structured Learning Assistance (SLA) Program. Some reflections on our experiences working with the SLA program presented at the Conversations Among Colleagues Conference, Michigan State University, Lansing, Michigan.

Tripp, J. S. (January 2004). Served as a Guest Speaker at the SLA New Faculty and Facilitator Training Workshop. Shared with participants my perspectives of the roles of faculty and workshop facilitators. Ferris State University, Big Rapids, Michigan.

Tripp, J. S. (July 2003). Fun with Math. Conducted a workshop session for public school students in grades 8 through 12 at the College Day Summer Technology Camp, Ferris State University, Big Rapids, Michigan.

Tripp, J. S. (October 2002). Some Characteristics of a Radically Reformed College-Level Mathematics Course. Colloquium Presentation, Mathematics Department, Ferris State University, Big Rapids, Michigan.

Tripp, J., Card, R., Mirtz, R., Schmidt, J., Johnson, L. & Adsmond, D. (December 2000). Teaching Insights Panel Discussion. We were invited to participate in a panel discussion concerning what we have learned about ways to effectively teach Ferris students. Learning about Teaching luncheon, Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan

Doerr, H. M., & Tripp, J. S. (April 1998). Model Development and Shifts in Students' Thinking. Paper Presented at Challenges and Opportunities of a Modeling Curriculum Symposium at the Annual Meeting of the American Educational Research Association, San Diego, California.

Tripp, J. S. (October 1997). The Effects of a Reform-Based Classroom Experience on Students' Conceptions of Mathematics and Mathematics Learning. Dissertation proposal presented at the 4th Annual New York Graduate Mathematics Education Research Conference at Syracuse University, Syracuse, New York.

Tripp, J. S. (October 1997). The Effects of a Reform-Based Classroom Experience on Students' Conceptions of Mathematics and Mathematics Learning. Dissertation proposal presented at the monthly meeting of the Teaching and Leadership Faculty, School of Education, Syracuse University, Syracuse, New York.

Doerr, H. M., & Tripp, J. S. (June 1997). Shifts in Student Thinking. Paper presented at The Fourth International Misconceptions Seminar—From Misconceptions to Constructed Understanding, Cornell University, Ithaca, New York.

Tripp, J., Myers, A., Nigam, P., & de Silva, R. (April 1997). Bridging the Gap Between Mathematics and Mathematics Education: Reflections on Designing Materials and Implementing Pedagogy and Research. 23rd Annual New York State Regional Graduate Mathematics Conference, Syracuse University, Syracuse, New York.

Tripp, J., Dominguez, A., Myers, A., Nigam, P., O'Brien, K., & de Silva, R. (November 1996). Mathematics Reform at the Undergraduate Level: Reflections on Designing Materials and Implementing Pedagogy. 3rd Annual New York Graduate Mathematics Education Research Conference at Syracuse University, Syracuse, New York.

Tripp, J., Reap, J., McGuire, K., & Mariano, M. (May 1996). Research Proposal: Persistence Across Ethnic Groups and Stages of Doctoral Study. Research proposal presented before the members of a Graduate Course on Educational Research Methods, Syracuse University, Syracuse, New York.

Tripp, J. S. (November 1995). Cognitive Style and the Learning of Geometry. Paper presented before the members of a Graduate Course on Teaching Geometry, Syracuse University, Syracuse, New York.

Publications

Tripp, J. S. (1999). Reprint of "Getting Students to do Homework." Missouri Council of Teachers of Mathematics Bulletin, 24(4), 15-16.

Doerr, H. M., & Tripp, J. S. (1999). Understanding How Students Develop Mathematical Models. Mathematical Thinking and Learning, 1(3), 231-254.

Tripp, J. S. (1998). Getting Students to do Homework. The Mathematics Teacher, 91(6), 478-479.

Masingila, J., Dominguez, A., King, K., & Tripp, J. (1997). Algebraic Operations and Functions. Needham Heights, MA: Simon & Schuster Custom Publishing.

Masingila, J., Dominguez, A., King, K., & Tripp, J. (1998). Algebraic Operations and Functions, 2nd Ed. Needham Heights, MA: Simon & Schuster Custom Publishing.

Meetings Attended

Attended the 7th **Annual Scholarship of Teaching and Learning Academy** (Theme: Integrating Technology with Learning: The 21st Century SoTL Classroom), The University of Findlay, Findlay, Ohio, May 16-17, 2016

Attended the **6th Annual Scholarship of Teaching and Learning Academy** (Theme: Reflect and Refresh: Twenty-five Years of SoTL), The University of Findlay, Findlay, Ohio, May 18-19, 2015

The Michigan Mathematical Association of Two-Year Colleges (MichMATYC) 2014 Fall Conference (Theme: Navigating the Winds of Change), Lake Michigan College, Benton Harbor, Michigan, October 4, 2014

Attended the **5th Annual Scholarship of Teaching and Learning Academy** (Theme: Making Student Learning Visible), Grand Valley State University, Grand Rapids, Michigan, May 20-21, 2013

Attended an **ALEKS Workshop**, Ferris State University, Big Rapids, Michigan, April 19, 2013
Discussed best practices in the use of the ALEKS adaptive learning system.

Attended an **ALEKS Workshop**, Ferris State University, Big Rapids, Michigan, January 7, 2013
Discussed best practices in the use of the ALEKS adaptive learning system.

Participated in the **Pre-Conference Workshop, An Inquiry into Teaching and Learning: Starting and Strengthening a SoTL Project)**, May 20, 2012 and attended the **4th Annual Scholarship of Teaching and Learning Academy** (Theme: Collaborative Engagement), Grand Valley State University, Grand Rapids, Michigan, May 21-22, 2012.

Attended the **ALEKs Mid-West Regional Conference**, Grand Rapids, Michigan, March 23, 2012

Attended the **Conversations Among Colleagues Conference** (Theme: Common Core State Standards: Implications for Mathematics Education), Grand Valley State University, Allendale, Michigan, February 5, 2011

Attended the 34th Annual **National Association for Developmental Education Conference** Columbus, Ohio, March 10-13, 2010

Attended the 5th annual **Conversations Among Colleagues Conference** (Theme: What Does It Mean To Do Mathematics), University of Michigan – Dearborn, Dearborn, Michigan, March 21, 2009

Attended the Special Session on Mathematical Knowledge for Teaching at the **American Mathematical Society Sectional Meeting**, Western Michigan University, Kalamazoo, Michigan, October 17-18, 2008

Attended the 18th Annual **Equity in the Classroom Conference** (Theme: Inclusion, Leadership and the Classroom: Making the Connection), Ferris State University, Big Rapids, Michigan, March 31, 2008

Attended the the 4th annual **Conversations Among Colleagues Conference** (Theme: Educating Future Teachers of Mathematics: Elementary through University), Western Michigan University, Kalamazoo, Michigan, March 15, 2008

Attend (two or three) Mathematics Department **Colloquia** each semester, Ferris State University, Big Rapids, Michigan, Fall 2002 to Present

Attended the American Educational Research Association **(AERA) 2007 Annual Meeting** (Theme: The World of Educational Quality), Chicago, Illinois, April 12 - 13, 2007

Attended a Mathematics Department **Learning Outcomes Workshop** sponsored by the Faculty Center for Teaching and Learning, (The participants discussed the development of learning outcomes statements for the courses we teach.), Ferris State University, Big Rapids, Michigan, March 15, 2007

Attended the **Spring Learning Institute** sponsored by the Faculty Center for Teaching and Learning (Theme: Creating the Learning-Centered University; Keynote by John Tagg, Author of The Learning Paradigm College), Ferris State University, Big Rapids, Michigan, January 26, 2007

Attended a College of Arts and Sciences **Learning Outcomes Workshop** sponsored by the Faculty Center for Teaching and Learning (The participants discussed the development of learning outcomes statements for the courses we teach.), Ferris State University, Big Rapids, Michigan, November 16, 2006

Attended the Mathematics Department **Faculty discussion group**, (Topic: "How to create a learning atmosphere"), Ferris State University, Big Rapids, Michigan, Fall 2006

Attended the **Math Education Seminar** sponsored by the Mathematics Department, Ferris State University, Big Rapids, Michigan, April 11, 2006

Attended the **Conversations Among Colleagues Conference** (Theme: Collaborating to Improve the Mathematical Education of Our Students), University of Michigan, Ann Arbor, Michigan, March 24, 2006

Attended meetings of the Mathematics Department **Faculty discussion group**, (Topics included: "Tips for teaching" and "How to motivate students"), Ferris State University, Big Rapids, Michigan, Spring 2006

Attended a three-hour **Learner-Centered Teaching Seminar** sponsored by the Faculty Center for Teaching and Learning, Ferris State University, Big Rapids, Michigan, November 11, 2005

Attended **Teaching to Create Deep Learning Seminar** sponsored by the Faculty Center for Teaching and Learning, Ferris State University, Big Rapids, Michigan, August 24, 2005

Attended the **Math Education Seminar** sponsored by the Mathematics Department, Ferris State University, Big Rapids, Michigan, April 14, 2005

Attended the **Conversations Among Colleagues Conference** (Theme: Collaborating to Improve the Mathematical Education of Our Students), Michigan State University, Lansing, Michigan, March 19, 2005

Attended the Psychology of Mathematics Education-North American Chapter **(PME-NA) 2004 Annual Meeting** (Theme: Building Bridges Between Communities), Toronto, Ontario, Canada, October 21 - 23, 2004

