MEMORANDUM

DATE: November 21, 2002

TO: Academic Senate

FROM: Academic Program Review Council

RE: Recommendations for:
Associate in Applied Science Degree in Radiography

CC: James Mayhew, Julian Easter, Stephen Perialas, Laurie Chesley, Thomas Oldfield, Barbara Chapman

DESCRIPTION OF PROGRAM:

AAS Degree in Radiography

A radiographer works under the direction of a physician in hospital and clinical radiology departments and physicians offices.

A radiographer uses equipment prescribed by a physician to create visual images of anatomical structures. This procedure includes adjusting imaging equipment to correct settings for each radiographic procedure, positioning the patient, and determining the proper imaging techniques for the production of an image with minimal radiation exposure to the patient.

A radiographer also assists a physician in preparation of radio-opaque mixtures that are administered to the patient so that internal organs may be clearly identified on the radiograph or image receptor.

Although the radiographic examination is usually completed in the hospital radiography department, the radiographer frequently operates mobile radiographic equipment at the patients bedside or in the operating room.

Most radiographers work in hospitals. However, positions in clinics, private offices, industry, civil service and public health facilities are also open to qualified individuals.

The six semester sequential course of study at Ferris leads to an associate in applied science degree. Graduates of the program are eligible to write the national certifying examination of the American Registry of Radiologic Technologists.

Students enter this program in the fall semester and spend the first three semesters on the Big Rapids campus. Studies during this period include general education and technical courses. Ample laboratory periods provide an opportunity to apply the theory and principles learned in the lecture sessions.

During the final three semesters, the student works with patients at an off-campus clinical education center. These sites are located throughout the state in hospitals affiliated with the university to provide clinical experience and continued academic instruction.

COST INFORMATION:

According to the office of Institutional research, the 1999-2000 cost data is as follows:

Total cost per SCH	
AAS in Radiography	$131.71
Total program cost	
AAS in Radiography	$10,273.44

RECOMMENDATIONS:

We recommend that the program be continued.

(1) The program has a number of important strengths:

- It is central to Ferris' mission.
- It is the largest radiography program in the State and is the only one that is based in a 4 year University.
- The program is accredited by the Joint Review Committee on Education in Radiologic Technology.
- It has a solid reputation among employers.
- Through the placement of graduates, this program provides an essential service to the state since there is a severe shortage of radiographers.
- A demand exists for the program by students as is demonstrated by an almost capacity enrollment and a waiting list.
- There is a very high demand for graduates of the program as is evidenced by the almost 100% placement rate of students. There is every indication that for the immediate future the demand will increase.
- The average starting salary is in excess of $30,000
- The faculty is experienced and well qualified.
- The faculty is very involved in continuing education and consulting activities.
- The faculty is active in recruiting students.

(2) We recommend that the following steps need to be taken to maintain the quality of these program:

- The program faculty should continue their recruitment activities and the administration of the College of Allied Health should continue to support their efforts.
- The equipment in X-ray room F needs to be updated.
- Digital equipment should to be obtained in order to keep pace with changes in the profession.
- The program faculty needs to continue to investigate methods to enhance instruction during the clinical phase training students. They should continue to investigate ways to utilize the capability of WebCT to provide off campus instruction to the students at clinical sites.

- While the faculty of the program is to be commended for the improvement in the pass rate shown since the last program review, they need to continue to address the relatively low pass rate by students on the National Registry Exam. They should continue to develop computer-based examinations that mimic the format of the Registry Exam.
- The program faculty should continue to evaluate the possibility of an increase in eligibility requirements for admission to the program, particularly in the level of competence in math.
- The program faculty should continue to investigate the potential of offering certificates to individuals working in the field.
- In view of the high productivity of the faculty and the problems reported by students with the educational experience at some clinical sites, the administration of the College of Allied Health and the University should seriously consider converting the part time Lab Assistant position to a full time faculty position. This would provide more faculty time to address the problems of pass rates that are below expectation and problems that occur at clinical sites.

Criteria Summary for
AAS Degree in Radiography

AAS Degree in Radiography

Accredited by the Joint Review Committee on Education in Radiologic Technology

A radiographer works under the direction of a physician in hospital and clinical radiology departments and physicians offices.

A radiographer uses equipment prescribed by a physician to create visual images of anatomical structures. This procedure includes adjusting imaging equipment to correct settings for each radiographic procedure, positioning the patient, and determining the proper imaging techniques for the production of an image with minimal radiation exposure to the patient.

A radiographer also assists a physician in preparation of radio-opaque mixtures that are administered to the patient so that internal organs may be clearly identified on the radiograph or image receptor.

Although the radiographic examination is usually completed in the hospital radiography department, the radiographer frequently operates mobile radiographic equipment at the patients bedside or in the operating room.

Most radiographers work in hospitals. However, positions in clinics, private offices, industry, civil service and public health facilities are also open to qualified individuals.

The six semester sequential course of study at Ferris leads to an associate in applied science degree. Graduates of the program are eligible to write the national certifying examination of the American Registry of Radiologic Technologists.

Students enter this program in the fall semester and spend the first three semesters on the Big Rapids campus. Studies during this period include general education and technical courses. Ample laboratory periods provide an opportunity to apply the theory and principles learned in the lecture sessions.

During the final three semesters, the student works with patients at an off-campus clinical education center. These sites are located throughout the state in hospitals affiliated with the university to provide clinical experience and continued academic instruction.

(See Disclaimer in the CAHS General Information section.)

First-year student admission criteria include a high school 2.5 GPA and a math ACT subscore of 19 or higher. Algebra is required.

A college student transferring into the program must have a 2.5 GPA with a C grade in MATH 110 or the equivalent.

Students must be 18 years of age in the first semester of the year of entry into the program.

To assure students of quality technical training in both classroom/lab instruction and clinical practice, enrollment is limited. Students who meet the programs admission criteria are accepted by priority date of application. It is essential to apply for admission at the earliest possible date.

In order to graduate, the student must complete all general education requirements as outlined in the General Education section of this catalog.

Students must earn a grade of C or better in all courses beginning with the RADI prefix and in BIOL 109 (Basic Human Anatomy and Physiology).

Prior to the clinical internship, the student must provide proof of current CPR certification; recent (within six months) negative TB test results; health insurance; and several vaccinations, including Hepatitis B, or proof of antibody titer. Please contact the program coordinator at 1-800-462-8553 for a list of specified immunizations.

If the Hepatitis B vaccine waiver declining the vaccine is signed, it is with the understanding that the waiver may make the student ineligible for placement at internship sites, which will ultimately result in the inability to graduate.

- **CENTRALITY TO FSU MISSION:**

  The AAS Degree in Radiography is central to the mission of Ferris State University. The emphasis on preparation for a career reflects the historic roots of the University.

- **UNIQUENESS AND VISIBILITY OF PROGRAM:**

  The program is quite visible to the hospitals around the state. It is the largest radiography program in the State and is the only one that is based in a 4 year University. There are 20 other radiography programs in the state, 11 that are housed in community colleges and 9 are hospital based. The program appears to be more visible to prospective students than do many of the other allied health programs.

- **SERVICE TO STATE, NATION, WORLD:**

  Through the placement of graduates, this program provides an essential service to the state since there is a severe shortage of radiographers.

- **DEMAND BY STUDENTS:**

  A demand exists for the program by students as is demonstrated by an almost capacity enrollment and a waiting list.

- **DEMAND FOR GRADUATES:**

  There is a very high demand for graduates of the program.

- **PLACEMENT RATE AND AVERAGE SALARY OF GRADUATES:**

  There is almost 100% placement rate of students. There is every indication that for the immediate future the demand will increase. The average starting salary is in excess of $30,000.

- **SERVICE TO NON-MAJORS:**

  Not applicable

- **QUALITY OF INSTRUCTION:**

  The AAS Degree in Radiography is accredited by the Joint Review Committee on Education in Radiologic Technology. Based on surveys of students and graduates the quality of instruction appears to be high. The faculty is very concerned about the pass rate on the registry exams and continues to explore ways in which to help students improve their performance on this exam.

- **FACILITIES AND EQUIPMENT:**

  The equipment in X-ray room F needs to be updated and digital equipment should to be obtained in order to keep pace with changes in the profession.

- **LIBRARY INFORMATION RESOURCES:**

  The library resources meet the needs of the program.

- **COST:**

  According to the 1999-2000 report from institutional research:

	Total cost per SCH
AAS Degree in Radiography	$131.71
	Total program cost
AAS Degree in Radiography	$10,273.44

- **FACULTY:**
  - **QUALIFICATIONS:**

    The faculty is experienced and qualified.

  - **PROFESSIONAL AND SCHOLARLY ACTIVITIES:**

    The faculty is very involved in continuing education and consulting activities.

  - **QUANTITY:**

    The faculty is very productive with respect to student credit hour production however, due to other demands on faculty time, some problems have risen with respect to the off campus experience of students. Converting the part-time laboratory assistant position into a full time position would relieve some of the current pressures on the full time faculty.

- **ADMINISTRATION EFFECTIVENESS:**

  The program appears to be thriving under the current administration.

MEMORANDUM

DATE: November 21, 2002

TO: Academic Senate

FROM: Academic Program Review Council

RE: General Recommendations for Programs reviewed in the 2002-2003 review cycle

CC: Vice-Presidents Chapman, Oldfield, and Chesley; All Deans

Approximately one year ago 12 panels charged with reviewing a total of 18 programs were formed. These panels were composed of program faculty and friends of the program. The panels collected information, analyzed that information, and wrote thorough and rigorous reports that detailed the status of the programs. These reports also identified needs of the programs. Based upon the written documents submitted to the Academic Program Review Council, the answers to written questions generated by the Council, and discussion with panel members and program administrators, the APRC has generated specific recommendations for each program reviewed. These recommendations have been submitted as separate memos. On behalf of the entire University, the APRC extends its appreciation and gratitude for the work done by the program review panels.

GENERAL RECOMMENDATIONS

The following recommendations are derived from our collective review of the programs and represent our suggestions for addressing concerns that affect more than one program in the University. A review of general recommendations from previous Academic Program Review Council reports reveals that, although progress has been made, some programs still encounter the same or similar difficulties observed in previous years. It is clear many of these problems must be solved at the institutional level. If a similar recommendation was made previously, the years are indicated in parentheses.

THERE SHOULD BE A MORE THOROUGH PROOFREADING OF THE UNIVERSITY CATALOG BEFORE IT IS PUBLISHED.

At the beginning of each recommendation memo, under the section titled program description, a statement concerning each program is reproduced exactly as it appears in the online catalog. Often, the first impression of the University that is gained by prospective students and the general public is obtained through the Catalog. Therefore, it is a matter of concern when there are misspellings and examples of poor use of language in one of the most visible documents of the University.

THE ANNUAL REPORT ON THE CUMULATIVE IMPACT OF ACADEMIC PROGRAM REVIEW RECOMMENDATIONS SHOULD LIST THE RECOMMENDATIONS MADE BY THE COUNCIL AND THE SPECIFIC ADMINISTRATIVE RESPONSE TO THEM.

The Academic Program Review Council would like to thank Vice-President Chapman for providing the Senate and the Council with an Annual Report on the Cumulative Impact of Academic Program Review, which was in the form of a memo dated August 5, 2002. The Council recognizes that it may not be possible for the University to completely address all of the recommendations made by the Council in a calendar year and appreciates the efforts of the administration to follow up on the issues that are raised. The Council notes, however, that some of the actions taken do not directly correspond to the actual recommendations of previous Councils. For the sake of clarity of communication, the Council requests that in future updates, starting with the current review cycle, there be a list of the specific recommendations of the Council and the administrative response to them (2001-2002). There is a precedent for this in the memo from Teshome Abebe, former Provost and Vice-President for Academic Affairs dated July 30, 1996 in which he provided a status report on the progress that had been made concerning the Senate-approved APRC recommendations for programs reviewed in 1995-1996.

OTHER DIVISIONS OF THE UNIVERSITY SHOULD BE REVIEWED WITH RESPECT TO THE QUALITY OF SERVICE THAT THEY PROVIDE TO ACADEMIC PROGRAMS AND THE EDUCATIONAL MISSION OF THE UNIVERSITY. FEED BACK CONCERNING THE OUTCOME OF THESE REVIEWS SHOULD BE SUPPLIED TO THE ACADEMIC SENATE AND THE ACADEMIC PROGRAM REVIEW COUNCIL.

The Council appreciates the decision by the administration to develop a review process for University Advancement and Marketing and the computer consortia. The council would like to point out, however, that the focus of these reviews as described in the memo from Dr. Chapman dated August 5, 2002 does not completely address the concerns of previous Academic Program Review Councils. Hopefully the QI2000+ Committee mentioned in the document will establish a thorough process of review of divisions in the University that support and serve academic programs so that, when problems arise because of policy or implementation of policy, a mechanism will be in place to correct the problems and allow affected programs input in the development of new policies. The purpose of this request is to ultimately improve the quality of academic programs (2000-2001, 2001-2002).

THE UNIVERSITY SHOULD REVIEW THE POLICIES ASSOCIATED WITH THE ISSUING OF STUDENT ID CARDS AND THE PROCEDURES FOR ASSIGNING STUDENT BARCODES.

Students still have trouble accessing library databases from off-campus. Barcode numbers needed for database login are not tracked when ID's are issued so students must call the library to have their barcode entered before they can access the databases from off-campus. The FLITE staff has worked diligently to alleviate some of these problems, however, much of the difficulty could be avoided by coordination between Telcommunications and FLITE.

THE UNIVERSITY AND, IN PARTICULAR, THE COLLEGE OF ARTS AND SCIENCES, SHOULD ENSURE THAT AN ADEQUATE NUMBERS OF COURSES, OFFERED IN AN APPROPRIATE FORMAT (12 WEEKS), ARE OFFERED DURING THE SUMMER SEMESTER.