Attended meetings of the Mathematics Department **Faculty discussion group**, (Topics included: "How to detect and handle cheating," How to deal with noisy, disruptive students," and "Grade inflation and how to deal with students wanting higher grades"), Ferris State University, Big Rapids, Michigan, Fall 2004

Attended the **Spring Learning Institute** sponsored by the Faculty Center for Teaching and Learning (Keynote presentation by Tisha Bender), Ferris State University, Big Rapids, Michigan, April 2, 2004

Attended the **Conversations Among Colleagues Conference** (Theme: Collaborating to Improve the Mathematical Education of Our Students) sponsored by Grand Valley State University, Grandville, Michigan, March 20, 2004

Attended the **Michigan Mathematical Association of Two-Year Colleges Fall Conference**, Lansing Community College, Lansing, Michigan, October 11, 2003

Attended the American Educational Research Association **(AERA) 2003 Annual Meeting** (Theme: Accountability for Educational Quality: Shared Responsibility), Chicago, Illinois, April 24 - 25, 2003

Attended a 7-week seminar entitled "**WebCT: Preparing for your first semester**" Sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, Winter 2003

Attended the **Spring Learning Institute** sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, March 28, 2003

Attended the **Michigan Mathematical Association of Two-Year Colleges Fall Conference,** Monroe County Community College, Monroe, Michigan, October 5, 2002

Attended the 2nd annual **Lilly Conference** on College and University Teaching
Ferris State University, Big Rapids, Michigan, September 2002

Attended a week-long session on building community in the classroom entitled "**Building Community in the Classroom as a Way to Enhance Student Learning and Motivation**" sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, July 2002

Attended the **Spring Learning Institute** (Theme: Brain Research—keynote given by Robert Sylwester), Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, March 22, 2002

Attended the 25th Annual **National Association for Developmental Education Conference**
Louisville, Kentucky, March 14-18, April 2001

Attended the 11th Annual **Equity Conference** (Theme: Teaching and Learning in a Diverse Classroom: "Let America be America…"), Ferris State University, Big Rapids, Michigan, March 22-23, 2001

Attended an 11-week seminar entitled "**Facilitating Student Learning**" sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, Fall 2000

Attended a seminar entitled "**The Art of Confrontation**" sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, October 12, 2000

Attended a seminar entitled "**Teaching At-Risk Learners**" sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan, September 12, 2000

Attended the 78th annual meeting of the **National Council of Teachers of Mathematics,** Chicago, Illinois, April 12-15, 2000

Participated in a year-long **New Faculty Orientation** Program sponsored by the Center for Teaching, Learning, and Faculty Development, Ferris State University, Big Rapids, Michigan,
Fall 1999 – Winter 2000

Attended **Harassment/Sensitivity Training,** Office of Affirmative Action, Ferris State University, September 30, 1999

Book Reviews

Reviewed the table of contents for a 1st edition Prealgebra textbook for McGraw-Hill
Authors: Miller, O'Neil, and Hyde, Spring 2008

Reviewed a textbook draft for McGraw-Hill, Prealgebra by Bach and Leitner, 3rd ed.
Summer 2004

Reviewed a textbook draft for McGraw-Hill, Prealgebra by Streeter et al., 1st ed.
Summer 2001

Reviewed a textbook draft for Prentice-Hall, Prealgebra by Martin-Gay, 3rd ed.
Fall 1999

Service Activities

University-Level

General Education Quantitative Literacy Subcommittee (Fall 2015 – Present)
Ferris State University, Big Rapids, Michigan
Responsibilities include defining criteria for the quantitative literacy general education outcome, preparing a rubric for evaluating proposed courses, and evaluating courses requesting general education certification for quantitative literacy.

Student Assessment Instrument Task force (Spring 2014 – Fall 2014)
Ferris State University, Big Rapids, Michigan
Responsibilities included revamping the SAI and making necessary changes including addition of new items or deletion of current ones, revising the language to make the instrument clearly understood by the students and to minimize guessing, advising as to the time and setting of administration of the instrument: online or during class, and submitting a report to the Academic Senate.

Professional Development Committee (Fall 2007 - Spring 2010 and Fall 2012 to Spring 2014)
Served as Chairperson (Fall 2009 - Spring 2010)
Served as Secretary (Fall 2008 - Spring 2009 and Fall 2012 to Spring 2013)
Ferris State University, Big Rapids, Michigan
Responsible for revising application guidelines, determining application deadlines, reviewing and evaluating professional development grant proposals, and determining awards.

Honors 100 Course Instructor (Fall 2013) Ferris State University, Big Rapids, Michigan
Responsible for planning for and delivering instruction to meet course learning outcomes.

Honors Outstanding Scholar Committee (January 2013)
Ferris State University, Big Rapids, Michigan
Responsible for selecting a senior level honors student to receive the Outstanding Senior Honors Scholar Award. Selection is based on essays written by senior level honors students and follow-up interviews.

Participated in **DAWG Days** events (Spring 2005, Spring 2006)
Involved meeting prospective students and their parents, answering questions, and providing materials. Ferris State University, Big Rapids, Michigan

Frequently write **letters of recommendation** for students, staff, and faculty
(Fall 1999 to Present) Ferris State University, Big Rapids, Michigan

<u>**College-Level**</u>
Advising Pre-pharmacy Students (Fall 2000 - Present)
College of Arts and Sciences, Ferris State University, Big Rapids, Michigan
Responsibilities include attending annual meetings with College of Pharmacy Associate Dean and with CAS educational counselors to discuss issues related to effectively advising pre-pharmacy students and meeting individually with students each semester to discuss course selection for the next semester and to discuss the larger issue of fulfilling requirements. Also involves advising students who are considering applying to other pharmacy colleges or changing majors.

Sabbatical Leave Committee (Fall 2008 - Spring 2009 and Fall 2014 – Spring 2016)
College of Arts and Sciences, Ferris State University, Big Rapids, Michigan
Responsible for reviewing sabbatical leave application files, participating in meetings to discuss applicant files, and forwarding a rank-ordered list of recommended applications to the Dean.

Advising Secondary Mathematics Education Students (Fall 2006 – Fall 2007)
School of Education, Ferris State University, Big Rapids, Michigan
Assisted students with the selection of mathematics and computer science courses and determining substitutions for courses in special cases.

Promotion/Merit Committee (Fall 2004 - Spring 2006)
College of Arts and Sciences, Ferris State University, Big Rapids, Michigan
Responsible for reviewing promotion and merit application files, participating in meetings to discuss applicant files, forwarding rank-ordered lists of granted and approved applications to the Dean, discussing changes in policies, and meeting with applicants.

<u>**Department-Level**</u>
General Education Task Force (Fall 2013 – Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for encouraging and facilitating the implementation of innovative teaching approaches among faculty in the Mathematics Department.

Tenure Committee for Victor Piercey (Fall 2012 - Present)
Serving as Chairperson (Fall 2012 to Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Includes conducting classroom observations, writing reports, and generally overseeing the growth and progress of the faculty member toward tenure.

Tenure Committee for Erin Militzer (Fall 2014 - Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Includes conducting classroom observations, writing reports, and generally overseeing the growth and progress of the faculty member toward tenure.

Tenure Committee for Anil Venkatesh (Spring 2016 - Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Includes conducting classroom observations, writing reports, and generally overseeing the growth and progress of the faculty member toward tenure.

Scheduling Committee (Fall 2002 - Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
The Scheduling Committee is responsible for addressing concerns regarding the scheduling of courses in the Mathematics Department and participating in the resolution of scheduling problems.

Algebra Course Committee (Fall 99 - Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for updating course outline as needed, developing learning outcomes statement, maintaining a current proficiency test, and selecting new textbooks.

Education Course Committee (Fall 2011 - Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for updating course outline as needed, developing learning outcomes statement, maintaining a current proficiency test, and selecting new textbooks.

Core Course Committee (Fall 2011 - Present)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for updating course outline as needed, developing learning outcomes statement, maintaining a current proficiency test, and selecting new textbooks.

Tenure Line Faculty Search Committee (Fall 2013 – Spring 2014)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for reviewing applications, selecting candidates for telephone interviews, conducting telephone interviews, selecting candidates for on-campus interviews, and facilitating on-campus interviews.

Post Doctoral Faculty Search Committee (April 2013)
Responsible for reviewing applications and interviewing candidates.

Tenure Line Faculty Search Committee (Fall 2011 – Spring 2012)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for reviewing applications, selecting candidates for telephone interviews, conducting telephone interviews, selecting candidates for on-campus interviews, and facilitating on-campus interviews. Two new tenure line faculty members were hired from this search.

MSTART Working Group (Mathematics Secondary Teacher Assessment and Revision Task) (Fall 2009 to Fall 2012)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Worked with several members of our department toward revising the mathematics component of our Secondary Mathematics Education degree program.

Tenure Committee for Jerome Trouba (Fall 2010- Fall 2013)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved classroom observations and writing reports.

Secondary Mathematics Education Committee (Fall 2002 - Spring 2009)
Mathematics Department, Ferris State University, Big Rapids, Michigan
The Mathematics Education Committee is responsible for overseeing the curriculum of the mathematics component of the B.S. degree in Secondary Mathematics Education.

Strategic Planning Committee (Fall 2008 – Spring 2009)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for creating a mission statement and goals along with action steps for our department.

Tenure Line Faculty Search Committee (Fall 2008 – Spring 2009)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for reviewing applications, selecting candidates for telephone interviews, conducting telephone interviews, selecting candidates for on-campus interviews, and facilitating on-campus interviews. One tenure line faculty member was hired from this search.

Tenure Committee for Mike Dekker (Fall 2004 - Fall 2007)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved classroom observations and writing reports.

Learning Outcomes Committee, (Spring 2007)
Served as Chairperson (Spring 2007)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Developed a learning outcomes statement for Math 130 (Advanced Algebra and Analytic Trigonometry).

Faculty Development Committee, (Fall 2001 - Spring 2006)
Served as Chairperson (Fall 2002 - Spring 2006)
Mathematics Department, Ferris State University, Big Rapids, Michigan
The Faculty Development Committee is responsible for promoting involvement in professional development activities among the faculty. The committee develops guidelines and procedures for distributing faculty development funds and decides on funding of proposed faculty development activities. My responsibilities as chairperson included scheduling and calling meetings, communicating policies, deadlines and awards to faculty and coordinating with the department head and secretary. I also served as the point of contact for the faculty, department secretary and department head.

Elementary Education Subcommittee (Fall 2005 - Spring 2006)
Served as Chairperson (Fall 2005 - Spring 2006)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Charged with developing a new course (Discrete Mathematics for Teachers) as part of a newly developed Mathematics Minor for elementary education students. Involved developing course outline and sample syllabus.

Learning Outcomes Committee, (Fall 2006)
Served as Chairperson (Fall 2006)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Developed a learning outcomes statement for our general education mathematics classes.

Elementary Education Committee (Fall 2005 - Spring 2006)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Responsible for overseeing the curriculum of the mathematics courses required of all elementary education students and the Mathematics Minor for elementary education students. From Fall 2005 to Spring 2006 we developed a new Math Minor, which included the development of five new courses.

Textbook Selection Committee (Spring 2006)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved reviewing several textbooks and selecting one text for Math 130 (Advanced Algebra and Analytical Trigonometry).

Textbook Selection Committee (Fall 2005)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved reviewing several textbooks and selecting one text for Math 110 (Beginning Algebra) and 115 (Intermediate Algebra).

Textbook Selection Committee (Spring 2005)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved reviewing several textbooks and selecting one text for Math 130 (Advanced Algebra and Analytical Trigonometry).

Textbook Selection Committee (Spring 2005)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved reviewing several textbooks and selecting one text for Math 010 (Prealgebra).

Quantitative Skills Committee (Fall 2004 - Spring 2005)
Mathematics Department, Ferris State University, Big Rapids, Michigan
Involved working toward the development of a general education statement for our general education mathematics courses (i.e., a statement of how each course contributes to the fulfillment of the quantitative skills portion of the University's general education requirement).

Professional Membership

National Council of Teachers of Mathematics

Jerome Trouba

(406) 570-2458 (home)
(231) 591-5630 (office)

Department of Mathematics
Ferris State University
Big Rapids, MI 49307

troubaj@ferris.edu

EDUCATION

Ph.D. Mathematics (Education Specialization) — Dec. 2009
Montana State University, Bozeman, MT

M.S. Mathematics — May 2006
Montana State University, Bozeman, MT

B.S. Mathematics Teaching (Secondary) — May 2003
Magna Cum Laude
University of Mary, Bismarck, ND

TEACHING EXPERIENCE

Ferris State University – Associate Professor — Fall 2009 - Present

Courses Taught:

- Math 110 – Fundamentals of Algebra
- Math 115 – Intermediate Algebra
- Math 116 – Intermediate Algebra with Numerical Trigonometry
- Math 117 – Contemporary Mathematics (online)
- Math 120 – Trigonometry
- Math 218 – Math for Elementary Teachers 1
- Math 219 – Math for Elementary Teachers 2
- Math 220 – Calculus 1
- Math 230 – Calculus 2
- Math 317 – Geometry for Elementary and Middle School Teachers
- Math 322 – Linear Algebra
- Math 325 – College Geometry
- Math 326 – Discrete Mathematics for Teachers
- Math 328 – Discrete Structures
- Math 330 – Differential Equations
- Math 360 – Operations Research
- Math 440 – Mathematical Modeling
- Math 497—Applied Mathematics for Chemical Engineers

Montana State University - Graduate Teaching Assistant — Fall 2003 – Spring 09

Math for Elementary Teachers I and II, Calculus for Technology I and II
Multivariable Calculus, Survey of Calculus, Calculus & Analytic Geometry I and II
Precalculus, College Algebra

Bismarck High School - Student Teacher Spring 2003
Algebra, Discrete Math, Trigonometry, Statistics

GRANTS

2008 - Yopp, D., Trouba, J. *Improving the Instructional Practices of Graduate Teaching Assistants in the Mathematical Sciences.* Montana State University – Office of the Vice Provost. Awarded $9,650.

2007 - (Submitted, not funded). Yopp, D. (P.I.), Trouba, J. *Improving the Teaching Effectiveness of Graduate Teaching Assistants in Undergraduate Mathematics.* Montana Space Grant Consortium – Science and Engineering Education Enhancement. $34,923

RESEARCH

Publication: Weller, K., Trouba, J., Wood, R. (2015). A Comparison of Instructional Delivery Formats in Intermediate Algebra, *MathAMATYC Educator*, 7(1), 14-23.

Student Placement – Analyzed the placement and retention in Beginning or Intermediate Algebra of 30,000 students based on ACT math score. Results lead to a policy change regarding minimum prerequisite ACT math score for placement into these courses.

Dissertation: *Designing, Implementing, and Evaluating a Teacher Training Workshop for Graduate Mathematics Teaching Assistants*. Advisor: Dr. David Yopp.

- To help train new Graduate Mathematics Teaching Assistants (GMTAs) to become more effective teachers, a workshop was designed based on effective teaching and professional development literature. Through the workshop, GMTAs learned to reflect on their teaching, engage their students, ask good questions, and use formative classroom assessment techniques. Results indicated that the teaching of over half of the participating GMTAs was significantly impacted by their workshop experience.

PRESENTATIONS

The Mathematics of Bird Flight April 2013
Biology invited talk - FSU

The Effects of Three Homework Systems on Student Learning in Intermediate Algebra: A Comparative Study Feb 2012
RUME, Portland, Oregon

The Design, Implementation, and Evaluation of a Teacher Training Workshop for GMTAs Feb 2010
The working group for Research on Novice College Mathematics Instructors: RUME Conference, Raleigh, NC

Designing, Implementing, and Evaluating a Teacher Training Workshop for Graduate Mathematics Teaching Assistants Aug 2009
Mathfest, Portland, Oregon

New GTA Teacher Training Spring 2008
Mathematics Education Seminar, MSU, Bozeman

"Proving" 1=2 Spring 2008

Mathematics Graduate Seminar, MSU, Bozeman

The Three-Dimensional Heat Equation — Spring 2007
Mathematics Graduate Seminar, MSU, Bozeman

Distributional Solutions to Differential Equations — Fall 2006
Mathematics Graduate Seminar, MSU, Bozeman

Computing Laplace Transforms using Residues — Fall 2004
Mathematics Seminar, University of Mary, Bismarck, ND

The Buckingham Pi Theorem and its Applications — Fall 2003
Mathematics Seminar, University of Mary, Bismarck, ND

PROFESSIONAL ACTIVITIES

MAA PREP Workshop – Modeling: Early and Often in Undergraduate Calculus, Grand Rapids, MI — July 2012

Guided Inquiry into Energy Technology, Grand Rapids, MI — May 2012

ALEKS Midwest Regional Conference – Invited Panelist — March 2012
Grand Rapids, MI

Great Lakes Conference on Teaching and Learning — May 2011
Central Michigan University, Mount Pleasant, MI

Conversations Among Colleagues, Grand Valley State University — Feb 2011

Inquiries into Teaching and Learning: A Focus on Student Learning — Spring 2011

ALEKS Training — April 2011

HONORS AND AWARDS

Faculty Appreciation Award — 2012
National Residence Hall Honorary at FSU

Faculty Appreciation Award — 2011, 2012
Student Athlete Advisory Committee
Ferris State University

Outstanding Graduate Teaching Assistant Award — 2006
College of Letters and Science
Montana State University

Outstanding Graduate Teaching Assistant Award — 2005
Department of Mathematical Sciences
Montana State University

Curriculum Vitae
Anil Venkatesh

Office Address: Ferris State University
Mathematics Department
ASC 2034
Big Rapids, MI 49307

Email Address: AnilVenkatesh@ferris.edu
Homepage: http://anilvenkatesh.com
Telephone: 231.591.2573
Date of CV: March 2016

Education

2015	Ph.D.	Duke University, Mathematics (advisor: Richard Hain) Thesis: *Triple Products of Eisenstein Series* Certificate in College Teaching
2009	B.A.	University of Pennsylvania, Mathematics (summa cum laude)
2009	B.S.E	University of Pennsylvania, Electrical Engineering (summa cum laude)

Academic honors and grants

2015	Timme Travel Grant, Faculty Center for Teaching and Learning, Ferris State University
2015	Project NExT Fellowship, Mathematical Association of America, 2015-2016
2014	Preparing Future Faculty Fellowship, Duke University
2014	Dean's Award for Excellence in Teaching, Duke University
2014	Grad Student Travel Grant – AMS Sectional Meeting
2014	Duke University Conference Travel Award – Joint Mathematics Meetings
2010 – 2014	NSF Graduate Research Fellowship
2010 – 2014	Graduate Fellowship, Duke University (declined 2010-2013)
2009	Phi Beta Kappa (nationwide honor awarded by University of Pennsylvania chapter)
2009	Senior Design Competition – First Prize, University of Pennsylvania (competition among all seniors in engineering)
2009	A. Atwater Kent Prize, University of Pennsylvania (senior-year Moore School award)
2008	E. Stuart Eichert, Jr. Memorial Prize, University of Pennsylvania (junior-year Moore School award)