The curricular design in several of the colleges (particularly Allied Health and Business) requires that students build a full load schedule during the summer. While offering courses of varying lengths during the summer may be convenient for faculty, such an arrangement makes it extremely difficult for students to achieve a full load of classes. That in turn may cause the student to choose a course based on the timeframe in which it is offered rather than the its educational value.

THE UNIVERSITY SHOULD REQUIRE THAT THE ADMINISTRATIVE PROGRAM REVIEW FORMS SHOULD BE FILLED OUT ACCURATELY AND COMPLETELY.

The Administrative Program Review documents provided to the council by the program panels varied significantly with respect to their completeness and reliability. In several cases, questions on the form were not answered and data related to enrollment according to class standing and the number of graduates in a given year was not listed. The Council relies heavily on this document in assessing the status and viability of each program.

THE DESIGN AND DISTRIBUTION OF SURVEYS FOR ACADEMIC PROGRAM REVIEW SHOULD BE PROCESSED THROUGH A CENTRAL UNIVERSITY OFFICE WITH INPUT FROM THE PROGRAM REVIEW PANEL.

The academic program review process relies extensively on information gathered through surveys. It is apparent to the council that this type of activity should be coordinated through a central office, which provides services to panels for programs undergoing review. Most program faculty are not trained or experienced in survey methodology. This often results in poorly designed surveys, low response rate, and information of dubious validity. This problem is compounded by the fact that other divisions within the University are sending out different surveys, in many cases to some of the same individuals. It is true that different divisions within the University may be interested in obtaining different kinds of information, however there is certainly a basic core of information that is important to all units within the University. A standardized survey form should be designed and distributed utilizing established survey methodology. This form should allow individual programs or units in the University to ask additional specific questions related to information unique for their needs. The staff of this central office should provide support for follow up procedures to ensure adequate response rates. They should also assist the program review panels in the use of applicable statistical procedures to insure proper interpretation of the data.

THE UNIVERSITY NEEDS TO HAVE A CENTRAL DATABANK THROUGH WHICH ALUMNI AND GRADUATES OF PROGRAMS ARE TRACKED.

Most panels reported that significant numbers of surveys were returned due to an incorrect address. There is no question that in this mobile society it is difficult to keep track of individuals, however, if there is a cooperative approach to collecting data from various sources on campus, it should be possible to increase the reliability of existing databases.

INSTITUTIONAL RESEARCH SHOULD COMPILE THE INFORMATION REQUIRED BY PROGRAM FACULTY AND ADMINISTRATORS FOR THE PROGRAMS UNDERGOING THE ACADEMIC PROGRAM REVIEW PROCESS.

The document titled Academic Program Review: A Guide for Participants lists some specific types of information that are required for the review process. Currently, the seeking out and collecting of relevant programmatic information on an individual basis is an inefficient process and is an inordinately consuming use of program faculty and administrator's time. The previous Academic Program Review Council did meet with a representative from Institutional Research last spring to discuss their methods of data collection and how they arrived at their interpretation of the data. At that time, this individual expressed a willingness to work with the Panels in obtaining the information that they need. The current Academic Program Council should develop a specific list of the information that is required and communicate this to the staff in Institutional Research. The council requests administrative approval for this expansion of duties by the staff of Institutional Research (2001-2002).

THE UNIVERSITY SHOULD CONTINUE TO EXPLORE WAYS IN WHICH IT CAN HELP PROGRAMS MAINTAIN AND ACQUIRE NEW EQUIPMENT AS THE NEEDS OF INDUSTRY CHANGE.

The Council appreciates the response of the administration documented in Dr. Chapman's August 5, 2002 memo to previous recommendations concerning maintenance and acquisition of equipment. The Council also recognizes there is no way that the University can fund all of the equipment requirements of all of the programs at the University. With a few exceptions, most of the programs reviewed this cycle had adequate facilities and equipment. However, concern was expressed by several program panels related to funding for maintenance, replacement of equipment items, and the purchase of new equipment. Updating of computers to handle increasingly sophisticated software continues to be a problem. The University should continue to provide support for the maintenance of equipment and establish funds the upgrading of equipment. The procedures for requesting such funds should be widely communicated throughout the campus. In addition, the University should continue to encourage and support the efforts of faculty and program administrators as they seek off campus sources of equipment and resources. (1995-1996, 1997-1998, 1998-1999, 1999-2000, 2001-2002)

THE UNIVERSITY SHOULD INVEST IN PROGRAM SPECIFIC ENROLLMENT AND RECRUITING EFFORTS:

The current guidelines for the academic program review process require the APRC to evaluate enrollment in programs as a part of the review process. Low enrollment in a program does have a direct impact on program cost and faculty productivity (as defined by the business operations of the University), particularly in programs that are laboratory and technology intense. Low enrollment does not necessarily have a direct relationship to the quality of education that is delivered to students.

As far as the Academic Program Review Council was able to determine, at least with respect to the programs that were reviewed this year, low enrollment levels were unrelated to the quality of instruction, the availability of jobs in the field, the potential salaries of employees in the field, and even the availability of financial aid in the form of scholarships to students. Some of the under-enrolled programs that were reviewed this year have few or no competitors in the state of Michigan and in some cases in the country. The faculty in several

of these under-enrolled programs has made an intensive recruiting effort, which seems to have had only a limited impact on increasing student numbers. On the other hand, new degree initiatives in the College of Education and Human Services and in the College of Arts and Sciences have resulted in programs with rapidly increasing enrollments but limited opportunities in the job market. The difference seems to be the visibility of programs to prospective students.

It has become apparent to the members of the Council, particularly those who have served several years, that allocating a few marketing dollars to a program with enrollment difficulties and creating an attractive brochure does little to increase student numbers. Asking faculty to spend increasingly more time in recruitment efforts is not a particularly productive or effective approach to solving the problem. Typically faculty members have had little, if any, training in marketing techniques, demographic analysis, and brochure design. Most faculty members choose teaching because of their love of their subject area and their desire to share their knowledge with students, not because of an interest in the marketing of their program to prospective students.

If the University is truly committed to its historic mission of preparing students for a career and wishes to continue to serve the state of Michigan by providing graduates who are prepared to work in vital areas of our economy such as heavy industry or health care and yet maintain the fiscal viability of the University, it must address the issues related to the marketing low enrollment programs at an institutional level. It must supplement the efforts of faculty and administrators in programs with low enrollment through the use of institutional resources for focused marketing that increases the visibility of low enrollment programs and increases the awareness on the part of prospective students that many of the programs at Ferris State University lead to career options in vital industries in which high paying jobs are going unfilled.

THE ACADEMIC SENATE SHOULD REVIEW ITS CHARGE TO THE ACADEMIC PROGRAM REVIEW COUNCIL.

The Academic Program Review Council has begun the second round of program review. It is time to review and to reevaluate the criteria that are utilized as the basis for recommendations that are listed in the document Academic Program Review: A Guide for Participants. The academic program review process should focus on the quality of instruction offered in each program. Some of the criteria mentioned previously seem to have a marginal relationship to that goal, at best. For example, the focus on enrollment, productivity, cost of instruction, demand for graduates and the salaries they achieve are certainly of interest and importance to the administration. The question that arises is whether the academic program review process is the appropriate medium to collect and tabulate that data. Perhaps the academic program review process should focus more directly on what skills or competencies are required of graduates, how effectively programs deliver instruction that provides students with those skills and competencies, how the programs assess the skills and competencies of their students and graduates, and what hinders the programs in their attempts to fulfill their responsibilities to their students.

The Academic Program Review Council, 2002-2003

Jack Buss, Arts and Sciences , Chair
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Carrie Forbes, Library and Information Services
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William Smith, Business
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Questions for APR Panel
AAS Degree in Radiography

Please list the primary skills, abilities, and knowledge base that you expect that a graduate of your program would possess.

To successfully pass the radiography program, the student will be able to:

1. Effectively use oral and written medical language.
2. Demonstrate knowledge of human structure, function, and pathology.
3. Anticipate and provide basic patient care and comfort.
4. Apply principles of body mechanics.
5. Perform basic mathematical functions.
6. Operate radiographic imaging equipment and accessory devices.
7. Position the patient and imaging system to perform radiographic examinations and procedures.
8. Modify standard procedures to accommodate for patient condition and other variables.
9. Process radiographs.
10. Determine exposure factors to obtain diagnostic quality radiographs with minimum radiation exposure.
11. Adapt exposure factors for various patient conditions, equipment, accessories, and contrast media to maintain appropriate radiographic quality.
12. Practice radiation protection for the patient, self, and others.
13. Recognize emergency patient conditions and initiate first aid and basic life-support procedures.
14. Evaluate radiographic images for appropriate positioning and image quality.
15. Evaluate the performance of radiographic systems, know the safe limits of equipment operation, and report malfunctions to the proper authority.
16. Demonstrate knowledge and skills relating to quality assurance.
17. Exercise independent judgment and discretion in the technical performance of medical imaging procedures.
18. Demonstrate general knowledge of body-section anatomy and radiographic methods.
19. Demonstrate general knowledge of basic computer operation and capabilities.
20. Demonstrate expected ethical and professional behavior.
21. Recognize the need for further professional education.
22. Recognize the function, effects, and administration of various drugs used in Radiology.

For each skill, ability or knowledge base listed above, identify the major component(s) of your curriculum that are designed to develop that characteristic in your graduate.

For each of the program objectives listed above, the content can be found in the following courses:

1. Medical terminology proficiency (MRIS 102)
2. BIOL 109
3. CCHS 103
4. CCHS 103
5. MATH 110 (sort of)
6. All RADI labs and clinical internship
7. RADI 101, 102, and 103
8. RADI 101, 102, and 103
9. RADI 123
10. RADI 110 and 111
11. RADI 110 and 111
12. RADI 122
13. RADI 102 and CPR
14. All RADI labs
15. All RADI labs
16. RADI 123 and 201

17. RADI 110 and 111
18. RADI 103
19. Computer competency and RADI 103
20. RADI 101, 102, 103, and clinical internship
21. Clinical internship
22. RADI 211

How are competencies tested? See page 3.
A student is considered clinically competent in any radiologic procedure when he or she undergoes the following steps:

1) The student must observe the procedure being performed by a registered radiographer.
2) When the radiographer and the student deem it appropriate, the student must perform several of these procedures under the direct supervision of the radiographer (the exact number of these procedures depends on the complexity of the exam, the skill of the student, and the availability of patients).
3) When student and radiographer agree that the student performed an adequate number of exams, the student may perform a "Master" exam whereby he or she completes the entire exam by his or herself and demonstrates, to the satisfaction of the technologist, that he or she is competent.
4) Following the "Master" exam, the technologist will check the radiographs for accuracy and complete a competency form that rates the student's ability to perform all of the necessary tasks. The student must obtain a score of 94% or higher on this form for the competency to be validated.
5) After the student has shown competency on a particular exam, he or she can perform the exam under indirect supervision.
6) Anytime throughout the internship, the Adjunct Clinical Instructor can do spot checks on exams previously mastered. If the student fails to pass the "spot-comp", he or she must start the competency process over.
7) All 49 competencies must be successfully completed before the student is eligible for graduation.

What is the primary emphasis of the ARRT registry exam, didactic, clinical, or both?

The ARRT examination is a computerized test (there is no practical portion) that is intended to demonstrate the examinee's ability to apply the skills and knowledge learned from the entire two-year radiography program. Therefore, it is meant to emphasize both the didactic and clinical portions of the program. In reality, it is probably more geared to the cognitive domain; however, the application of this knowledge can only be refined during clinical.

You have a goal that 75% of examinees will pass ARRT registry on the first attempt (page 4) yet the national pass rate on the registry is 90% (see page 11). Why do you think that the pass rate for Ferris students is lower than the national pass rate? Are students able to obtain jobs without passing the registry? Is on the job training a viable option for someone wishing to have a career in radiography

This is a complex question. The faculty has many theories, but it is most likely a combination of a variety of factors. First, the program set its pass rate relatively low because it has yet to meet its own standard, much less the national average. As for the low pass rate, this may be affected by: (1) the structure of the program (one year on-campus and one year off), (2) the difficulties with providing structured learning activities while the students are all over the state, (3) the lack of face-to-face interactions between the students and faculty for most of the second year, (4) the fact that Michigan does not have a licensure law for radiographers and some (very few) hospitals do not require certification, (5) the large number of students in the program, (6) the lack of credit hours dedicated to the professional sequence, (7) the amount of time spent re-teaching the on-campus students basic skills, (8) the relatively low entrance requirements, and (9) the overall lack of emphasis on program quality. Any (and more likely all) of these must be

factored into the program's low pass rate. There are some areas that can be, and are being addressed (i.e.: eligibility requirements, structured learning during clinical), while others (i.e.: Michigan licensure, program size, lack of off-campus faculty) are simply a fact of life. The program hopes to see a significant rise in the pass rate this year, but even if this occurs, this issue must still be our top priority.

How important is accreditation in attracting students and securing employment for graduates of this program?

Accreditation is imperative to a radiography program. If a program is not accredited, its graduates are not eligible to take the national registry examination, and therefore may not work in most hospitals anywhere in the country.

How do you track students and employers?

We track our graduates by gathering information (address, e-mail, employer, etc.) during registry review. Six months following graduation, we send them a graduate survey and ask them by whom they are employed. We then contact the employers to evaluate the abilities of their new hires.

How does the new curriculum (page 6) differ from the previous curriculum?

Each RADI course was renumbered, renamed, and redesigned completely. In the old curriculum (copies of the old check-sheet will be distributed on Tuesday) each RADI course was an amalgamation of material, with content areas like radiation physics and radiation biology intermingled with positioning and patient care. It was very difficult for the student to separate these areas and even more difficult to gain a true understanding of each portion. The new curriculum features individual courses for each content area and the student is required to pass each course to continue within the program. The majority of the second (internship) year stayed static, but two new, on-line courses were introduced each semester. This was ostensibly done to free up some much-needed hours during the first year for instruction in the basic radiographic concepts. Overall, it is felt by the faculty that the new curriculum is a vast improvement over the old, however, as has been stated many times before, there still is simply not enough credit hours within the professional sequence to provide the student with a quality education.