Research interests

Topology, algebra, number theory, music theory, signal processing, scholarship of teaching and learning

Teaching activities

Courses taught at Ferris

2017	Fall	Quantitative Reasoning for Professionals (Math 109)
2017	Fall	Advanced Algebra-Analytic Trig (Math 130)
2017	Fall	Object Oriented Programming (CPSC 200)
2016	Spring	Linear Algebra (Math 322)
2016	Spring	Calculus 1 (Math 220)
2016	Spring	Intermediate Algebra-Numerical Trig. (Math 116)
2015	Fall	Calculus 2 (Math 230)
2015	Fall	Intermediate Algebra-Numerical Trig. (Math 116, two sections)

Courses taught at Duke

2015	Spring	Laboratory Calculus and Functions I (Math 105L)
2014	Fall	Laboratory Calculus and Functions I (Math 105L)
2013	Spring	Laboratory Calculus and Functions I (Math 105L)
2012	Fall	Introductory Calculus II with Applications (Math 122L)

2012 Spring Laboratory Calculus II (Math 112L)
2011 Fall Laboratory Calculus and Functions I (Math 105L)
2009 Fall Teaching assistant for Laboratory Calculus and Functions I (Math 105L)

Course and curriculum design

2016 Jan. Designed Specifications-based grading system for exams and implemented in all courses. Exams are initially graded on a qualitative scale from "Needs Work" to "Mastery," with a required reflection assignment afterwards.
2015 Sep. Designed and implemented weekly writing exercises focused on student self-reported comprehension and confidence; collected data for SoTL study on student attitudes toward mathematics.
2014 Sep. Designed a Calculus I laboratory assessment introducing logarithmic plotting in the context of the Richter scale. Students rediscover the Gutenberg-Richter law from real seismic data, then write reports discussing the consequences of their findings in public policy and economic terms.
2014 Aug. Replaced Calculus I weekly homework quizzes by in-class reflective writing in order to improve assessment of student comprehension.
2013 Feb. Implemented "flipped classroom" technique of in-class peer review of group reports.
2012 Dec. Reorganized Math 122L course syllabus to improve logical flow and replace unproductive lessons.

Lectures and presentations

Invited talks

2016 Apr. Kalamazoo, MI (K'zoo College): Pythagoras to Secor: Improving the Miracle Temperament
2015 Nov. Holland, MI (Hope College): Generating Functions and Recurrence Relations
—— Oct. Allendale, MI (Grand Valley State University): Generating Functions and Rec. Relations
—— Mar. Washington, DC (AMS sectional meeting): Iterated Integrals of Eisenstein Series
AMS Special Session on Iterated Integrals and Applications
—— Jan. Big Rapids, MI (Ferris State University): Generating Functions and Divisor Fcn. Relations
2014 Nov. Elon, NC (Elon University): Cardinality and Gödel Numbering
—— Oct. Elon, NC (Elon University): Orders of Infinity

Conference abstracts

2016 Jan. Seattle, WA (JMM): Pythagoras to Secor: A mathematical approach to musical temperament
MAA Contributed Paper Session on Math and the Arts
2015 Aug. Washington, DC (MAA MathFest): Pythagoras to Secor: Generalized keyboards and the miracle temperament
Themed Contributed Paper Session: Mathematics and Art
—— Jan. San Antonio, TX (JMM): Massey Products of Eisenstein Series
AMS General Contributed Paper Session on Number Theory

Other talks

2014 Oct. Math Slam (Duke Math Department): Generating Functions and the Fibonacci Sequence
—— Sep. Duke Mathematics Graduate-Faculty Seminar: The Arithmetic of Modular Forms
2009 Sep. Duke Mathematics Elliptic Curves Seminar: A Concrete Approach to Elliptic Integrals

Sessions/panels organized

2016 Oct.	West Michigan Lecture Series in Mathematics Collaboration with Grand Valley State University, Kalamazoo College, and Calvin College Speaker: Michael Dorff
—— Aug.	Columbus, OH (MathFest): Specifications-Based Grading in Undergraduate Courses Project NExT Invited Paper Session Panelists: TBD
—— Jan.	Seattle, WA (JMM): Integrating Writing in Undergraduate Courses Project NExT Invited Paper Session Panelists: Crannell, A., Leonard, K., Pilgrim, M.

Conferences Refereed

2016 Jan.	Joint Mathematics Meetings Undergraduate Poster Session, Seattle, WA
2015 Sept.	SACNAS National Conference Undergraduate Abstract Submissions, Washington, D.C.

Conferences/workshops attended

2016 Aug.	MAA MathFest, Columbus, OH
—— Apr.	MAA Michigan Section Meeting, Hillsdale, MI
—— Mar.	Reacting to the Past Workshop, Eastern Michigan University, Ypsilanti, MI
—— Jan.	Joint Meetings in Mathematics, Seattle, WA
2015 Aug.	MAA MathFest, Washington, DC
—— Aug.	Project NExT Workshop, Washington, DC
—— Mar.	AMS Special Session, Washington, DC
—— Jan.	Joint Meetings in Mathematics, San Antonio, TX
2014 Nov.	AMS Special Session, Greensboro, NC
—— Oct.	Workshop on the Fundamental Group and Periods, Princeton, NJ (IAS)
—— Aug.	Teaching and Learning Conference, Elon, NC
—— Jul.	Periods and Motives: Feynman Amplitudes in the 21st Century, Institudo de Ciencias Matemáticas
2013 Jun.	Recent Advances in Hodge Theory, University of British Columbia
2011 Jun.	Multiple Zeta Values, Modular Forms & Elliptic Motives, University of Bristol
2010 Jun.	Sage Days 22, Berkeley, CA (MSRI)

Engineering research/design experience

2009 Apr.	Working with three other engineering students, designed and built a 21-camera array, wrote a custom video streaming protocol above UDP, and wrote a software package to perform real-time facial recognition of occluded persons. Platform: C++.
2008 Aug.	Research fellow at SUNFEST REU at University of Pennsylvania. Wrote code to implement software package for voice-guided pathfinding robot. Platform: Java and Python.
2007 Jul.	Research assistant at Signal Processing Lab at Helsinki University of Technology. Designed and studied various implementations of Newton's method for optimization on manifold of $n \times n$ unitary matrices. Platform: Matlab.

Community outreach

2010 – 2011	Volunteer tutor at Emily K. Center serving local high school students (Durham, NC)
2008 – 2009	Volunteer teaching assistant in 11^{th}-grade physics at University City High School (Philadelphia, PA)

Academic Service

National Service

2016 –	Pi Mu Epsilon Journal referee

Service at Ferris

2016	Apr.	Faculty representative – Lower Michigan Mathematics Competition (Holland, MI)
2016	Feb.	*Ferris In Focus* Math Department Panelist – television and digital media production senior project
2016	Jan.	Super STEM Saturday Committee – math experience for local middle school students
2015 – 2017		MAA Michigan Section Meeting Planning Committee (Spring 2017)
2015 –		University Senate Diversity Committee
2015 –		Academic Interdisciplinary Task Force
2015 –		Core Departmental Division
2015 –		Department Scheduling Committee
2015	Nov.	Faculty Mentor: Chinese Faculty Mentor Program
2015	Sep.	Faculty representative – Accident Fund information session (Lansing, MI)

Service at Duke

2014	Dec.	Selection Committee – Dean's Award for Excellence in Teaching 2015
2014	Aug.	Graduate Student Panelist – new student orientation for Duke Graduate School
2010 – 2014		Graduate Student Panelist (departmental recruitment events)
2010 – 2011		Graduate Student Departmental Representative

Professional Affiliations

American Mathematical Society, Mathematical Association of America, Pi Mu Epsilon, Council on Undergraduate Research

Relevant Computer Skills

LaTeX, Maple, Mathematica, Sage, Matlab, C++, Excel, Google Docs Suite

References

Richard Hain, Mathematics
Duke University
919.660.2819
hain@math.duke.edu

Chad Awtrey, Mathematics
Elon University
336.278.6299
cawtrey@elon.edu

Leslie Saper, Mathematics
Duke University
919.660.2843
saper@math.duke.edu

Lewis Blake, Mathematics
Duke University
919.660.2857
blake@math.duke.edu

Clark Bray, Mathematics
Duke University
919.660.2800
cbray@math.duke.edu

Curriculum Vitæ

Shaw Walker

Contact Information

Department of Mathematics
Ferris State University
Big Rapids, Michigan 49307

Office: (231) 591–2570
Home: (231) 580–1445
Email: `walkers@ferris.edu`

Personal Data

Birth date: March 12, 1964
Birthplace: Muskegon, Michigan

Citizenship: U.S.
Married, two children

Education

M.S.	Scientific Computing and Computational Mathematics, Stanford University, Department of Computer Science, 1999
B.S.	Mathematics, *Magna Cum Laude*, Santa Clara University, 1997
B.M.	Percussion, *with Distinction*, Eastman School of Music, 1987

Employment

2005–Present	Associate Professor, Department of Mathematics, Ferris State University
2001–2005	Assistant Professor, Department of Mathematics, Ferris State University
1999–2001	Lecturer, Department of Mathematics and Computer Science, Santa Clara University
2000	Lecturer, Department of Computer Engineering, Santa Clara University
1999–2001	Unix System Administrator, Department of Mathematics and Computer Science, Santa Clara University
1998	Technical Support Engineer, Hitachi Internetworking Inc.
1996–97	Mathematics/Physics Tutor, Learning Resources Center, Santa Clara University
1996	Research Assistant, Department of Mathematics and Computer Science, Santa Clara University
1992	Interlochen Arts Camp, Music Faculty
1988–92	Military Service, U.S. Navy

Date of CV: December 1, 2015.

Interests

Scientific computing, simulation and modeling, statistics and applied probability, computational statistics, numerical analysis, computer science

Teaching Experience

Associate Professor. Department of Mathematics, Ferris State University, 2005–Present. **Assistant Professor**, 2001–2005. Taught Computer Simulation, Data Structures and Algorithms, Object Oriented Programming (in C++), Applied Calculus, Fundamentals of Algebra, Intermediate Algebra, Intermediate Algebra and Trigonometry, Algebra and Analytic Trigonometry, Contemporary Mathematics.

Lecturer. Department of Mathematics and Computer Science, Department of Computer Engineering, Santa Clara University, 1999–2001. Taught Introduction to Computer Science (in C++), Applied Programming (in C), Calculus and Analytic Geometry I & II, Precalculus.

Tutor. Learning Resources Center, Santa Clara University, 1996–97. Lead discussion sections for calculus, differential equations, and physics courses.

Academic Service

Pre-Engineering AA Program Review Committee, 2015

Sabbatical Leave Committee, College of Arts and Sciences, 2010–14

Departmental Strategic Planning Committee, 2009–10

Departmental Bylaw Committee, 2009–10

Computer Science Division, Department of Mathematics, 2008–Present

Chair, Computer Science Division, Department of Mathematics, 2001–08

Technology Service Course Division, Department of Mathematics, 2004–Present

Statistics Division, Department of Mathematics, 2002–04, 2010–Present

Applied Mathematics Division, Department of Mathematics, 2010–Present

Chair, Tenure Committee for Prof. James Nystrom, 2007–12

College of Engineering Technology Mathematics (MCET) Committee, 2009–10

Pre-Pharmacy Academic Advisor, 2008–Present

Computer Science Academic Advisor, 2002–08, 2013–14

Departmental Curriculum Committee, 2002–08

Faculty Search Committees, 2005–06, 2006–07

Faculty Mentoring Committee, 2006–07

University Quantitative Skills Committee, 2004–06

Departmental Assessment Committee, 2002–04

Departmental Academic Program Review Committee, 2002–03

Mathematics Advisory Board Committee, 2002–03

Departmental Meeting Secretary, 2002–03, 2013

Honors, Awards

Dean's Initiative Grant, Ferris State University, 2004

George W. Evans Memorial Prize in Mathematics, Santa Clara University, 1997

President, California Eta chapter of *Pi Mu Epsilon*, mathematics honor society, 1996–97

Elected to *Phi Beta Kappa*, *Sigma Xi*, and *Pi Mu Epsilon* societies

Professional Memberships

Society for Industrial and Applied Mathematics (SIAM)

Society for Modeling and Simulation International (SCS)

Association for Computing Machinery (ACM)

Institute of Electrical and Electronics Engineers (IEEE)

Activities

Mathematics consultant for *Rudimental Arithmetic* text by Robert Becker, 2006–07

AMS/MAA Joint Mathematics Meetings, January 2003

Appendix E

CPSC Course Results

Course ID	Course Outcome Name	Result Date	Result
CPSC 150	Problem Solving and Programming Steps		
CPSC 150	Reading Programs		
CPSC 150	Thinking about Programs		
CPSC 200	Arrays	06/07/2016	100% of 24 students met this outcome
CPSC 200	C++ Basics	06/07/2016	100% of 24 students met this outcome
CPSC 200	Classes	06/07/2016	92% of 24 students met this outcome
CPSC 200	Compilers	06/07/2016	100% of 24 students met this outcome
CPSC 200	Debugging	06/07/2016	100% of 24 students met this outcome
CPSC 200	File I/O and Namespaces	06/07/2016	92% of 24 students met this outcome
CPSC 200	Functions	06/07/2016	100% of 24 students met this outcome
CPSC 200	Programming Style	06/07/2016	100% of 24 students met this outcome
CPSC 200	Recursion	06/07/2016	96% of 24 students met this outcome
CPSC 300	Advanced C++		
CPSC 300	Applications		
CPSC 300	Asymptotic Analysis		
CPSC 300	Data Structure Design and Implementation		
CPSC 300	Fundamental Data Structures		
CPSC 300	Recursion		
CPSC 300	Searching and Sorting		
CPSC 300	Standard Template Library		
CPSC 320	Applications		
CPSC 320	Implementation		
CPSC 320	Interpretation of Simulation Results		
CPSC 320	Probability Models		
CPSC 320	Simulation Fundamentals		
CPSC 320	Stochastic Systems		
CPSC 326	Computer Graphics Basics		
CPSC 326	Computer Graphics Programming		
CPSC 326	Theory, Methods and Algorithms		
CPSC 328	Counting Problems		
CPSC 328	Inductive Proof		
CPSC 328	Knowledge & Application		

Course ID	Course Outcome Name	Result Date	Result
CPSC 328	Understanding Algorithm Complexity		
CPSC 328	Using Algorithms		
CPSC 340	Assembly Language Programming and Microprogramming		
CPSC 340	Numbers Systems and Digital Logic		
CPSC 340	Operating Systems and Memory System Fundamentals		
CPSC 442	Language Systems, Types and Scope		
CPSC 442	Syntax and Semantics of Programming Languages		

Course Results

Course ID	Course Outcome Name	Result Date	Result
MATH 010	Algebraic Simplification	12/22/2008	76% of students successfully met this learning outcome based on assessment through examinations in two sections of this course.
MATH 010	Algebraic Simplification	05/23/2016	89% of students successfully met this learning outcome based on assessment through a final exam (n=9).
MATH 010	Application	12/22/2008	73% of students successfully met this learning outcome based on assessment through examinations in two sections of this course.
MATH 010	Application	05/23/2016	89% of students successfully met this learning outcome based on assessment through a final exam (n=9).
MATH 010	Basic Computation	12/22/2008	85% of students successfully met this learning outcome based on assessment through examinations in two sections of this course.
MATH 010	Basic Computation	05/23/2016	89% of students successfully met this learning outcome based on assessment through a final exam (n=9).
MATH 010	Ratio Comprehension & Application	12/22/2008	86% of students successfully met this learning outcome based on assessment through examinations in two sections of this course.
MATH 010	Ratio Comprehension & Application	05/23/2016	89% of students successfully met this learning outcome based on assessment through a final exam (n=9).
MATH 010	Real-World Comprehension & Application	12/22/2008	87% of students successfully met this learning outcome based on assessment through examinations in two sections of this course.
MATH 010	Real-World Comprehension & Application	05/23/2016	67% of students successfully met this learning outcome based on assessment through a final exam (n=9).
MATH 109	DATA		
MATH 109	FORMULA CONSTRUCTION		
MATH 109	FORMULA MANIPULATION		
MATH 109	PROBLEM SOLVING		
MATH 109	PROPORTIONAL REASONING		
MATH 110	Application	08/13/2015	Promesa Summer 15 Overall: 77.8% (Based on Final Exams) Promesa Summer 15 Detroit: 53.9% (Based on Final Exam) Promesa Summer 15 Grand Rapids: N/A (Based on Final Exam) Promesa Summer 15 Holland: N/A(Based on Final Exam) Promesa Summer 15 Shelby: 100% (Based on Final Exam)
MATH 110	Application	05/23/2016	80% of the students met this outcome (n=166)
MATH 110	Calculation	08/13/2015	Promesa Summer 15 Overall: 81.5% (Based on Final Exams) Promesa Summer 15 Detroit: 61.5% (Based on Final Exam) Promesa Summer 15 Grand Rapids: N/A (Based on Final Exam) Promesa Summer 15 Holland: N/A(Based on Final Exam) Promesa Summer 15 Shelby: 100% (Based on Final Exam)
MATH 110	Calculation	05/23/2016	93% of the students met this outcome (n=166)
MATH 110	Factoring	08/13/2015	Promesa Summer 15 Overall: 63.1% (Based on Final Exams) Promesa Summer 15 Detroit: 69.2% (Based on Final Exam) Promesa Summer 15 Grand Rapids: 32% (Based on Final Exam) Promesa Summer 15 Holland: 88.9% (Based on Final Exam)