On page 7 in the recommendations and in the plan of action for objective 1 you mention SLAs for radiography courses. How effective have these been?

At this time, we have an SLA attached to the RADI 121 (Radiographic Physics) and an SI (Structured Instruction) attached to all sections of RADI 110 (Radiographic Imaging 1). Both of these courses have been extremely successful. In 2000, 11 students did not make the requisite grade of C or better in RADI 121 and last year, only 4 students failed to make the C grade. The success of the SLA can also be judged by the student's assessment of the validity and worth of the process. Last year, students found the SLA so rewarding that they recommended SLAs for RADI 110 and 111. This fall we incorporated an SI into RADI 110 and it along with the 121 SLA have been very well received, and we are planning to implement an SI into RADI 111 for the winter semester.

At several points in the report, mention is made of the incompatibility of the academic calendar with the clinical experience, primarily the long Christmas break. Has that issue been addressed?

Not at the present. We have been discussing the possibility of having the students in clinical during part of the Christmas break, but faculty availability, liability, and scheduling problems at the clinical site cloud the issue. The simplest alternative would be to have the Christmas break itself limited, but this is out of our control.

On page 14 you indicate that Ferris State University is the only university in the state that offers radiography. How many other institutions in the state offer degrees in radiography? Are any of them accredited?

There are 21 radiography programs in the State of Michigan (including Ferris). Of these, 11 are housed in community colleges or equivalent, and 9 are hospital-based programs. All of these programs are accredited through the JRCERT.

You indicate that attrition is 27.6%. (See page 7 and page 18). What steps are being taken to reduce attrition?

This situation gets very sticky. The problem seems to be three-fold: (1) our presently low eligibility requirements allow a fairly large number of poorly prepared students to enter the program, (2) the outcome of the national registry requires a high level of cognitive ability, so the program must maintain a fairly rigorous curriculum to be fair to the student (and keep accreditation), so (3) the attrition rate is a little high. The simplest solution would seem to be raising the eligibility requirements, but this is not enough. The program also needs to utilize such avenues as structured learning and tutoring to help the under prepared student to prevail.

On page 41 and page 66 you cite the need for more credits in the didactic courses at Ferris. How does the number of credits offered at Ferris compare with those from institutions that typically have 90% of their students in radiography that pass the registry?

The problem with the credit hours resides mainly with the structure of the program. The clinical "courses" eat up a large number of credit hours. A total of 34 credit hours are allotted to courses during the second year of the program. This was done at the behest of a past Dean because she insisted that while in clinical, the students must maintain full-time status. Most other Radiography programs only allocate 4 to 5 credit hours per semester to clinical because the clinical internship is integrated into the entire two-year program. As for the number of credit hours allocated to didactic courses in other programs, I will bring this information to the meeting on Tuesday.

Has consideration been given to converting your program into a BS degree program such as that being proposed at Grand Valley? See page 65.

The answer to this is yes and no. We have often considered a 2+2 BS degree in Radiography, and we are trying to start this process by proposing the certificate programs in computed tomography and mammography. This would be the first step in the process because these certificates and others (MRI, cardiovascular-interventional, bone densitometry, quality management) need to be imbedded into the curriculum before a BS degree can be instituted. Other curriculum tracks under consideration are radiology management and education.

On the other hand, we do not want to propose a program like that at Grand Valley. Their program is unfeasible because it requires the student to take two years of general health education and then be assigned a specialty program (physical therapy, physician assistant, radiography, radiation therapy, etc.) by GPA. This would mean that a student would not be able to take the first two years of the program, take and pass the national registry, and then ladder into a higher level of education. The problem arises when the student finds out that employers are not looking for BS prepared technologists (they want registered techs) and they will not pay any higher salary for them. The program at GVSU was solely created to syphon-off less qualified students that wanted to go into PT, OT, or PA without loosing them from the University.

The statement is made on page 15 of the administrative report that "these machines can pose a radiation safety hazard to students, faculty, and other individuals with in the college." What steps are being taken to monitor radiation exposure? What steps are being taken to eliminate this potential hazard? What effect does the age of these machines have on the quality of education that the students receive? What is the status of your proposal to replace this equipment?

The State of Michigan monitors radiation levels of all equipment. At this time, all of our machines are functioning within normal limits, but one room is very old and the potential for future radiation leakage problems is present. This room (room F) is the one that needs to be replaced. Another identical room was replaced this summer with up-to-date equipment and room F is

scheduled to be replaced through Perkins funds next year (2003-04). As long as it is approved next year, the radiation hazard is minimal, but with time, the hazard increases.

The student surveys on pages 21-25 seem to indicate that there are some significant problems with at least some clinical sites. Explain the relationship between the Radiography Program and the clinical sites. How are adjunct faculty selected? How do you evaluate the quality of the clinical experiences your students receive? What options are available to the program with respect to adding and dropping clinical sites?

The relationship between Ferris and its clinical sites is really pretty good. We have about twenty hospitals around the state that will take students each year. They range in size from the University of Michigan Medical Center (1200 beds) to Spectrum Health – Reed City (35 beds), so the clinical experience may vary greatly from site to site. This being said, every student gets the same basic education during internship, only the variety of experiences may differ. The clinical site's participation in the internship program is voluntary and no restitution is paid by Ferris. Each site provides a registered technologist designated as the Adjunct Clinical Instructor. This position is not paid by the University but, in theory, the program has final approval of the individual. In reality, however, there is usually only one person willing and able to take on this responsibility, so the program's control of who is selected is minimal.

It is the responsibility of the ACI to act as the liaison between the site, the student, and Ferris; to monitor and evaluate the student's progress through the internship; to provide instruction and guidance in the performance of clinical assignments; and to be the student's advocate and mentor. The problems cited by the students often arise because many hospitals are so desperately understaffed, the students are used as free labor and the ACI has little or no time to be an instructor, mentor, or advocate.

At the end of the summer semester, students are asked to complete an evaluation of the clinical experience (a copy of the form will be disseminated at the meeting on Tuesday). These forms are collected, tabulated, and analyzed by the faculty to see if there are any serious concerns brought up by the students. If there is a concern, it is discussed either with the ACI or department administrator and a resolution is usually reached. Sometimes concerns are not fixable (the labor shortage for one), and sometimes the problems are so deep that there can be no resolution (one site was recently dropped because of a lack of proper supervision of the student).

For the most part, sites can be added or dropped at the discretion of the program, but each site must be monitored closely so that the quality of instruction remains high. Also, each hospital has a maximum number of students that can be assigned to it and the number of slots available must at least equal the number of students in the program. Most of the large and medium sized hospitals around the state are affiliated with one or more programs already, and many of the small hospitals don't have the variety and number of exams required to take students, so there isn't a lot of room for expansion.

The calendar, particularly the length of the Christmas break, was mentioned several times in the surveys. Is this issue being addressed?

Is it just me, or did I answer this one somewhere before?

Has your recommendation 4 on page 43 concerning a second ACI meeting been implemented?

The program is discussing a second meeting next week.

How do you anticipate addressing the issues raised concerning the "core" curriculum of the College of Allied Health (see pages 46 and 47)? Is there administrative support for your position that core courses should be dropped in order to increase credits in radiography courses?

The core curriculum is a very sore topic for the radiography program. We are presently trying to address it within a college-wide committee intended to evaluate the efficacy of the core program. It is unclear what, if any, good will come out of this exercise, but it appears that it is our

only avenue at the moment. We would like to discuss this with the committee in detail on Tuesday.

What steps are being taken to increase the entry requirements into the program? See page 47.

The program faculty has voted to propose that the eligibility requirements be raised to a 2.7 GPA and one year of either high school or college Biology. We are presently writing the proposal so it can begin the approval process.

On page 56 you indicate that the radiography lab needs repainting and repairs to the walls? Have these requests been put into a unit action plan or minor caps budget?

The repainting and repairs of the lab have been in the last three minor caps requests. It has yet to be approved.

On page 56 you cite the need for computers and printer in the lab. Would you elaborate on what is preventing you from obtaining these?

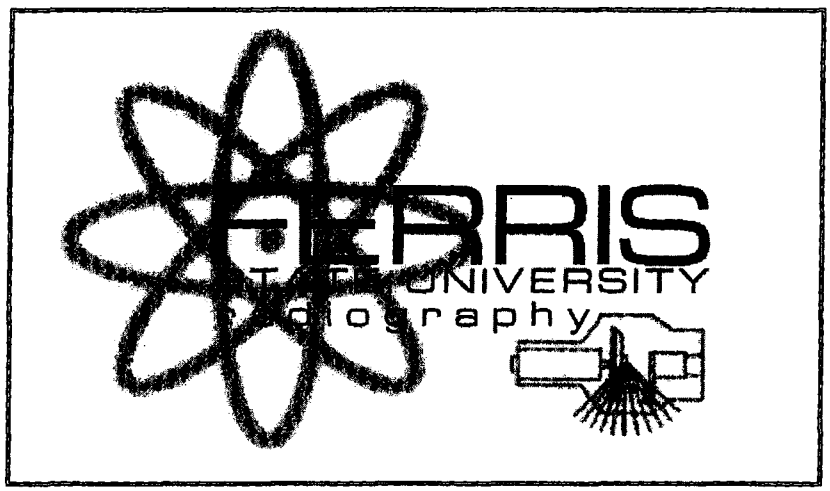
Funding! The program has requested new (or at least updated) computers for the lab numerous times over the past two years. Unfortunately, lab computers are low on the priority list for the college.

Would you please comment on what is preventing you from updating the 20 year old videotapes described on page 57?

Again, simply funding. Perkins funds are often available for major equipment purchases, but small-ticket items are often much harder to come by.

FERRIS STATE UNIVERSITY

RADIOGRAPHY PROGRAM



ACADEMIC PROGRAM REVIEW

2002

Program Review Panel Members:

James E. Mayhew, RT(R)(QM) – Program Coordinator, Chair
Joel R. Rescoe, RT(R) – Faculty Member
Robert T. Holihan, RT(R) – Clinical Coordinator
Lisa Wall, RT(R) – Lab Assistant

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PROGRAM OVERVIEW

PROFESSIONAL OVERVIEW

The profession of Radiography is a sub-discipline of the broader profession of Radiology. Radiology is the branch of the health sciences that uses ionizing and non-ionizing radiation to produce images of the body for the diagnosis and treatment of disease and injury. It encompasses numerous imaging modalities including radiography, diagnostic medical sonography, nuclear medicine, and radiation therapy. Although usually housed in hospitals, Radiology departments, equipment, and personnel can be found in doctor's offices, clinics, specialized imaging centers, cancer treatment centers, and numerous other healthcare organizations. The Radiology practitioner is now, and has been for over 100 years, an integral part of the medical profession.

Radiography is the specialized area of Radiology that uses x-radiation to image internal structures of the body. This includes such specific areas as: diagnostic radiography, fluoroscopy, computed tomography (CT), magnetic resonance imaging (MRI), mammography, angiography, cardiac catheterization, and bone densitometry. Radiography is the largest discipline within Radiology and is the backbone of any medical imaging department.

Nationally, the American Registry of Radiologic Technologists (ARRT) provides certification for radiographers, nuclear medicine technologists, and radiation therapists. After successfully passing the radiography certification examination the technologist is considered a registered technologist in radiography or RT(R). Even though most states have individual licensure laws governing radiographers, all consider certification by the ARRT as proof of entry-level competency. Unfortunately, Michigan is one of the few states that does not require licensure of radiographers, however, most employers still require that all employees be registered.

PROGRAM HISTORY

The Radiography Program at Ferris State University has had a long and successful history. From its inception in 1966 to the present, this program has served the educational needs of its students and medical community not only in western Michigan, but also across the country and around the world.

The program began 36 years ago as a 33-month Associate Degree program in response to a need voiced by the medical imaging community in the state of Michigan. At the time, a considerable number of individuals who were working in the field of radiography did not meet minimum standards of education or experience. Data obtained from the American Heart Association's 1966 survey of hospital personnel revealed that there was indeed a need for a college-based program in this geographical area.

In the subsequent years, the program has grown and prospered to the point that it is now one of the largest accredited radiography programs in the country. During this time, the program has graduated thousands of qualified and highly sought after radiographers who have become the

backbone of the medical imaging profession in the state. Virtually every hospital in Michigan (as well as numerous other states) presently employs Ferris graduates, and the program's reputation for producing the highest quality entry-level radiographers is widely accepted.

This reputation of program quality extends to potential students and the general public as well. In fact, in a 1997 survey of incoming students, 48% of radiography and pre-radiography students indicated that their primary reason for choosing Ferris was that it had the "best radiography program in Michigan". The program also attracts students based on the fact that it is the only University-based radiography program in the state. This gives its students the unique ability to easily extend their education to Bachelor and Master of Science degree programs.

The Radiography Program is now, and always has been, fully accredited by the Joint Review Committee on Education in Radiologic Technology whose purpose is to assess compliance with the standards of practice established by the profession. In 2003, the program's accreditation process will begin anew. A self-study report will be generated in the spring of 2003 and a site visit will be conducted by the JRCERT in the fall of 2003.

PROGRAM STRUCTURE

The Radiography Program is a two-year (six-semester), competency-based program that terminates with an Associate of Applied Science Degree. At present, the program requires a minimum of 80 semester hours of radiography specific, laboratory, general, and clinical education for satisfactory completion. Following graduation in August, students are eligible to sit for the national ARRT (American Registry of Radiologic Technology) registry. Those individuals passing the national registry are considered fully certified and qualified as a registered radiologic technologist or radiographer (RTR).

The program has two distinct phases of instruction: on-campus (first year) and clinical internship (second year). In the on-campus portion of the program, the student receives radiography specific didactic and laboratory instruction. During this time, the student can also take the required support and general education courses including: Anatomy and Physiology, English, Interpersonal Communications, Cultural Enrichment and Social Awareness electives, and the "core" courses for the College of Allied Health Sciences. Students also must show competency in computer skills and medical terminology (please see the Radiography Program Check sheet for specific courses and suggested sequence). For the past five years, as a capstone for the program, the student have been required to come back on campus for the last week of the second summer semester to a Registry Review (RADI 299). This time is used to review and reinforce previously learned knowledge, discuss the structure and methods of the registry, strengthen test-taking skills, explore job-hunting techniques and opportunities, and survey the students opinions of the strengths and weaknesses of the program.