Course ID	Course Outcome Name	Result Date	Result
MATH 110	Factoring	08/13/2015	Promesa Summer 15 Shelby: N/A (Based on Final Exam)
MATH 110	Factoring	05/23/2016	71% of the students met this outcome (n=153)
MATH 110	Graphing & Systems of Equations	08/13/2015	Promesa Summer 15 Overall: 73.8% (Based on Final Exams) Promesa Summer 15 Detroit: 84.7% (Based on Final Exam) Promesa Summer 15 Grand Rapids: 48% (Based on Final Exam) Promesa Summer 15 Holland: 92.6% (Based on Final Exam) Promesa Summer 15 Shelby: N/A (Based on Final Exam)
MATH 110	Graphing & Systems of Equations	05/23/2016	67% of the students met this outcome (n=151)
MATH 110	Polynomials	08/13/2015	Promesa Summer 15 Overall: 79.7% (Based on Final Exams) Promesa Summer 15 Detroit: 69.2% (Based on Final Exam) Promesa Summer 15 Grand Rapids: 72% (Based on Final Exam) Promesa Summer 15 Holland: 96.2% (Based on Final Exam) Promesa Summer 15 Shelby: 100% (Based on Final Exam)
MATH 110	Polynomials	05/23/2016	61% of the students met this outcome (n=161)
MATH 110	Rational Expressions	08/13/2015	Promesa Summer 15 Overall: 69.3% (Based on Final Exams) Promesa Summer 15 Detroit: 69.3% (Based on Final Exam) Promesa Summer 15 Grand Rapids: N/A (Based on Final Exam) Promesa Summer 15 Holland: N/A(Based on Final Exam) Promesa Summer 15 Shelby: N/A (Based on Final Exam)
MATH 110	Rational Expressions	05/23/2016	56% of the students met this outcome (n=152)
MATH 114	Exponential Modeling	05/23/2016	76% of 33 students met this outcome
MATH 114	Linear Analysis	05/23/2016	70% of 33 students met this outcome
MATH 114	Linear Modeling	05/23/2016	82% of 33 students met this outcome
MATH 114	Logarithmic	05/23/2016	52% of 33 students met this outcome
MATH 114	Problem Solving	05/23/2016	70% of 33 students met this outcome
MATH 115	Application	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 65% proficiency recorded on items on this outcome.
MATH 115	Application	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 3 questions over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 34.5% correct responses and the average on the post-test was 72.0% correct responses.
MATH 115	Evaluation of Logarithmic & Exponential Expressions	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 78% proficiency recorded on items on this outcome.
MATH 115	Evaluation of Logarithmic & Exponential Expressions	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 2 questions related to this outcome. (Note: One of these questions is also related to the outcome labeled "Properties of Logarithms".) 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 29.9% correct responses and the average on the post-test was 73.4% correct responses.
MATH 115	Factoring	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 65% proficiency recorded on items on this outcome.
MATH 115	Factoring	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 1 question over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 60.7% correct responses and the

Course ID	Course Outcome Name	Result Date	Result
MATH 115	Factoring	05/10/2010	average on the post-test was 87.8% correct responses.
MATH 115	Graphing	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 57% proficiency recorded on items on this outcome.
MATH 115	Graphing	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 1 question over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 36.4% correct responses and the average on the post-test was 76.7% correct responses.
MATH 115	Linear Equations	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 67% proficiency recorded on items on this outcome.
MATH 115	Linear Equations	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 3 questions over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 41.1% correct responses and the average on the post-test was 78.9% correct responses.
MATH 115	Notation	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students - this outcome was not listed as assessed.
MATH 115	Notation	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 2 questions over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 33.3% correct responses and the average on the post-test was 60.8% correct responses.
MATH 115	Operations with Complex Numbers	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 50% proficiency recorded on items on this outcome.
MATH 115	Operations with Complex Numbers	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 1 question over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 20.9% correct responses and the average on the post-test was 74.4% correct responses.
MATH 115	Operations with Radical Expressions	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 51% proficiency recorded on items on this outcome.
MATH 115	Operations with Radical Expressions	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 2 questions related to this outcome. (Note: These 2 questions are also related to the outcome labeled "Simplifying Expressions".) 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 41.5% correct responses and the average on the post-test was 83.4% correct responses.
MATH 115	Parallel & Perpendicular Lines	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 38% proficiency recorded on items on this outcome.
MATH 115	Parallel & Perpendicular Lines	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 1 question over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 33.5% correct responses and the average on the post-test was 63.9% correct responses.
MATH 115	Properties of Logarithms	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 79% proficiency recorded on items on this outcome.
MATH 115	Properties of Logarithms	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 3 questions related to this outcome. (Note: One of these questions is also related to the outcome labeled "Evaluation of Logarithmic & Exponential Expressions".) 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 29.4% correct responses and the average on the post-test was 86.3% correct responses.
MATH 115	Simplifying Expressions	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 74% proficiency recorded on items on this outcome.
MATH 115	Simplifying Expressions	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 2 questions related to this outcome. (Note: These 2

Course ID	Course Outcome Name	Result Date	Result
MATH 115	Simplifying Expressions	05/10/2010	questions are also related to the outcome labeled "Operations with Radical Expressions".) 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 41.5% correct responses and the average on the post-test was 83.4% correct responses.
MATH 115	Skill: Algebraic Manipulation	05/23/2016	72% of 276 students met this outcome
MATH 115	Skill: Algebraic Problem Solving	05/23/2016	73% of 164 students met this outcome
MATH 115	Skill: Solving Algebraic Equations & Inequalities	05/23/2016	66% of students met this outcome (n=277)
MATH 115	Skill: Understanding & Constructing Graphs	05/23/2016	81% of 279 students met this outcome
MATH 115	Slope	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 75% proficiency recorded on items on this outcome.
MATH 115	Slope	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 1 question over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 37.4% correct responses and the average on the post-test was 84.4% correct responses.
MATH 115	Solving Equations	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 72% proficiency recorded on items on this outcome.
MATH 115	Solving Equations	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 3 questions over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 46.3% correct responses and the average on the post-test was 85.6% correct responses.
MATH 115	Solving Inequalities	12/22/2008	A 50-question multiple choice comprehensive final exam was given to 271 students with 69% proficiency recorded on items on this outcome.
MATH 115	Solving Inequalities	05/10/2010	A 25-question multiple choice pre-test and post-test was given with 2 questions over this outcome. 206 students took the pre-test and 180 of these students took the post-test. The average on the pre-test was 39.5% correct responses and the average on the post-test was 77.5% correct responses.
MATH 116	Computing Values of Trigonometric Functions		
MATH 116	Distance & Midpoint		
MATH 116	Exponentials & Radicals		
MATH 116	Factoring		
MATH 116	Graphing		
MATH 116	Knowledge & Application of Trigonometric Ratios		
MATH 116	Modeling Quadratic Problems		
MATH 116	Parallel & Perpendicular Lines		
MATH 116	Performing Basic Operations		
MATH 116	Solving Oblique Triangles		
MATH 116	Systems of Linear Equations		
MATH 116	Understanding Graphs		
MATH 117	Basic Algebra		

Course ID	Course Outcome Name	Result Date	Result
MATH 117	Graphing & Systems		
MATH 117	Interest Application		
MATH 117	Metric & English Systems		
MATH 117	Normal Distributions		
MATH 117	Polygons		
MATH 117	Probability		
MATH 117	Skill: Solving Financial Applications		
MATH 117	Skill: Performing Basic Statistics		
MATH 117	Skill: Solving Algebraic Equations & Inequalities		
MATH 117	Skill: Solving Basic Probability Applications		
MATH 117	Skill: Solving Geometric Applications		
MATH 117	Skill: Understanding & Constructing Graphs		
MATH 117	Solving		
MATH 117	Statistical Display		
MATH 117	Statistical Measures		
MATH 120	Application		
MATH 120	Area		
MATH 120	Calculator Trigonometric Function Evaluation		
MATH 120	Conversions		
MATH 120	Defining Trigonometric Functions		
MATH 120	Exact Trigonometric Function Evaluation		
MATH 120	Graphing		
MATH 120	Identities		
MATH 120	Solving Triangle Problems		
MATH 120	Solving Triangles		
MATH 120	Solving Trigonometric Equations		
MATH 120	Speed		
MATH 120	Vectors		
MATH 122	Linear Functions	12/22/2008	23 successful students (70% or higher) out of 30 students, so 77% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Functions	05/11/2009	21 successful students (70% or higher) out of 30 students, so 70% of students achieved at least a 70% proficiency on this outcome.

Course ID	Course Outcome Name	Result Date	Result
MATH 122	Linear Functions	12/21/2009	22 successful students (70% or higher) out of 30 students, so 73% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Programming - Algebraic Approach	12/22/2008	22 successful students (70% or higher) out of 29 students, so 76% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Programming - Algebraic Approach	05/11/2009	16 successful students (70% or higher) out of 29 students, so 55% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Programming - Algebraic Approach	12/21/2009	16 successful students (70% or higher) out of 29 students, so 55% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Programming - Geometric Approach	12/22/2008	19 successful students (70% or higher) out of 30 students, so 63% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Programming - Geometric Approach	05/11/2009	15 successful students (70% or higher) out of 30 students, so 50% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Linear Programming - Geometric Approach	12/21/2009	23 successful students (70% or higher) out of 30 students, so 77% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Matrices	12/22/2008	21 successful students (70% or higher) out of 30 students, so 70% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Matrices	05/11/2009	20 successful students (70% or higher) out of 30 students, so 67% of students achieved at least a 70% proficiency on this outcome.
MATH 122	Matrices	12/21/2009	24 successful students (70% or higher) out of 30 students, so 80% of students achieved at least a 70% proficiency on this outcome.
MATH 126	Complex Numbers		
MATH 126	Conic Curves		
MATH 126	Exponentials & Logarithms		
MATH 126	Inequalities		
MATH 126	Logarithms & Exponentials		
MATH 126	Polynomial & Rational Functions		
MATH 126	Polynomial Roots		
MATH 126	Solving Inequalities		
MATH 126	Trigonometric Functions & Identities		
MATH 126	Trigonometry		
MATH 130	1-1 Functions	12/21/2009	91% of students successfully met this learning outcome based on assessment through one examination given in two sections of this course.
MATH 130	Binomial Theorem	12/21/2009	74% of students successfully met this learning outcome based on assessment through one examination given in two sections of this course.
MATH 130	Composite Functions	12/21/2009	81% of students successfully met this learning outcome based on assessment through one examination given in two sections of this course.
MATH 130	Function Concept	12/21/2009	75.5% of students successfully met this learning outcome based on assessment through two examinations both given in two sections of this course.