The student's second year is spent in clinical internship at one of approximately 20 hospitals across the state of Michigan. The internship portion of the program contains the clinical practicum portion for each semester as well as webCT-based on-line courses. The on-line courses have been developed to integrate with the first year on-campus courses to give the student the cognitive knowledge necessary to become successful in the field as well as pass the

national registry. The Clinical Practicum course is developed to give the student the psychomotor and professional skills expected of an entry-level radiographer. The Clinical Coordinator facilitates both the on-line courses and the Clinical Practicum courses. During the year in clinical, the student must show competence (mastery) in 39 mandatory and 10 optional radiographic procedures as determined by the American Registry of Radiologic Technologists (ARRT). The student most also show competence in various areas within the radiology department including: diagnostic radiography, fluoroscopy, portable and surgical procedures; clerical and patient care skills; radiographic processing and equipment maintenance; and image critique. They also gain valuable experience in a variety of imaging modalities including Computed Tomography (CT), Magnetic Resonance Imaging (MRI), mammography, angiography, and ultrasound.

It has been shown that it takes all or most of three semesters (approximately 1500 clinical hours) to learn and show true mastery of the required procedures. For example: in the 2000-2001 school year, no students showed mastery in all 49 procedures before the end of the second semester and two-thirds of the students had not completed all masters before the last month of the program. It has also been shown that three semesters of clinical is needed for the student to gain experience and show proficiency in all of the numerous areas and procedures expected by the profession.

FERRIS STATE UNIVERSITY
RADIOGRAPHY PROGRAM MISSION AND GOALS

INTRODUCTION: The Radiography Program has developed goals and measurable objectives within the guidelines of the mission and goals of the University, the College of Allied Health Sciences, and the department of Hospital Related Programs. Program objectives have been focused within the context and limited to the format previously adopted by the College of Allied Health Sciences.

PROGAM MISSION: It is the mission of the Ferris State University Radiography Program to provide the highest quality instruction and to prepare the student to assume the professional challenges and responsibilities of an entry-level radiographer.

Goal #1: *To produce competent and qualified entry-level graduates.*

Objectives:

1. Seventy-eight percent (75%) of examinees will pass the ARRT registry on the first attempt.

2. Ninety percent (90%) of graduating students will rate the effectiveness of the academic, clinical, and overall program as "Fair" or better (3.0 on a 5.0 scale).

3. Ninety percent (90%) of the graduates surveyed will rate the overall quality and effectiveness of the program as "Fair" or better (3.0 on a 5-point scale or 8.0 on a 10-point scale).

4. The average scaled ARRT registry score will meet or exceed the national average scaled score for the October examination.

5. One hundred percent (100%) of graduates will indicate that they are adequately prepared clinically as entry-level radiographers.

Goal #2: *To maintain or improve the quality of instruction.*

Objectives:

1. Eighty percent (80%) of enrolled students will complete the program.

2. One hundred percent (100%) of those students who graduate will earn their degree in radiography within 150% of the program length (nine semesters from the beginning of the program).

3. The average scaled score for each content area of the ARRT registry will meet or exceed 8.0.

Goal #3: *To meet the employment needs of graduates and employers.*

Objectives:

1. One hundred percent (100%) of employers surveyed will rate the program's recent graduates as "Meets" or "Exceeds" standards (3.0 on a 4-point scale) in all criterions.

2. One hundred percent (100%) of the members of the Advisory Committee will rate the programs design to provide students with practical job application experience as "Good" or "Excellent".

3. Ninety percent (90%) of those graduates seeking employment will be employed within six months of graduation.

Goal #4: *To promote a flexible and adaptive curriculum.*

Objectives:

1. One hundred percent (100%) of Adjunct Clinical Instructors will rate the first year students' general understanding of radiographic concepts, psychomotor ability, patient care skills, and professional behavior as "Fair" or better (3.0 on a 5-point scale).

2. One hundred percent (100%) of graduates will rate the overall didactic instruction as "Adequate" or better (3.0 on a 5-point scale).

3. One hundred percent (100%) of program faculty will rate the curriculum designed to facilitate student learning as "Good" or "Excellent" (4.0 on a 5-point scale).

4. One hundred percent (100%) of the members of the Advisory Committee rate the program's instructional content as "Acceptable", "Good", or "Excellent".

Goal #5: *To provide an environment that responds to the need for continuing education of faculty, clinical staff, graduates, and registered technologists.*

Objectives:

1. One hundred percent (100%) of the full-time program faculty will attend one or more professional or educational activities each year.

2. Seventy-five percent (75%) of graduates will indicate interest in pursuing one or more post-RT certificate(s).

3. Seventy-five percent (75%) of Adjunct Clinical Instructors will attend the yearly ACI meeting.

OBJECTIVE/OUTCOME	INDICATOR	ACTUAL OUTCOME	% ATTAINMENT	ANALYSIS	RECOMMENDATIONS AND PLAN OF ACTION	FOLLOW UP
1. 75% of examinees will pass the ARRT registry on the first attempt	ARRT pass rate	73%	97%	Even though the pass rate has increased every year for the past five years, it has still not met this objective. Students under the new curriculum will be taking the registry in the fall, 2002. It is hoped that this will increase the pass rate markedly.	1) There must be greater emphasis placed on registery review in the summer semester. 2) The registry review must be improved and lengthened. 3) The entrance requirements for the program must be reviewed and changed if appropriate. 4) Additional RADI credits need to be added	
2. 90% of graduating students will rate the effectiveness of the academic, clinical, and overall program as Fair or better (3 on a 5 scale)	Program Evaluation (Academic Portion)	93% Average = 3.67	103%	This objective has been met	None at this time	N/A
	Program Evaluation (Clinical Portion)	88% Average = 3.70	98%	The clinical portion of the program needs to be more organized and there needs to be better communication with the interns and ACIs.	With help from the Lab Assistant, the Clinical Coordinator is creating a plan to increase communications with the interns and ACIs and to assure more organized clinical courses and activities.	
	Program Evaluation (Overall Program)	98% Average = 3.77	109%	This objective has been met	None at this time	N/A
3. 90% of graduates surveyed will rate the overall quality and effectiveness of the program as Fair or better (3 on a 5 point scale)	Graduate Survey	100% Average = 4.20	111%	This objective has been met	None at this time	N/A
4. The average scaled ARRT registry score will meet or exceed the national average scaled score for the Oct. examination.	ARRT average scaled score (2001 national average = 83.3)	80%	96%	Please see objective #1	Please see objective #1	
5. 100% of graduates will indicate that they were adequately prepared clinically as entry-level radiographers.	Graduate Survey	100%	100%	This objective has been met	None at this time	N/A

OBJECTIVE/OUTCOME	INDICATOR	ACTUAL OUTCOME	% ATTAINMENT	ANALYSIS	RECOMMENDATIONS AND PLAN OF ACTION	FOLLOW UP
1. 80% of enrolled students will complete the program	FSU attrition / retention data	72.4%	91%	With a large group if incoming students, attrition is to be expected. The entrance requirements for the program need to be reviewed and possibably increased. While in the program, students need to have access to additional help if needed.	The program is proposing an increase in the entrance requirements to coinside with the University's increased requirements. An SLA was incorporated into RADI 121 last fall and an SI was incorporated into RADI110 this fall. An additional SLA has been proposed for RADI 111 for winter 2003.	
2. 100% of those students who graduate will earn a degree within 150% of the program length	FSU statistics	100%	100%	This objective has been met	None at this time	N/A
3. The average scaled score for each content area of the ARRT registry will meet of exceed 7.5	ARRT average category score Radiation Protection	8.2	109%	This objective has been met	None at this time	N/A
	Equipment Operation and Maintenance	7.7	103%	This objective has been met	None at this time	N/A
	Image Production and Evaluation	8	107%	This objective has been met	None at this time	N/A
	Radiographic Procedures	7.8	104%	This objective has been met	None at this time	N/A
	Patient Care	8.6	115%	This objective has been met	None at this time	N/A

OBJECTIVE/OUTCOME	INDICATOR	ACTUAL OUTCOME	% ATTAINMENT	ANALYSIS	RECOMMENDATIONS AND PLAN OF ACTION	FOLLOW UP
1. 100% of employers surveyed will rate the program's recent graduates as Meets or Exceeds standards (3.0 on a 4-point scale.	Employer surveys	100% Average: 3.44	100%	This outcome has been met.	None at this time.	N/A
2. 100% of the Advisory Committee will rate the program's design to provide students with practical job application experience as Good or Excellent.	Advisory Survey					
3. 90% of those graduates seeking employment will be employed within six months of graduation.	Graduate survey	100%	125%	This outcome has been met.	None at this time.	N/A

OBJECTIVE/OUTCOME	INDICATOR	ACTUAL OUTCOME	% ATTAINMENT	ANALYSIS	RECOMMENDATIONS AND PLAN OF ACTION	FOLLOW UP
1. 100% of ACIs will rate the first year students as Fair or better (3.0 on a 5-point scale).	ACI Survey General understanding of radiographic concepts	100% Ave = 4.14	100%	This objective has been met.	None at this time.	N/A
	Psychomotor ability	100% Ave = 4.14	100%	This objective has been met.	None at this time.	N/A
	Patient care skills	100% Ave = 4.00	100%	This objective has been met.	None at this time.	N/A
	Professional behavior	100% Ave =3.57	100%	This objective has been met.	None at this time.	N/A
2. 100% of graduates will rate the overall didactic instruction as Adequate or better (3.0 on a 5-point scale).	Graduate Survey	87% Ave = 3.67	87%	It is felt that the new curriculum initiated in 200 will increase the student's preception of the didactic portion of the program.	The effectiveness of the new curriculum will need to be closely monitored. A survey will be sent to the second-year students this fall to determine their preceptions of the didacctic portion of the program.	The survey of the second-year students will be sent out on October 15, 2002. These data will be collected, tabulated, and analyzed to determine the effectiveness of the on-campus instruction
3. 100% of program faculty will rate the curriculum designed to facilitate student learning as Good or Excellent (4.0 on a 5-point scale).	Faculty Survey					
4. 100% of the Advisory Committee will rate the program's instructional content as Acceptable, Good, or Excellent.	Advisory Committee Survey					

OBJECTIVE/OUTCOME	INDICATOR	ACTUAL OUTCOME	% ATTAINMENT	ANALYSIS	RECOMMENDATIONS AND PLAN OF ACTION	FOLLOW UP
1. 100% of full-time program faculty will attend one or more professional or educational activities each year	Faculty end-of-year report	100%	100%	This objective has been met.	None at this time.	N/A
2. 75% of graduates will indicate interest in pursuing one or more post-RT certificates.	Graduate Survey	67%	89%	Two out of three graduates indicated that they were interested in post-RT certificates. The program has proposed the development of both CT and mammography certificates with others to follow. Once these certificates are in place, it is felt that more students will show interest.	The CT and mammo certificates has not completed the pre-apporval process at the time of this writing. The VP of Academic Affairs has neither approved nor rejected the proposals. At this point, we are in limbo.	When the new Dean brought onboard, it is hoped that she will push the certificate approval process foreward.
3. 75% of ACI's will attend the yearly ACI meeting.	ACI Meeting minutes	80%	107%	This objective has been met.	None at this time.	N/A

ARRT REGISTRY SCORES

Following successful completion of the Radiography Program, students are eligible to take the national registry examination administered by the American Registry of Radiologic Technology. This registry is considered the benchmark of the profession and most states have licensure laws that identify the ARRT registry as a minimum entry-level requirement. Even though Michigan has no such licensure law at present, most hospitals follow the recommendations set forth by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) to only hire registered technologists. Therefore, the program's ability to give its students the knowledge and skills necessary to pass the national registry is paramount to the success of the program. The following is information about graduate student performance for the past five years:

ARRT First Time Examinees*

1997	48	56	90	77	83.74
1998	44	64	89	77	83.09
1999	54	70	88	80	82.81
2000	45	71	88.7	78.4	83.1
2001	40	73	88.3	80	83.3

* Please note that these statistics are for first-time examinees only. Data from students taking subsequent tests is not included in the statistics released by the ARRT.

As determined by the JRCERT, a benchmark of a 75% pass rate has been set for all accredited radiography programs. As seen on the accompanying charts, the program has not met this standard in any of the last five years. Even though the pass rate has risen each year, this trend is of extreme concern for the faculty and administration of the program. The program feels that the review and complete revision of the curriculum completed in 2000 will help bring the pass rate up. The class graduating in 2002 was the first group to complete the program under the new curriculum. Their pass rate for 2002 (due out in November) will be informative as to its efficacy. We are also currently engaged in an in-depth programmatic evaluation that includes using the information and insight gained through the PRP processes to determine potential actions for increasing student success. The program's conclusions and recommendations are included in the curriculum review portion of this document.

ARRT Results by Section

	A	B	C	D	E
1997 FSU	7.5	6.9	7.5	7.7	8.3
1997 National Mean	8.4	7.8	8.4	8.4	8.8
1998 FSU	7.8	7.2	7.7	7.6	8
1998 National Mean	8.6	8	8.3	8.3	8.6
1999 FSU	8.2	7.7	7.9	7.7	8.5
1999 National Mean	8.5	8	8.3	8.2	8.6
2000 FSU	7.9	7.4	7.9	7.7	8.5
2000 National Mean	8.5	7.9	8.3	8.2	8.7
2001 FSU	8.2	7.7	8	7.8	8.6
2001 National Mean	8.5	7.9	8.3	8.3	8.9

ADMINISTRATIVE PROGRAM REVIEW: 2001

(final version – 10/24)

Program/Department: Radiography Date Submitted: January 4, 2002

Please provide the following information:

Enrollment

	Fall 1997	Fall 1998	Fall 1999	Fall 2000	Fall 2001
Tenure Track FTE	3	3	3	3	3
Overload/Supplemental FTEF	.12	.04	0	0	0
Adjunct/Clinical FTEF (unpaid)	25	25	25	25	25
Enrollment on-campus total*	96	110	106	107	91
Freshman	29	15	17	20	25
Sophomore	30	53	48	35	24
Junior	22	27	30	40	30
Senior	15	15	11	12	12
Masters	0	0	0	0	0
Doctoral	0	0	0	0	0
Pre-Professional Students	84	48	39	28	26
Enrollment off-campus*	0	0	0	0	0
Traverse City					
Grand Rapids					
Southwest					
Southeast					

*Use official count (7-day)

If there has been a change in enrollment, explain why:

Capacity:

Estimate program capacity considering current number of faculty, laboratory capacity, current equipment, and current levels of S&E.

120 students

What factors limit program capacity?

Financial

Expenditures*	FY 97	FY 98	FY 99	FY 00	FY 01
Supply & Expense	$16,926	$20,071	$19,551	$17,456	$18,272
Faculty Prof. Development					
General Fund					
Non-General Fund					
UCEL Incentives				$10,000	
FSU-GR Incentives					
Equipment					
Voc. Ed. Funds	$30,606	$53,678	$55,249	$30,160	
General Fund					$426
Non-General Fund					
UCEL Incentives					
FSU-GR Incentives					

*Use end of fiscal year expenditures.

If you spent UCEL and FSU-GR incentive money for initiatives/items other than faculty professional development and equipment, what were they? Explain briefly. Please also include amounts spent on each initiative/item.

Revenues	FY 97	FY 98	FY 99	FY 00	FY 01
Net Clinic Revenue					
Scholarship Donations					
Gifts, Grants, & Cash Donations					$50
Endowment Earnings					
Institute Programs/Services					
In-Kind					

Other

	AY 96/97	AY 97/98	AY 98/99	AY 99/00	AY 00/01
Number of Graduates* - Total	53	47	59	58	47
- On campus	53	47	59	58	47
- Off campus	0	0	0	0	0
Placement of Graduates	95%	92%	100%	96%	
Average Starting Salary	$27,000	$28,500	$30,000	$32,000	
Productivity - Academic Year Average	763	725	799	696	743
- Summer	356	364	358	380	319
Summer Enrollment	98	99	100	96	93

* Use total for full year (S, F, W)

1. a) Areas of Strength:

- The radiography program is the largest program in the state of Michigan and one of the largest in the nation.
- At present, Ferris is the only University in the state that offers the Radiography program.
- The program's laboratory equipment (four x-ray rooms, c-arm, fluoro equipment, portable unit, mammographic machines, working darkroom, and various pieces of ancillary equipment) makes it one of the largest and most complete labs of any program in the country.
- We have an excellent reputation among employers throughout the state for the skills and knowledge of our graduates.
- The program has numerous internship sites at major hospitals throughout the state that provides the student with a rich and practical clinical experience.
- At every clinical site the program has highly qualified Clinical Instructors who facilitate student learning and promote the program.
- The demand for graduates from the program is extremely high.
- The program's major curriculum adjustments that took effect in the Fall 2000 appear to be very successful. The first class to follow this curriculum has recently begun its second year and most indications show that they are doing extremely well in their clinical internships.
- The program's ARRT registry pass rate has increased every year for the past five years. In 2000 it neared 80%, which is a vast improvement from the 56% pass rate in 1997.

b) Areas of Concern and Proposed Action to Address Them:

The major concern of the program is the need to replace old and outdated x-ray equipment. Three of the four x-ray rooms in the radiography laboratory are more than ten-years old (one room was installed in 1991, one in 1988, and one in 1984). A plan for the replacement of this equipment needs to be initiated in the very near future because 1) the radiography lab cannot function at full capacity without all four rooms operating properly, 2) the present equipment is very prone to breakdown and quality lab time is lost each semester when various rooms are unusable, 3) even when operating, the present equipment provides unreliable exposures and many experiments are inaccurate due to the rooms' unpredictability, 4) these machines can pose a radiation safety hazard to students, faculty, and other individuals within the college, 5) this equipment is nowhere near industry standards and the students have a very difficult time integrating into their clinical experience due to this wide gap in technology.

2. Future goals (please give time frame)

The possibility of developing individual certificate programs in special areas of radiation such as Computer Tomography (Cat Scan), MRI, mammography, cardiovascular interventional, bone densitometry, and quality assurance are currently being evaluated.

3. Other Recommendations:

4. Does the program have an advisory committee? Yes.

a) If yes, when did it last meet?
The last meeting was in June 199. Next meeting is scheduled for November 2001.

b) If no, why not? By what other means do faculty receive advice from employers and outside professionals?

c) When were new members last appointed? New members will be appointed at the next meeting.

d) Are there non-alumni/ae on the committee? How many? Yes. Six.

5. Does the program have an internship or other cooperative or experiential learning course? Yes

a) If yes, is the internship required or recommended? Required

b) If no, what is the reason for not requiring such an experience?

6. Does the program offer courses through the web?

a) Please list the web-based (fully delivered through the internet) courses the program offered last year?

b) Please list the web-assisted (e.g., WebCT) courses the program offered last year.

RADI 201, 202, 291, 211, 212, 292, 222, 293

7. What is unique about this program?

a) For what distinctive characteristics is it known in the state or nation?

- Ferris has the largest program in the state and one of the largest in the country , therefore we have a very large number of alumni to advertise the program.
- At present, we are the only University in the state that offers the Radiography program. Many students come to Ferris for the "college experience" (i.e. living away from home, extracurricular activities, fraternities, sororities, intercollegiate athletics, cultural events, etc.)
- The program attracts students from all parts of the state and from neighboring states (Wisconsin, Illinois, Indiana, etc.) because of its reputation for quality education.
- Our numerous internship sites are conveniently located throughout the state – this gives the opportunity for students to do their internship close to home.

b) What are some strategies that could lead to (greater) recognition?

- The program faculty need to become more involved in state and national professional and educational activities. We have the opportunity to be one of the most recognized and respected programs in the country if we become more visible.

8. Questions about Program Outcomes Assessment (attach additional sheets, if necessary):

a) What are the program's learning outcomes? (see attached)

b) What assessment measures are used, both direct and indirect?

c) What are the standards for assessment results?

d) What were the assessment results for 2000-01?

e) How will / how have the results been used for pedagogical or curricular change?

9. Questions about Course Outcomes Assessment:

a) Do all multi-sectioned courses have common outcomes?
All multi-sectional courses are taught by the same instructor and therefore have the same outcomes.

b) If not, how do you plan to address discrepancies?

c) Do you keep all course syllabi on file in a central location?
Yes, in the program coordinator's office and with the departmental secretary*

*If you have questions about the outcomes assessment portions of this survey, please contact Laurie Chesley (x2713).

Form Completed by Julian Easter, Department Head, Health Related Programs
Name and Title

Reviewed by Dean _____
Name and Date

Radiography Program Attrition/Retention Rates

Year	# Enrolled Fall	# Graduated	# Currently Enrolled	Attrition	Retention
1996	70	50		28.60%	71.40%
1997	66	58		12.10%	87.90%
1998	61	47		22.90%	77.10%
1999	59	52		11.90%	88.10%
2000	58	42		27.60%	72.40%
2001	55		42	23.60%	76.40%
2002	58		58	0%	100%

gave a seminar on radiation protection at the International Society of Radiologic Technologists annual meeting in Mexico.

Administrative effectiveness

The administration within the College of Allied Health Sciences is generally supportive of the program. We almost always have any equipment and supply needs filled quickly and we have had good fortune in being eligible for Perkins Funds every year. Funding for faculty development is available (yet underutilized) and the lab equipment is maintained properly. Faculty computer equipment and support is excellent except in the lab where two new computers are needed to support learning activities.

The one area that is unsettling to the faculty is the administration's somewhat lukewarm support of new initiatives. Certificate programs in computed tomography and mammography have been proposed and have apparently stalled somewhere up the ladder. These programs are the first step in creating a system of certificate programs that will eventually lead to a Bachelor's degree in radiography. It is felt by the faculty that we are going to have a window of opportunity close soon if we cannot bring these programs to fruition. Other programs around the state are starting programs (Baker College and Delta College have started certificates and Grand Valley has proposed a BS in imaging sciences) that will place them that far ahead of our efforts. To be effective, we need to move these programs forward in the near future.

PROGRAM STRENGTHS

The faculty of the program feels that the following are some of the strengths of the program:

1) The dedication, experience, and expertise of the faculty.

2) The number and diversity of clinical sites that give the students a wide variety of options and experiences in the internship portion of the program.

3) The motivation and dedication of the Adjunct Clinical Instructors.

4) The students graduate with a high degree of employability skills.

5) The quality and utility of radiographic equipment in the laboratory.

6) The availability of state-of-the-art computers, audio-visual equipment, and other multimedia resources.

7) The cost-effectiveness of the program.

8) The substantial progress made in the development of competency and outcomes based instruction.

9) The development and implementation of a comprehensive program evaluation process.

PROGRAM WEAKNESSES

The faculty has determined that the following areas need to be improved in the program:

1) The lower than national average registry pass rates

2) The clinical portion of the program needs to be more organized and a better system of communication between Ferris and the clinical sites needs to be established.

3) The lack of class time (credits) is a detriment to the student's ability to pass the national registry.

4) The faculty needs to be constantly updating their professional skills.

5) The program's structure (i.e. one-year on-campus and one year off). It is felt that a simultaneous integration of classroom knowledge and clinical application would be a positive factor in student learning.

6) The incoming student's prerequisite skill level in certain areas.

7) The program's eligibility requirements are too low.

8) A smaller class size would be more conducive to student / teacher communication.

RECOMMENDATIONS

1) The lab assistant position is now part-time (32 hours per week). It needs to be made a full-time position with benefits. The person that is presently in that position is performing an excellent job now, but she does not get compensated properly for what she does. Also with the additional 8 hours per pay period, she would be able to perform other essential tasks including:

- Ordering of supplies.
- Basic equipment maintenance and repairs.
- New course and certificate program development.
- Web development.
- Helping with registration of new students for summer semester.
- Assist with registry review instruction.
- Assist with clinical internship and site visits.
- Maintain immunization and CPR records of students.
- Assist with program evaluations and student semester evaluations.
- Coordinate computer competencies.
- Fill-in for lectures.
- Maintain film file and database.
- Scanning of radiographs and development of lab related activities.
- Coordination of and preparation in recruitment activities.

2) Additional credit hours must be assigned to the program. This can be accomplished effectively only by discontinuing the requirement for CCHS courses.

3) Room F in the lab needs to be replaced (this is scheduled to be funded with Perkins Funds in 2003 – 2004). New digital equipment must be purchased to allow the program to keep abreast with the new technologies in the hospitals.

4) The eligibility requirements for the program need to be increased and the math requirement needs to be raised to MATH 115.

5) The proposed certificate programs in CT and mammography need to be green-lighted. This will be the first step in a series of certificate programs that will ultimately culminate in a BS degree in radiography.

James E. Mayhew, MS, RT(R)(QM)

20610 Ross Parkway ♦ Big Rapids, Michigan 49307 ♦ (231) 796-8648

CURRICULUM VITAE

EDUCATION:

Master of Science in Career and Technical Education
Ferris State University, Big Rapids, Michigan
Graduated with Highest Distinction: May, 2002

Bachelor of Science in Health Care Administration
Columbia Union College, Takoma Park, Maryland
Graduated Magna Cum Laude: May, 1993

Associate of Applied Science in Radiologic Technology
University of Cincinnati, Cincinnati, Ohio
Graduated Magna Cum Laude: August, 1987

EXPERIENCE:

Program Coordinator, Ferris State University, Big Rapids, Michigan
August 2000 to Present

- ◊ Administration and coordination of program
- ◊ Program representative to state and national regulatory agencies
- ◊ Instructor for three to four courses per semester
- ◊ Development and implementation of radiography curriculum
- ◊ Advisement of 60 to 70 students per year
- ◊ Programmatic recruitment and marketing

Clinical Coordinator, Ferris State University, Big Rapids, Michigan
January 1997 to August 2000

- ◊ Coordinated clinical activities at 20 internship sites across the state
- ◊ Developed and taught Clinical Education and Clinical Practicum courses
- ◊ Organized and supervised Adjunct Clinical Instructors
- ◊ Instructed and evaluated students in Advanced Radiographic Positioning course

Diagnostic Radiologic Technologist, Borgess Medical Center, Kalamazoo, Michigan
April 2000 to September 2000, (part-time weekends)

- ◊ Performed diagnostic and fluoroscopic examinations

Program Director, Washington Adventist Hospital School of Radiography, Takoma Park, Maryland
December 1991 to January 1997

- ◊ Oversaw complete operation of Radiography Program
- ◊ Taught 10 classes in Radiography
- ◊ Planned and implemented curricula
- ◊ Managed staff of Clinical Director, three clinical associates and clerical staff

EXPERIENCE continued:

Clinical Director, Washington Adventist Hospital School of Radiography, Takoma Park, Maryland
September 1989 to December 1991

- ◊ Taught 10 to 12 classes per year
- ◊ Organized and implemented clinical curriculum
- ◊ Created and employed student clinical evaluations

Computed Tomography Technologist, Washington Adventist Hospital, Takoma Park, Maryland
June 1989 to November 1991 (part-time)

- ◊ Provided weekend and evening coverage for Computed Tomography department
- ◊ Performed Computed Tomographic examinations of the head, chest, abdomen, and spine
- ◊ Assisted physicians in lung and liver biopsies

Special Procedures Technologist, Washington Adventist Hospital, Takoma Park, Maryland
May 1989 to September 1989

- ◊ Performed numerous angiographic and special procedures

Diagnostic Radiologic Technologist, Washington Adventist Hospital, Takoma Park, Maryland
October 1987 to May 1989

- ◊ Proficient in diagnostic radiography, tomography, fluoroscopy and xeroradiography

PUBLICATIONS EDITED:

Radiographic Imaging and Exposure by Burns and Fauber, Mosby Publishing

Computer Assisted Instruction for Medical Imaging Sciences, Educational Software Concepts, Inc.