Course ID	Course Outcome Name	Result Date	Result
MATH 130	Graphing Basic Functions	12/21/2009	89% of students successfully met this learning outcome based on assessment through three examinations all given in two sections of this course.
MATH 130	Graphing Transformations	12/21/2009	81.7% of students successfully met this learning outcome based on assessment through three examinations all given in two sections of this course.
MATH 130	Growth & Decay Application	12/21/2009	77% of students successfully met this learning outcome based on assessment through one examination given in two sections of this course.
MATH 130	Sequences	12/21/2009	83% of students successfully met this learning outcome based on assessment through one examination given in two sections of this course.
MATH 130	Solving Equations	12/21/2009	76% of students successfully met this learning outcome based on assessment through five examinations all given in two sections of this course.
MATH 130	Trigonometric Identities	12/21/2009	74% of students successfully met this learning outcome based on assessment through two examinations both given in two sections of this course.
MATH 130	Verifying Trigonometric Identities	12/21/2009	86% of students successfully met this learning outcome based on assessment through one examination given in two sections of this course.
MATH 130	Zeros of Polynomial Functions	12/21/2009	81% of students successfully met this learning outcome based on assessment through two examinations both given in two sections of this course.
MATH 132	Application	05/11/2009	17 successful students (70% or higher) out of 17 students, so 100% of students achieved at least a 70% proficiency on this outcome.
MATH 132	Differentiation	05/11/2009	15 successful students (70% or higher) out of 17 students, so 88% of students achieved at least a 70% proficiency on this outcome.
MATH 132	Functions, Graphs, & Limits	02/06/2009	8 successful students (70% or higher) out of 17 students, so 47% of students achieved at least a 70% proficiency on this outcome.
MATH 132	Integration	05/11/2009	9 successful students (70% or higher) out of 17 students, so 53% of students achieved at least a 70% proficiency on this outcome.
MATH 135	Differentiation	12/10/2010	60 out of 64 (94%) students achieved 70% or better .
MATH 135	Exponential and Logarithmic Functions	12/10/2010	58 out of 62 (94%) students achieved 70% or better .
MATH 135	Graphing	12/10/2010	61 out of 64 (95%) students achieved 70% or better .
MATH 135	Integration	12/10/2010	61 out of 62 (98%) students achieved 70% or better .
MATH 135	Limits and Continuity	12/10/2010	60 out of 64 (94%) students achieved 70% or better .
MATH 135	Optimization	12/10/2010	51 out of 64 (80%) students achieved 70% or better .
MATH 216	Applications	05/23/2016	38% of the students met this outcome (n=13)
MATH 216	Integration	05/23/2016	62% of the students met this outcome (n=13)
MATH 216	Limits	05/23/2016	47% of the students met this outcome (n=15)
MATH 216	The Derivative	05/23/2016	50% of the students me this outcome (n=14)
MATH 218	Analysis	12/21/2009	24 students were assessed through activities, quizzes, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Analysis	05/10/2010	25 students were assessed through multiple discussion board assignments and 24 (96%) of them achieved at least a 70% proficiency on this outcome.

Course ID	Course Outcome Name	Result Date	Result
MATH 218	Analysis	12/20/2010	17 students were assessed on this outcome using discussion activities and presentations. 15 (88%) of these students achieved at least 70% proficiency, with an overall class average of 93% on this outcome.
MATH 218	Application	12/21/2009	24 students were assessed through activities, quizzes, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Application	05/10/2010	25 students were assessed through multiple assignments, quizzes, and projects, and 24 (96%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Application	12/20/2010	17 students were assessed on this outcome using daily activities. All students achieved at least 70% proficiency, with an overall class average of 94% on this outcome.
MATH 218	Communication	12/21/2009	24 students were assessed through activities, quizzes, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Communication	05/10/2010	25 students were assessed through multiple assignments, class discussions, quizzes, and projects, and 24 (96%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Communication	12/20/2010	17 students were assessed on this outcome using discussion activities and presentations. 15 (88%) of these students achieved at least 70% proficiency, with an overall class average of 93% on this outcome.
MATH 218	Evaluation	12/21/2009	24 students were assessed through multiple assignments and 23 (96%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Evaluation	05/10/2010	25 students were assessed through multiple assignments and 24 (96%) of them achieved at least a 70% proficiency on this outcome.
MATH 218	Evaluation	12/20/2010	17 students were assessed on this outcome using written assignments. 15 (88%) of these students achieved at least 70% proficiency, with an overall class average of 92% on this outcome.
MATH 219	Analysis	12/21/2009	13 students were assessed through activities, quizzes, presentations, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Analysis	05/10/2010	24 students were assessed through online discussions and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Analysis	12/20/2010	20 students were assessed on this outcome using discussions and assignments. 17 (85%) of these students achieved at least 72% proficiency, with an overall class average of 88% on this outcome.
MATH 219	Application	12/21/2009	13 students were assessed through activities, quizzes, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Application	05/10/2010	24 students were assessed through activities, quizzes, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Application	12/20/2010	20 students were assessed on this outcome using class activities. All of these students achieved at least 74% proficiency, with an overall class average of 96% on this outcome.
MATH 219	Communication	12/21/2009	13 students were assessed through activities, quizzes, presentations, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Communication	05/10/2010	24 students were assessed through activities, quizzes, presentations, and projects, and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Communication	12/20/2010	20 students were assessed on this outcome using discussions and presentations. 17 (85%) of these students achieved at least 72% proficiency, with an overall class average of 88% on this outcome.
MATH 219	Evaluation	12/21/2009	13 students were assessed through multiple assignments and all (100%) of them achieved at least a 70% proficiency on this outcome.

Course ID	Course Outcome Name	Result Date	Result
MATH 219	Evaluation	05/10/2010	24 students were assessed through multiple assignments and all (100%) of them achieved at least a 70% proficiency on this outcome.
MATH 219	Evaluation	12/20/2010	20 students were assessed on this outcome using written assignments. 19 (95%) of these students achieved at least 78% proficiency, with an overall class average of 92% on this outcome.
MATH 220	Absolute Extrema		
MATH 220	Application	05/25/2016	51% of 53 students met this outcome
MATH 220	Approximating Definite Integrals		
MATH 220	Area		
MATH 220	Computations	05/25/2016	53% of 53 students met this outcome
MATH 220	Differentiation		
MATH 220	Estimation	05/25/2016	83% of 53 students met this outcome
MATH 220	Evaluating Definite Integrals		
MATH 220	Function Concepts	05/25/2016	62% of 53 students met this outcome
MATH 220	Function Continuity		
MATH 220	Fundamental Theorem of Calculus		
MATH 220	Graphing		
MATH 220	Growth & Decay Application		
MATH 220	Implicit Differentiation		
MATH 220	Integration		
MATH 220	Limits - Estimation		
MATH 220	Limits - Evaluation		
MATH 220	Logarithmic Differentiation		
MATH 220	Optimization		
MATH 220	Solving Differential Equations		
MATH 226	Improper Integrals		
MATH 226	Integration	05/23/2016	83% of the students met this outcome (n=24)
MATH 226	Laplace Transforms	05/23/2016	55% of the students met this outcome (n=22)
MATH 226	Series	05/23/2016	73% of the students met this outcome (n=22)
MATH 226	Solving Differential Equations	05/23/2016	86% of the students met this outcome (n=22)
MATH 230	Conic Sections		
MATH 230	Differentiation & Integration		
MATH 230	Graphing Conic Sections		
MATH 230	Graphing Parametric Equations		
MATH 230	Graphing Polar Equations		
MATH 230	Integration		

Course ID	Course Outcome Name	Result Date	Result
MATH 230	Real-World Application		
MATH 230	Series		
MATH 251	Estimates	12/22/2008	75% of students successfully met this learning outcome based on assessment through an examination given in this course.
MATH 251	Hypothesis Testing	12/22/2008	83% of students successfully met this learning outcome based on assessment through an examination given in this course.
MATH 251	Knowledge	12/22/2008	78% of students successfully met this learning outcome based on assessment through three examinations given in this course.
MATH 251	Probability	12/22/2008	81% of students successfully met this learning outcome based on assessment through two examinations given in this course.
MATH 251	Significance	12/22/2008	71% of students successfully met this learning outcome based on assessment through an examination given in this course.
MATH 251	Statistical Summaries	12/22/2008	83% of students successfully met this learning outcome based on assessment through two examinations given in this course.
MATH 251	Visual Data	12/22/2008	85% of students successfully met this learning outcome based on assessment through three examinations given in this course.
MATH 314	Continuous Random Variables		
MATH 314	Counting		
MATH 314	Discrete Random Variables		
MATH 314	Probabilities		
MATH 317	Activities		
MATH 317	Geometric Figures		
MATH 317	History		
MATH 317	Measurement		
MATH 317	More on Geometric Figures		
MATH 317	Solve		
MATH 317	Technology		
MATH 318	Data Collection & Display		
MATH 318	Data Descriptions		
MATH 318	Predictions/Inference		
MATH 318	Probability		
MATH 319	Collaboration	12/20/2010	25 of 29 students achieved at least a 70% proficiency on this outcome based upon online discussion participation with an average proficiency of 90%.
MATH 319	Communication	12/20/2010	29 students were assessed on this outcome, though oral communication was not assessed. 93% of these students achieved success with an 87% average achievement rate.
MATH 319	Organization	12/20/2010	Organization and planning was assessed within the same assessments as the Problem Solving Outcome.
MATH 319	Planning	12/20/2010	Organization and planning was assessed within the same assessments as the Problem Solving Outcome.