PROFESSIONAL CERTIFICATES:

The American Registry of Radiologic Technologists

- ◊ Radiography and Quality Management
- ◊ Certificate Number 220246

State of Maryland, Department of Health and Mental Hygiene

- ◊ License Number R01012

PROFESSIONAL ORGANIZATIONS:

Joint Review Committee on Education in Radiologic Technology

- ◊ Site Visitor - 1997 to Present

American Society of Radiologic Technologists, 1992 to Present

PROFESSIONAL ORGANIZATIONS continued:

Michigan Society of Radiologic Technologists, 1997 to Present

Maryland Society of Radiologic Technologists, 1989 to Present

- ◊ Central District President - 1991 to 1992
- ◊ Legislative Committee Chairperson - 1991
- ◊ Continuing Education Committee Member - 1991

Association of Educators in Radiologic Sciences, 1987 to Present

PROFESSIONAL PRESENTATIONS

Radiation Protection for the Technologist, International Society of Radiologic Technologists, Cancun Mexico, July 2002

COLLEGE AND UNIVERSITY COMMITTEES:

- ◊ Academic Program Review Council
- ◊ Strategic Planning Committee
- ◊ Curriculum Assessment Planning Committee
- ◊ Student Affairs Committee (Chair)
- ◊ Athletic Advisory Committee
- ◊ Library/Historical/Archival Committee
- ◊ Sonography Faculty Search Committee (Chair)
- ◊ Dean of Allied Health Sciences Search Committee
- ◊ Respiratory Care Faculty Search Committee
- ◊ Nuclear Medicine Faculty Search Committee
- ◊ Study Abroad Committee
- ◊ Reasoning Ability and Lifelong Learning Assessment Committee
- ◊ Radiography Program Review Committee (Chair)

NAME OF PROGRAM	INSTITUTION	CERT/C.E.U.	YEAR
Radiographic Pathology of the Chest	ASRT	1.5 CEUs	1997
Trauma Radiography	ASRT	1.0 CEUs	1997
Skull & Facial Bone Radiography	ASRT	1.0 CEUs	1997
Medical Imag of Trauma: Upper Cervical Spine	ASRT	1.0 CEUs	1997
Mammo Eval of Postsurgical/ Irradiated Breast	ASRT	2.0 CEUs	1997
Early Detection Techniques in Breast Cancer Management	ASRT	2.0 CEUs	1997
Defecation Disorders & the Role of Defecography	ASRT	2.5 CEUs	1997
JRCERT Site Visitor Workshop	ASRT	9.5 CEUs	1997
Radiographic Imaging of Small Bowel Disease	ASRT	1.5 CEUs	1997
Designing Effective Writing Assignments	FSU	No	1998
Assessment Seminar	FSU	No	1998
Harassment/Sensitivity Training	FSU	Certificate	1998
Distance Learning Seminar	FSU	No	1998
File Server Training	FSU	No	1998
Hepatic CT: Review of Optimal Scanning Techniques	ASRT	1.0 CEUs	1998
Breast Ca in Men & Mammo of Male Breast	ASRT	1.5 CEUs	1998
Coping with Increasingly Complex Radiation Control Regulations	ASRT	2.0 CEUs	1998
Creative Aspects of Critical Thinking	ASRT	2.0 CEUs	1998
Computed Radiography Systems	ASRT	1.0 CEUs	1998
Enhancing Your Role in Patient Assessment	ASRT	1.0 CEUs	1998

Basic Concepts of MRI	ASRT	1.5 CEUs	1998
Preparing for Standard Eleven/ Program Effectiveness	ASRT	1.5 CEUs	1998
Managing Cultural Diversity: Art of Communication	ASRT	1.5 CEUs	1998
Radiographic and Endoscopic Eval of Upper GI Tract	ASRT	2.0 CEUs	1998
The Radiologic Technologist's Role in Pt Education	ASRT	1.5 CEUs	1998
Dx and Tx of Mandible and Facial Fractures	ASRT	1.5 CEUs	1998
3-D Imaging: Basic Concepts for Radiologic Techs	ASRT	2.0 CEUs	1998
Emergency Ultrasound for Ectopic Pregnancy	ASRT	1.5 CEUs	1998
Radiologic Technology's Role in Sports Medicine	ASRT	1.5 CEUs	1998
Technical Topics -- Using HTML	FSU	No	1999
Writing Effective Tests	FSU	No	1999
Pioneering Allied Health Clinical Education Reform -- A National Consensus Conference	Univ. of Maryland	9 CEUs	1999
Web Building	FSU	No	1999
Grant Group	FSU	No	1999
Genetics of Sporadic & Inherited Breast Cancer	ASRT	1.5 CEUs	1999
Mammographic Evaluation of the Augmented Breast	ASRT	2.0 CEUs	1999
Lymphedema Following Breast Cancer Treatment	ASRT	1.5 CEUs	1999
QC and Artifacts in Mammography	ASRT	1.5 CEUs	1999
Osteoporosis and Bone Densitometry	ASRT	2.0 CEUs	1999
Radiology's Role in I.C.U. Care	ASRT	1.0 CEUs	1999

Radiation Biology: Update	ASRT	1.0 CEUs	1999
So Now You Have a Job	ASRT	1.0 CEUs	1999
Digital Imaging	ASRT	1.5 CEUs	1999
Valuing Diversity: Beyond the Scope	ASRT	1.5 CEUs	1999
Effective Communication Habits	ASRT	2.0 CEUs	1999
Change & Transition	ASRT	2.0 CEUs	1999
Substance Abuse	ASRT	1.0 CEUs	1999
Computer Technology for the Tech	ASRT	1.0 CEUs	1999
Diversity	ASRT	1.5 CEUs	1999
Life is Too Important to be Taken Seriously	ASRT	1.0 CEUs	1999
Forensic Medicine: Duties and Responsibilities of the Radiographer	ASRT	2.0 CEUs	1999
Viewing the Swallow: Dysphagia - Diagnosis and Treatment	ASRT	2.5 CEUs	1999
Imaging the Shoulder	ASRT	1.0 CEUs	1999
Atypical Orthopedic Procedures	ASRT	1.0 CEUs	1999
Infection Control Workshop	Delta College	Certificate	2000
Ethics and Law for the Radiologic Technologist	ASRT	1.5 CEUs	2000
Radiologic Assessment of Temporal Lobe Epilepsy	ASRT	0.5 CEUs	2000
Radiation Dose in CT	ASRT	2.0 CEUs	2000
Interventional Radiology of the Pancreas and Liver	ASRT	1.5 CEUs	2000
MSQA: The final Rule	ASRT	1.5 CUEs	2000
Current Techniques in Sentinel Node Mapping	ASRT	1.5 CEUs	2000
Radiology Department & Nosocomial Infections	ASRT	1.0 CUE	2001

Digital Medical Image Management	ASRT	2.0 CEUs	2001
Facilitating Learning and Teaching Methods	FSU	Certificate	2001
Breast Procedures and Imaging Techniques	ASRT	1.5 CEUs	2001
Recent Advances in Breast Cancer Imaging	ASRT	2.0 CEUs	2001
Telemedicine and Teleradiology	ASRT	3.0 CEUs	2001
Forensic Medicine: Matters of Life and Death	ASRT	2.0 CEUs	2001
Communicating with Mammography Patients	ASRT	1.5 CEUs	2001
Radiation Protection for Radiologic Technologists	ASRT	1.5 CEUs	2001
JRCERT Site Visitor Seminar	ASRT	14.0 CEUs	2001
Image-Guided Percutaneous Needle Biopsy	ASRT	2.5 CEUs	2001
Survey Research Techniques	ASRT	1.0 CEU	2001

CURRICULUM VITAE

Biographical Data:

Name: Joel R. Rescoe, MS, RT(R) **DATE:** September, 2002
Current Rank: Assistant Professor
Program of Major Responsibility: Radiography

I. Formal Education

Highest Degree Earned: Master's Degree
Major: Career and Technical Education
Year Granted: 2001
Granting Institution: Ferris State University
Additional Degrees: AAS – Radiography, Ferris State University, 1977
BS – Health Studies, Western Michigan University, 1981

II. Professional Credentials

1. Registered Radiographer (Radiography) ARRT, 99% scaled score. Currently good standing.
2. Member – ASRT
3. Member – MSRT

III. Work Experience (Other than teaching):

PLACE	JOB DESCRIPTION	YEAR
Butterworth Hospital (now Spectrum Health – Downtown) Grand Rapids, MI	Staff Radiographer Unit Supervisor Quality Assurance Coordinator Assistant Clinical Instructor	1977-81
U.S. Gypsum Co. Tawas City, MI	Quality Assurance Technician	1971-77
Ferris State University Big Rapids, MI	Student Orientation Leader	1977

IV. Continuing Education

NAME OF PROGRAM	INSTITUTION	CERTIFICATE/ CEU	YEAR
Certification in Quality Improvement Concepts and Practices	FSU		2002
Educ 518 Diversity in Classroom & Workplace	FSU		2001
Leadership Training as Member of FSU Leadership Development Committee	FSU		1999-2000

IV. Continuing Education (con't)

NAME OF PROGRAM	INSTITUTION	CERTIFICATE/ CEU	YEAR
Communicable Diseases & Bloodborne Pathogens: Current Protocols	Delta Saginaw, MI		1999-2000
TQI/CQI Team Facilitator Training	FSU		1999
Improving Process Performance (3 day session)	Prism/FSU	No	1998-99
Supervisory Skills Training for Quality Improvement (3 day session)	FSU	Yes	1998
Web CT Seminar: Implementing the Web into the Curriculum	FSU	No	1998
Post-Tenure Review/Performance Appraisal Seminar	CMU	No	1997
Instructional Strategies	FSU	No	1996
Team building/Coaching for Managers	FSU	No	1995
Clinical Instructor's Workshop	Mayo Clinic Phoenix, AZ	Yes	1995
Critical & Creative Thinking Workshop	Sonoma State Univ. Chicago, IL	Yes	1993
Creative Multimedia Instruct. Workshop	East Lansing, MI	No	1991
Radiation Devices Orientation	FSU	Yes	1987
Professional Dev. Courses	FSU	Yes	1982-98
M.S.R.T.* Annual Conventions	Various locations in Michigan	Yes	1975-98
R.S.N.A.**	R.S.N.A. Chicago, IL	No	1993-94

*Michigan Society of Radiologic Technologists. Have attended every annual convention with a few exceptions within the years specified. Participated in convention seminars specific to the radiographic or education profession too numerous to list.

**Radiological Society of North America. Preeminent annual convention, global in scope, that includes gamut of equipment, procedures and personnel involved in diagnostic/ therapeutic medical imaging.

V. Non-Contractual Professional and Community Contributions

Academic Year 1996-97

1. Participant in Academic Program Review process for the Ferris Radiography Program. This extensive internal self study required surveying, data collection, and analysis as well as report publication. My major responsibility involved assessing program student and graduate input and compilation of this report section.

2. Participant in Registry Review Seminar for soon to be graduates. Reviewed specific topic: "Radiography of the Head and Related Procedures".

3. Project leader and mentor: Young Women in Science – Cross Age Research Teams. This was an extensive (6 month duration) NSF sponsored scientific research project with the purpose of promoting young women's (grades 5-8) interest in science and familiarity with methods of scientific inquiry. Topic: The Effects of Ultraviolet Radiation Upon Plant Growth and Other Living Things. Findings presented at Central Michigan University.

4. Development of Instructional Web Site for my courses. The purpose is to convey current information regarding courses or content (instruction) to students in a timely manner, and to encourage the use of innovative emerging learning or communication technologies.

5. Supervising instructor for several learners conducting independent research or special studies. Course RADI 297 – Special Studies in Radiography, variable college credit. Representative projects include "An Analysis of Correlation Between the Patient's Education, Social Class, and Knowledge of Radiology".

6. Directed teaching mentor for student in Allied Health Education. Assisted the student in the application of didactic learning to Radiography program courses. Student name: Ms. Tammy Cingano.

7. Participant/Presenter in Eco-Camp 97, a summer school program for elementary school students. My area of responsibility included ecological awareness and preservation, earth sciences, paleontology, orienteering/map interpretation and design, and nature survival skills.

8. Presented "Careers and Unique Aspects of Biology from a Medical Perspective" to fifth grade students at Brookside Elementary School, Big Rapids, MI.

Academic Year 1997-98

9. Presented "Careers and Unique Aspects of Biology from a Medical Perspective" to third grade students at Brookside Elementary School, Big Rapids, MI, and first and second grade students at Eastwood Elementary School.

10. Presenter/Mentor in Project Earth Program, Summer session. Similar in scope to item #7.

11. Presenter, Ferris State University Registry Review Seminar, Summer, 1998.

12. Girls major softball coach, Big Rapids Little League, 1998 season.

V. Non-Contractual Professional and Community Contributions (con't)

Academic Year 1998-99

13. Co-Chair, Division of Administration and Finance, Quality Improvement Communication Committee, Intracampus Publication of Report of Findings.

14. Quality Improvement 2000+ Advisory Board and Steering Committee.

15. University Leadership Quality Improvement and Leadership Development Committee.

16. Mentor and Organizer, Brookside Chess Champions Project.

17. Member, Big Rapids Public Schools Citizen's Curriculum Advisory Committee.

18. Assistant Leader, Ferris Geology Field Trip, Summer, 1999.

Academic Year 1999-2000

19. Member, Big Rapids Public Schools Citizen's Curriculum Advisory Committee

20. University Leadership Quality Improvement and Leadership Development Committee

21. Quality Improvement 2000+ Advisory Board and Steering Committee

22. Assistant Leader, Ferris Geology Field Trip, Summer, 2000

Academic Year 2000-2001

23. Member, CAHS Planning Committee

24. Member, Quality Improvement 2000 Steering Committee

25. Member, University Leadership, Quality Improvement and Leadership Development Committee

26. Member, Quality Improvement Student Transfer Process

Academic Year 2001-2002

27. Satisfactory Appraisal, Post-Tenure Review Process

28. Member, FSU Quality Improvement 2000 Advisory Committee

29. Member, CAHS Safety Committee

30. Member, Quality Improvement Student Transfer Process

VI. Teaching Experience (Ferris and other):

Total Years: 21

Years (full-time) Employed at Ferris: 20

Current contractual responsibilities (2002-03):

Course Instruction: 17 contact hours/week (2001-02)
Advise 40+ students
Member, Quality Improvement 2000 Steering Committee – University Scope
Member, University Leadership, Quality Improvement & Leadership Development Committee

VII. Significant Past Professional Contributions and Accomplishments

Certification in Quality Improvement Concepts and Practices, 2002.

Consultant, Site Visitor, University of Wisconsin at Stout, Malcolm Baldridge Quality In Education Award, 2002.

Served as Radiography Program Coordinator, Ferris State University, AY 1994-95.

Chair, Michigan Society of Radiologic Technologists, Annual State Convention Educational Program, 1992.

Chair, MSRT Annual State Convention Essay Competition, 1988.

Chair, MSRT Annual State Convention Essay Competition, 1984.

Editorial Publication: "At the Crossroads", Wolverine Contact, 1984.

Scientific Publication: "Radioiodinated Serum Albumin as an International Radiation Dosimeter", University of Iowa Press, 1971.

Research Studies (not published) at Ferris State University involving dose reduction protocols for dental clinic patients and staff. Co-authored with Mrs. Lynne Scheible.

BIOGRAPHICAL DATA
ROBERT T. HOLIHAN

ACADEMIC RANK:

Technical Instructor
Radiography Program
Ferris State University, Big Rapids, MI 49307

EDUCATION:

1989 – 1991	Health Systems Management Program Ferris State University Big Rapids, MI 49307 Public Admin. Program Western Michigan University
Oct. 1986 – March 1987	Off-Campus Ultrasound Program Ferris State University Big Rapids, MI 49307
1978	Bachelor of Science, Allied Health Education Ferris State College Big Rapids, MI 49307
1974	Associate in Applied Science, Radiography Ferris State College Big Rapids, MI 49307

WORK EXPERIENCE:

2000 – Present	Clinical Coordinator/Radiation Safety Officer Radiography Program Ferris State University Big Rapids, MI 49307
1981 – 2000	Program Coordinator/Technical Instructor Radiography Program Ferris State University Big Rapids, MI 49307
1975 – 1979	Mecosta County General Hospital Big Rapids, MI 49307
1974 – 1975	Clinical Instructor Munson Medical Center Traverse City, MI 49684
1973 – 1974	St. Mary's Hospital Grand Rapids, MI 49503

PROFESSIONAL RECOGNITION:

Sept. 1981 – May 1983	President of the Lakeshore X-Ray Society
	American Registry of Radiologic Technology

PROGRAM DEVELOPMENT:

May 18, 1995	Ultrasound Spring Seminar Ferris State University Big Rapids, MI 49307

PUBLICATION/PROFESSIONAL LECTURES:

October, 1998	"Radiographers Review of Bacteriology", Michigan Society of Radiologic Technologists, Dist. #3.
March, 1983	"OTC Silicates Residues" Co-author: W. Neuman, Ph.D.

ACADEMIC SERVICE:

Pride Committee, FSU
Academic Senate, FSU
Promotion Committee, College of Allied Health Sciences
Curriculum Development, College of Allied Health Sciences
(initiated Core Curriculum)
Faculty Resource Committee, College of Allied Health Sciences

COMMUNITY SERVICE:

1993-95, 1998 – 2000	Grand Knight, Knights of Columbus St. Mary's Church Big Rapids, MI 49307 Held other various officer positions since 1982.

MILITARY SERVICE:

Retired from United States Naval Reserve as a Navy Chief – 22 years

FERRIS STATE UNIVERSITY
RADIOGRAPHY PROGRAM

RADI 121 - Radiographic Physics and Image Production
COURSE SYLLABUS (Fall 2002)

INSTRUCTOR: Jim Mayhew, RT(R)(QM)

OFFICE LOCATION: VFS 409 (Allied Health Building)

OFFICE PHONE: (231) 591-2320

FAX: (231) 591-3788

E-MAIL: Mayhewj@ferris.edu or tjmayhew@greatlakes.com

OFFICE HOURS: Wednesday 9:00 AM to 11:00 AM
Thursday 9:00 AM to 11:00 AM

For any other time, please call for an appointment.

LECTURE HOURS: Tuesday and Thursday 12:15 PM to 1:30 PM

PREREQUISITES: Admission to the Radiography Program

REQUIRED TEXT: Principles of Radiographic Imaging by: Carlton and Adler 3rd Edition

COURSE DESCRIPTION: This course is designed to introduce the student to the basic principles of radiation physics as well as the nature, sources, and physical properties of ionizing radiation. It so introduces the student to the structure and function of the x-ray tube and other radiographic equipment used to create and control x-radiation.

COURSE OBJECTIVES: After successful completion of this course including all reading and written assignments, the student will be able to:

1. Perform mathematical functions and calculations necessary for the study of radiation physics.
2. Differentiate between the US and metric systems and perform calculations necessary to convert from one system to the other.
3. List and describe the various types of energy found in nature and give examples of each.
4. Describe and explore the general theories of physics at the atomic and subatomic levels.
5. Describe the structure of an atom and identify all of its parts.
6. Define electrostatics and electrodynamics and describe their relationship to the field of radiology.
7. Identify and describe the nature and characteristics of electricity and magnetism and how they relate to radiology.
8. List the components of a basic electric generator and an electrical motor and describe the function of each.
9. Relate the structure and function of step-up, step-down, and autotransformers.
10. Define the function of a typical rectification system.
11. List and describe, in detail, the major components of an x-ray tube and examine how they are capable of producing electromagnetic radiation.
12. Examine the two methods of x-ray production which take place within the tube.
13. List and describe the five interactions between x-rays and matter.
14. Outline the structure of the entire x-ray circuit.
15. Draw and differentiate the various waveforms produced by the x-ray circuit.
16. List and describe the various types of exposure timers used in radiographic equipment.

ATTENDANCE: Attendance for this course is essential to the student's learning process, therefore, absenteeism and chronic lateness will not be tolerated. Attendance will be monitored daily and points will be added to or deducted from the student's total according to the following:

0 absences – 10 points will be added
1 absence – 5 points will be added
2 absences – 0 points will be added
3 absences – 5 points will be deducted
4 or more absences – 10 points will be deducted for each absence

Weekly quizzes and in-class assignments will not be made up. If a test is missed, the student must make arrangements with the instructor to make it up during the next regular lecture period following his or her return or a grade of "0" will be recorded.

GRADING: The final grade for this course will be determined using the following point system:

Three unit tests @ 100 points each	300
Final examination (cumulative)	200
12 weekly quizzes @ 10 points each	120
8 homework assignments @ 10 points each	80
TOTAL POINTS POSSIBLE	700

GRADING SCALE:

PERCENTAGE OF POSSIBLE POINTS	NUMERICAL	GRADE
95 – 100	4	A
92 – 94	3.7	A-
89 – 91	3.3	B+
86 – 88	3	B
83 – 85	2.7	B-
80 – 82	2.3	C+
77 – 79	2	C
74 – 76	1.7	C-
71 – 73	1.3	D+
68 – 70	1	D
65 – 67	0.7	D-
BELOW 65	0	F

TESTS A total of three unit tests will be given this semester. Each test will consist of 50 to 75 multiple choice, labeling, and/or matching questions. Each test will be worth 100 points.

The final (cumulative) examination will include all of the material covered in the semester and will consist of 100 to 150 multiple choice questions. The final is worth a total of 200 points.

QUIZZES: Short (10 to 15 minute) quizzes will be given each week of the semester and they will include the material covered in the preceding week's lecture. Each quiz will be worth 10 points for a total of 120 points. Questions on the quizzes will be fill-in-the-blank and short answer. **If a quiz is missed, it will not be made up.**

Class Schedule

CLASS PERIOD	TOPIC	READING ASSIGNMENT
1	Introduction and Review of Mathematics	
2	Application of Mathematical Principles and Calculations	pages 4 - 15
3	Application of Mathematical Principles and Calculations	pages 4 - 15
4	Application of Mathematical Principles and Calculations	pages 4 - 15
5	Units of Measure	pages 15 - 18
6	Units of Measure	pages 15 - 18
7	Atomic Structure	pages 21 - 32
8	Atomic Structure	pages 21 - 32
9	Test #1	
10	Matter and Energy	pages 21 - 32
11	Matter and Energy	pages 21 - 32
12	Electromagnetic Spectrum and Electrostatics	pages 32 - 44
13	Electrodynamics	pages 44 – 54
14	Electrodynamics	pages 44 – 54
15	Magnetism	pages 58 - 62
16	Magnetism and Electromagnetism	pages 62 - 67
17	Electric Generators and Motors	pages 67 - 73
18	Electric Generators and Motors	pages 67 - 73
19	Test #2	
20	Transformers, Autotransformers, and Rectification	pages 73 - 84
21	Transformers, Autotransformers, and Rectification	pages 73 - 84
22	Transformers, Autotransformers, and Rectification	pages 73 - 84
23	X-ray Production	pages 132 - 139
24	X-ray Production	pages 132 - 139
25	X-ray Production	pages 132 - 139
26	X-ray Interactions with Matter	pages 193 - 204
27	X-ray Interactions with Matter	pages 193 - 204
28	X-ray Interactions with Matter	pages 193 - 204
29	Test #3	
30	FINAL EXAM	

IMPORTANT NOTE:
Students with a documented disability (physical, learning, mental, emotional) requiring a classroom accommodation should contact the Disabilities Services Office, located in Arts & Sciences Commons 1017K (phone # 591-3772) or ASC 1021 (phone # 591-5039).

FERRIS STATE UNIVERSITY
COLLEGE OF ALLIED HEALTH SCIENCES
RADIOGRAPHY PROGRAM

RADI 101
RADIOLOGIC POSITIONING AND PROCEDURES 1
COURSE SYLLABUS
3 CREDITS

Course Description: An in-depth study of the anatomy, positioning, medical terminology, and patient care required to perform routine radiographic examinations of the upper extremities, shoulder girdle, and lower extremities. This course also provides an introduction to the use of computers in radiography. In the laboratory portion to this course, students will apply the knowledge and skills learned in lecture, as well as demonstrate proficiency in the evaluation and critique of radiographic images.

Time: First Semester, First year of the program

Lecture Hours: 30

Laboratory Hours: 45

Prerequisite: Admission into the Radiography Program

Course Instructor: Mr. Joel Rescoe, M.S., RT(R)
Assistant Professor and Advisor

Office Location: VFS 302

Office Phone: (231) 591-2322 (on-campus, just dial 2322)

Office Hours: Please refer to "Attachment D".

E-Mail: rescoej@ferris.edu or jrayxray@hotmail.com

Web Site: http://groups.msn.com/Radferris

Required Textbooks: Ballinger, P. Merrill's Atlas of Radiographic Positions and Radiologic Procedures, Mosby, St. Louis, MO. Current edition preferred (9th). Three volume set.

Hayes, S. Radiographic Anatomy, Positioning and Procedures Workbook, Mosby, St. Louis, MO. Current edition (2nd). Two volume set.

You will be using course textbooks next year, don't sell any back!

Course Hours and Location: Please refer to "Attachment D".

Instructional Methods: A variety of traditional and non-traditional instructional methods will be utilized as appropriate to accommodate various learning styles, and to facilitate the understanding, retention, and application of knowledge.

Evaluation Methods: Written quizzes, tests, positioning performance evaluations, experiments and conclusions, radiograph production and assessment, reports, worksheets, class participation, and other activities as indicated. Please refer to "Attachment A" for more information.

General Course Objectives:

1. Develop personal growth and positive attitudes toward learning.
2. Acquire and apply knowledge and professional skills, in team or individual context, to competently perform professional responsibilities.
3. Constructively interact with peers, patients, or health care providers.
4. Define and use proper positioning and medical terminology.
5. Utilize radiographic equipment or accessories efficiently.
6. Identify and describe anatomy and anatomical landmarks pertaining to the upper and lower extremities.
7. Evaluate radiographs for positioning and technical accuracy.
8. Demonstrate methods by which the diagnostic quality of medical images can be improved.
9. Identify and utilize skills necessary for the care and safety of the patient.
10. Determine the practical application of computers in the Radiology department, as well as access and use of various computer applications available in the curriculum.
11. Apply anatomical and procedural knowledge to properly position patients consistent with diagnostic requirements.

Course Requirements: Please refer to Attachment "A".

Grading Criteria: Please refer to Attachments "A" and "B".

Course Outline: Please refer to Attachment "C".

Attendance Policy: Please refer to Attachment "E".

ATTACHMENT A

RADI 101
COURSE REQUIREMENTS

1. Questions are encouraged at any time.
2. Laboratory attendance is mandatory and cannot be made up without an excused absence, otherwise attendance and class participation are intangible factors in grade computation. Refer to attendance-grade incentives below.
3. Assignments are generally provided daily and are coordinated with lecture and laboratory topics.
4. You are encouraged to work together on assignments unless instructed otherwise. This will, hopefully, promote friendships and encourage a beneficial exchange of ideas about radiographic concepts.
5. Handouts and educational materials are generally distributed at the beginning of lecture or lab. To obtain a copy of the handout other than at this time will cost 1 point per handout.