Course ID	Course Outcome Name	Result Date	Result
MATH 319	Problem Solving	12/20/2010	29 students were assessed on this outcome through all course assignments, discussions, quizzes, and exams. 27 of these students achieved greater than 70% proficiency, with an average of 87% on assessments on this outcome.
MATH 319	Technology		
MATH 320	Analyze Vectors	05/10/2010	80% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Differentiability Involving Several Variables	05/10/2010	64% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Directional Derivatives & Gradients	05/10/2010	71% of students achieved 70% or more proficiency on this outcome based on results obtained from a quiz. This went down to 64% of students achieving 70% or more proficiency on this outcome based on a later in-class exam.
MATH 320	Double & Triple Integrals	05/10/2010	32% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Extrema	05/10/2010	Outcome was not covered in instruction and not assessed due to lack of time.
MATH 320	Function Continuity	05/10/2010	75% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Graphing	05/10/2010	68% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Jacobians	05/10/2010	Outcome was not covered in instruction and not assessed due to lack of time.
MATH 320	Limits	05/10/2010	75% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Lines & Planes in Space	05/10/2010	85% of students achieved 70% or more proficiency on this outcome based on results obtained from a quiz. This went down significantly to 60% of students achieving 70% or more proficiency on this outcome based on a later in-class exam.
MATH 320	Mass & Inertia	05/10/2010	Outcome was not covered in instruction and not assessed due to lack of time.
MATH 320	Partial Derivatives	05/10/2010	80% of students achieved 70% or more proficiency on this outcome based on results obtained from a quiz. This went down significantly to 60% of students achieving 70% or more proficiency on this outcome based on a later in-class exam.
MATH 320	Solid Regions	05/10/2010	Outcome was not covered in instruction and not assessed due to lack of time.
MATH 320	Space Curves	05/10/2010	72% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Surfaces in Space	05/10/2010	60% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Tangent Planes & Normal Lines	05/10/2010	60% of students achieved 70% or more proficiency on this outcome based on results obtained from an in-class exam.
MATH 320	Tangent Vectors	05/10/2010	68% of students achieved 70% or more proficiency on this outcome based on results obtained from a quiz. This improved to 75% of students achieving 70% or more proficiency on this outcome based on a later in-class exam.
MATH 320	Vector Products	05/10/2010	85% of students achieved 70% or more proficiency on this outcome based on results obtained from a quiz. This went down slightly, but not significantly to 78% of students achieving 70% or more proficiency on this outcome based on a later in-class exam.
MATH 320	Vector Valued Functions	05/10/2010	50% of students achieved 70% or more proficiency on this outcome based on results obtained from a quiz. This improved to 60% of students achieving 70% or more proficiency on this outcome based on a later in-class exam.
MATH 322	Cramer's Rule	05/10/2010	32 students were assessed on this learning outcome on a final exam. 29 of the 32 students (91%) successfully met this outcome.
MATH 322	Determinants	05/10/2010	32 students were assessed on this learning outcome on a final exam. 26 of the 32 students (81%) successfully met this outcome.
MATH 322	Eigenvalues & Eigenvectors	05/10/2010	32 students were assessed on this learning outcome on a final exam. 30 of the 32 students (94%) successfully met this outcome.
MATH 322	Evaluating Determinants	05/10/2010	32 students were assessed on this learning outcome on a final exam. 29 of the 32 students (91%) successfully met this outcome.

Course ID	Course Outcome Name	Result Date	Result
MATH 322	Inverse Matrices	05/10/2010	32 students were assessed on this learning outcome on a final exam. 24 of the 32 students (75%) successfully met this outcome.
MATH 322	Matrix Operations	05/10/2010	32 students were assessed on this learning outcome on a final exam. 27 of the 32 students (84%) successfully met this outcome.
MATH 322	Solving Systems of Linear Equations with Matrices	06/21/2010	32 students were assessed on this learning outcome on a final exam. 16 of the 32 students (50%) successfully met this outcome.
MATH 322	Vector Space	05/10/2010	32 students were assessed on this learning outcome on a final exam. 24 of the 32 students (75%) successfully met this outcome.
MATH 322	Vectors	05/10/2010	32 students were assessed on this learning outcome on a final exam. 24 of the 32 students (75%) successfully met this outcome.
MATH 324	Cardinality	12/17/2010	24 out of 33 (73%) students achieved 70% or better .
MATH 324	Groups	12/17/2010	Not covered in Fall 2010
MATH 324	Proofs	12/17/2010	34 out of 34 (100%) students achieved 70% or better .
MATH 324	Relations and Functions	12/17/2010	28 out of 33 (85%) students achieved 70% or better .
MATH 324	Set Theory	12/17/2010	30 out of 34 (88%) students achieved 70% or better .
MATH 325	Constructions and Coordinate Geometry	05/10/2010	89% of the 27 students assessed on this outcome achieved at least a 70% proficiency.
MATH 325	Constructions and Coordinate Geometry	05/06/2014	100% of 10 students achieved at least a 70% proficiency--90% of students achieved at least 90% proficiency.
MATH 325	Euclidean Geometry I	05/10/2010	100% of the 27 students assessed on this outcome achieved at least a 70% proficiency.
MATH 325	Euclidean Geometry I	05/06/2014	100% of 10 students achieved at least a 70% proficiency--90% of students achieved at least 90% proficiency.
MATH 325	Euclidean Geometry II	05/10/2010	100% of the 27 students assessed on this outcome achieved at least a 70% proficiency.
MATH 325	Euclidean Geometry II	05/06/2014	100% of 10 students achieved at least a 70% proficiency--90% of students achieved at least 90% proficiency.
MATH 325	Neutral Geometry	05/10/2010	89% of the 28 students assessed on this outcome achieved at least a 70% proficiency.
MATH 325	Neutral Geometry	05/06/2014	100% of 10 students achieved at least a 70% proficiency--90% of students achieved at least 90% proficiency.
MATH 326	Communication/Explanation	05/10/2010	16 students were assessed on this learning outcome on a final exam. 12 of the 16 students (75%) successfully met this outcome.
MATH 326	Modeling	05/10/2010	16 students were assessed on this learning outcome on a final exam. 16 of the 16 students (100%) successfully met this outcome.
MATH 326	Modeling Graphically	05/10/2010	16 students were assessed on this learning outcome on a final exam. 16 of the 16 students (100%) successfully met this outcome.
MATH 326	Proof	05/10/2010	16 students were assessed on this learning outcome on a final exam. 9 of the 16 students (56%) successfully met this outcome.
MATH 326	Real-World Probability Application	05/10/2010	16 students were assessed on this learning outcome on a final exam. 13 of the 16 students (81%) successfully met this outcome.
MATH 326	Recognition	05/10/2010	16 students were assessed on this learning outcome on a final exam. 14 of the 16 students (88%) successfully met this outcome.
MATH 326	Synthesis	05/10/2010	16 students were assessed on this learning outcome on a final exam. 12 of the 16 students (75%) successfully met this

Course ID	Course Outcome Name	Result Date	Result
MATH 326	Synthesis	05/10/2010	outcome.
MATH 328	Counting Problems	05/10/2010	36 students were assessed on this learning outcome on a final exam. 27 of the 36 students (75%) successfully met this outcome.
MATH 328	Inductive Proof	06/21/2010	36 students were assessed on this learning outcome on a final exam. 25 of the 36 students (69%) successfully met this outcome.
MATH 328	Knowledge & Application	05/10/2010	36 students were assessed on this learning outcome on a final exam. 26 of the 36 students (72%) successfully met this outcome.
MATH 328	Understanding Algorithm Complexity	05/10/2010	36 students were assessed on this learning outcome on a final exam. 32 of the 36 students (89%) successfully met this outcome.
MATH 328	Using Algorithms	05/10/2010	36 students were assessed on this learning outcome on a final exam. 32 of the 36 students (89%) successfully met this outcome.
MATH 330	First-Order Differential Equations		
MATH 330	Higher-Order Linear Differential Equations		
MATH 330	Other Topics		
MATH 330	Systems of Linear Differential Equations		
MATH 340	Computer Arithmetic		
MATH 340	Deriving, Implementing and Understanding Numerical Algorithms		
MATH 360	Future Application	12/10/2010	25 students were assessed on this learning outcome through tests and special projects. 22 of the 25 students (88%) successfully met this outcome.
MATH 360	Solving Real-World Problems	12/10/2010	25 students were assessed on this learning outcome through tests and special projects. 22 of the 25 students (88%) successfully met this outcome.
MATH 414	EIGHT		
MATH 414	FIVE		
MATH 414	FOUR		
MATH 414	ONE		
MATH 414	SEVEN		
MATH 414	SIX		
MATH 414	THREE		
MATH 414	TWO		
MATH 418	Assessing Learning		
MATH 418	Meeting Special Needs		
MATH 418	Planning Instruction		
MATH 418	Promoting Learning		
MATH 418	Technology in Learning		

Course ID	Course Outcome Name	Result Date	Result
MATH 418	Understanding of Learning		
MATH 420	Aspects of Groups		
MATH 420	Groups		
MATH 420	Rings and Fields		
MATH 420	Types of Groups		
MATH 430	Continuity and Differentiability		
MATH 430	Integrals and Infinite Series		
MATH 430	Limits		
MATH 430	Sequences		
MATH 440	Future Application	12/10/2009	21 students were assessed on this learning outcome through tests and special projects. 20 of the 21 students (95%) successfully met this outcome.
MATH 440	Solving Real-World Problems	12/10/2009	21 students were assessed on this learning outcome through tests and special projects. 20 of the 21 students (95%) successfully met this outcome.