KEYS TO SUCCESS IN RADI 101

1. Read assignments before and after the corresponding lecture.
2. Participate in the learning process. We can't learn effectively without mutual participation. We need you in class for this to occur.
3. Emphasize information in this course that can be applied for the rest of your career. Focus upon basic concepts that can be adapted to new situations.
4. Utilize learning objectives and handout material to identify most relevant information.
5. Review the materials frequently and try to remember the information. You'll need it later as a radiographer. The materials learned are used as building blocks for subsequent concepts.
6. Trust that I am teaching to help you succeed as a person and as a radiographer.

GRADING CRITERIA

1. Unannounced quizzes will be presented in both lecture and lab. Their value will range between one (1) and fifteen (15) points. Quizzes cannot be made up.
2. Scheduled tests or activities.
    a. Three tests, approximately 50 points each.
        1) Comprehensive, utilize all forms of question format.
            a) Multiple choice, true-false, matching, illustration, visual interpretation, short answer, essay.
    b. Comprehensive final during finals week, approximately 100 points.
    c. Lab activities: approximately ten (10), each worth 10-20 points.
    d. Laboratory performance evaluation: 15 to 25 points.
        1) Assess ability to utilize radiographic equipment, properly position patients, and produce diagnostic medical images.
    e. Other assignments or activities when appropriate: 50 points total.
    f. Up to five (5) points of extra credit can be earned for RADI 101. Please see me first with your ideas.
    g. Complete comprehensive course notebook: 10 points.
3. Total points for RADI 101 is approximately 500-600.
4. Make-up Policy: Points missed (excluding quizzes) require an excused absence for make up. Please contact the instructor to schedule make up work. Make up tests are generally designed as short answer and essay.
5. Attendance incentives: 5 bonus points for perfect attendance, 3 points for 1 absence, 2 points for no more than 2 absences. Absence determined as quizzes missed.

ATTACHMENT B

GRADING SCALE

PERCENTAGE	NUMERICAL	GRADE
95 – 100	4	A
92 – 94	3.7	A-
89 – 91	3.3	B+
86 – 88	3	B
83 – 85	2.7	B-
80 – 82	2.3	C+
77 – 79	2	C
74 – 76	1.7	C-
71 – 73	1.3	D+
68 – 70	1	D
65 – 67	0.7	D-
BELOW 65	0	F

Sample Grade Determination

	T 1	Q 1	L 1	Total	%	Grade
Possible Points:	75	5	20	100	100	A
Your Points:	65	5	18.5	88.5	88.5	B+

$$\frac{65}{75} = 0.866 \cong 0.87 \times 100 = 87\% = B$$

ATTACHMENT C

RADI 101
RADIOLOGIC POSITIONING AND PROCEDURES 1
TENTATIVE COURSE OUTLINE

UNIT	LECTURE	LAB
Unit 1	Course Overview Syllabus Teambuilding Activity Overview of Imaging Production	Procedures and Resources Orientation Equipment Manipulation Seashell Radiograph Activity Worksheet
Unit 2	Preliminary Procedural Steps Radiographic Terminology Radiograph Assessment Patient Interactions	Preliminary Procedural Steps Radiograph Assessment Activity Worksheet Patient Interactions
Unit 3	Anatomy and Radiography of the Hand and Digits	Positioning and Radiography of the Hand and Digits
Unit 4	Osteology and General Pathology	Procedural Evaluation Process Research Osteology or Pathology X-ray Vision and Problem Solving
Unit 5	Anatomy and Radiography of the Wrist and Forearm	Positioning and radiography of the Wrist and Forearm
Unit 6	Lecture Review and Test	Laboratory Procedure/Positioning Evaluation
Unit 7	Anatomy and Radiography of the Elbow and Humerus	Positioning and Radiography of the Elbow and Humerus
Unit 8	Anatomy and Radiography of the Shoulder, Clavicle, and Scapula	Positioning and Radiography of the Shoulder, Clavicle, and Scapula
Unit 9	Lecture Review and Test	Laboratory Procedure/Positioning Evaluation
Unit 10	Anatomy and Radiography of the Foot and Toes	Positioning and Radiography of the Foot and Toes
Unit 11	Anatomy and Radiography of the Lower Leg and Knee	Positioning and Radiography of the Lower Leg and Knee
Unit 12	Lecture Review and Test	Laboratory Positioning/Procedure Evaluation
Unit 13	Computers in Radiology*	Laboratory Computer Application
Finals Week	Lecture Final Test	No labs during finals week

*Ongoing integrated instruction and activities throughout course.

ATTACHMENT "D"

OFFICE HOURS

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 a.m.				RADI 101	
8:30 a.m.				Lab	
9:00 a.m.	RADI 101	Office	RADI 101	VFS 105	
9:30 a.m.	Lecture	VFS 302	VFS 328	Sec. 213	
10:00 a.m.	Office		RADI 101		Office
10:30 a.m.	VFS 302		Lab		VFS 302
11:00 a.m.		Meetings	VFS 105	Meetings	RADI 101
11:30 a.m.			Sec. 211		Lab
12:00 noon	Lunch	Lunch		Lunch	VFS 105
12:30 p.m.					Sec. 215
1:00 p.m.			Lunch		
1:30 p.m.	Office			RADI 101	
2:00 p.m.	VFS 302		RADI 101	Lab	
2:30 p.m.			Lab	VFS 105	
3:00 p.m.			VFS 105	Sec. 214	
3:30 p.m.			Sec. 212		
4:00 p.m.					
4:30 p.m.					
5:00 p.m.					

Additional Office Hours by Appointment

Attachment "E"

Attendance Policy for RADI 101 and 102

Ferris State University has recently implemented a policy that requires attendance in all courses numerically designated below 200. RADI 101 and 102 fall within this category. Therefore, an attendance process has been developed for RADI 101 and 102 that encourages self-responsibility and recognizes that participation/presence in the classroom substantially enhances learning. The course attendance policy also accommodates emergencies or justifiable reasons for missing class without disproportionate penalty. The course attendance process is specified below.

Lab

- Scheduled lab attendance is mandatory. We do a lot of collaborative and hands on learning in lab that requires your presence. Labs will be made up only for valid reasons as specified in the student catalog (documented illness, jury duty, death in the family, etc.)

Lecture

- Unannounced quizzes will be presented in lecture. Their value will range between one (1) and fifteen (15) points. Missed quizzes cannot be made up.

- Quizzes missed by students will be an indicator of classroom attendance and the number of quizzes not taken will be documented as we progress through the semester.

- It is preferable that class attendance be a constructive process rewarded with incentives rather than used as a means of penalty for absence so...

- At the end of the semester an attendance incentive of 5 bonus points will be awarded to each student that has missed no quizzes, 3 bonus points will be awarded to students missing only one quiz, 2 bonus points for students missing two quizzes, and 0 bonus points for students missing more than two quizzes.

RADI 291

CLINICAL PRACTICUM I

10 Credits 16 weeks

First in a series of a Clinical Practicum. This practicum will include such performances as: appropriate patient care, process examination requisitions other documentation related to the procedure, darkroom procedures and processing films, performances of basic radiographic procedures to include the chest, abdomen, upper and lower limb.

Competencies Outline Textbooks Mastery Information Grading

RADI 291

COURSE COMPETENCIES

1. Perform proper office and darkroom procedures including scheduling patients, originate patient exam requests, file and locate films, process films, maintain screens and cassettes, stock films and duplicate film.

2. Describe the function of the various departments within the hospital.

3. Demonstrate proper radiation protection procedures

4. Demonstrate appropriate ethical, legal and professional job-related behavior.

5. Communicate appropriately with patients, physicians, and other members of the health care team.

6. Demonstrate critical thinking skills in the production of images and the care of patients

7. Perform basic radiographic equipment operation and maintenance procedure.

8. Utilize proper patient care technique

9. Under general supervision, perform chest, abdomen, upper and lower limbs.

HOME Outline

RADI 291

I. Facility Departments

- A. Hospital
- B. Radiology
- C. Ancillary

II. Regulations and Policies

- A. Hospital
- B. Radiology departments - protection
- C. Program
- D. Ethical, legal, professional behavior
- E. Communication

III. Scheduling and Documentation

- A. Admitting and scheduling patients
- B. Processing requests for examination
- C. Examination categories
- D. Electronic forms of communication

IV. Patient Care and Support Activities

- A. Transportation of patients
- B. Office procedures - films
  1. process
  2. file
  3. locate
  4. stock
  5. Duplication
- C. Darkroom procedures
- D. Patient assistance
- E. Communication

V. Equipment Operation and Maintenance

- A. X-ray machine operation
- B. Darkroom machine operation
- C. Ancillary equipment
  1. screens
  2. cassettes

D. Patient safety
E. maintenance procedure
    1. examination requisition
    2. billing
    3. supplies

VI. Radiation Protection

A. Collimation
B. Shielding
C. Extension cones
D. Gloves and aprons
E. Personnel monitoring

VII. Radiographic Procedures

A. Chest
B. Upper and lower limb
C. Abdomen
D. Shoulder girdle and thoracic bones
E. Spine
F. Contrast Media Studies (Assist only)
G. Portable procedures (Observation only)
H. Surgical procedures (Observation only)

VIII. Professional Behavior

A. Professionalism
B. Ethical behavior
C. Scope of practice
D. Proper work ethics
E. Legal responsibilities

IX. Communication Skills

A. Patient
B. Physicians
C. Health care team
D. Written communication
E. Computer-based systems
    1. examination requisitions
    2. billing
    3. supplies

MASTERY INFORMATION

1. 15 Masteries (Blue cards) are to be completed this semester, an incomplete (I) will be given if not completed, a failing grade (F) if not completed by the mid-semester of the following semester (Winter Semester) and the internship will be terminated at that point in time.

2. Make sure you re-read the clinical manual on clinical competencies.

3. Understand that a mastery can be taken away from the intern if the intern fails a spot competency of a particular mastered exam.

4. It will be incumbent on the intern to send in the mastery sheet at the end of each month, this will be on web so that the intern can send it via email.

HOME

TEXTBOOKS

(1) Merrills Vol. I, II, III Workbooks Vol. I, II Mosby - St Louis, Mo.

(2) DeAngelis Robert: The Integrated Radiography Workbook

READING ASSIGNMENT

TEST I:

(2) Bone Development and Articulationpps. 299-302

(2)Upper Extremitypps. 306-309

(2)Positioning Terminologypps. 397 - 401

(2)X-ray Tube pps 103-106

GRADING

100 - 95 A	79 - 77 C
94 - 92 A-	76 - 74 C-
91 - 89 B+	73 - 71 D+
88 - 86 B	70 - 68 D
85 - 83 B-	67 - 65 D-
82 - 80 C+	Below 65 F

40% GRADE BEHAVIORAL

40% MASTERY

20% Test and Quizzes

100%

Home

Program Review Panel Evaluation Form

(PRP: complete this form and include with your report)

Program: RADIOGRAPHY

Instructions: Circle the number which most closely describes t he program you are evaluating.

1. Student Perception of Instruction **Average Score** 4.0

5 4 3 2 1

Currently enrolled students rate instructional effectiveness as extremely high.

Currently enrolled students rate the instructional effectiveness as below average.

2. Student Satisfaction with Program **Average Score** 3.5

5 4 3 2 1

Currently enrolled students are very satisfied with the program faculty, equipment, facilities, and curriculum.

Currently enrolled students are not satisfied with program faculty, equipment, facilities, or curriculum.

3. Advisory Committee Perceptions of Program **Average Score** 3.75

5 4 3 2 1

Advisory committee members perceive the program curriculum, facilities, and equipment to be of the highest quality.

Advisory committee members perceive the program curriculum, facilities, and equipment needs improvement.

4. Demand for Graduates **Average Score** 5.0

5 4 3 2 1

Graduates easily find employment in field.

Graduates are sometimes forced to find positions out of their field.

5 4 3 2 1

5. Use of Information on Labor Market **Average Score** 4.0

The faculty and administrators use current data on labor market needs and emerging trends in job openings to systematically develop and evaluate the program.

The faculty and administrators do not use labor market data in planning or evaluating the program.

Program Review Panel Evaluation Form (page 2)

6. Use of Profession/Industry Standards Average Score 4.0

5 4 3 2 1

Profession/industry standards (such as licensing, certification, accreditation) are consistently used in planning and evaluating this program and content of its courses.

Little or no recognition is given to specific profession/industry standards in planning and evaluating this program.

7. Use of Student Follow-up Information Average Score 3.75

5 4 3 2 1

Current follow-up data on completers and leavers are consistently and systematically used in evaluating this program.

Student follow-up information has not been collected for use in evaluating this program.

8. Relevance of Supportive Courses Average Score 3.25

5 4 3 2 1

Applicable supportive courses are closely coordinated with this program and are kept relevant to program goals and current to the needs of students.

Supportive course content reflects no planned approach to meeting needs of students in this program.

9. Qualifications of Administrators and Supervisors Average Score 3.5

5 4 3 2 1

All persons responsible for directing and coordinating this program demonstrate a high level of administrative ability.

Persons responsible for directing and coordinating this program have little administrative training and experience.

10. Instructional Staffing Average Score 3.75

5 4 3 2 1

Instructional staffing for this program is sufficient to permit optimum program effectiveness.

Staffing is inadequate to meet the needs of this program effectively.

Program Review Panel Evaluation Form (page 3)

11. Facilities Average Score 4.0

5 4 3 2 1

Present facilities are sufficient to support a high quality program.

Present facilities are a major problem for program quality.

12. Scheduling of Instructional Facilities Average Score 4.25

5 4 3 2 1

Scheduling of facilities and equipment for this program is planned to maximize use and be consistent with quality instruction.

Facilities and equipment for this are significantly under-or-over scheduled.

13. Equipment Average Score 4.25

5 4 3 2 1

Present equipment is sufficient to support a high quality program.

Present equipment is not adequate and represents a threat to program quality.

14. Adaption of Instruction Average Score 4.0

5 4 3 2 1

Instruction in all courses required for this program recognizes and responds to individual student interests, learning styles, skills, and abilities through a variety of instructional methods (such as, small group or individualized instruction, laboratory or "hands on" experiences, credit by examination).

Instructional approaches in this program do no consider individual student differences.

15. Adequate and Availability of Instructional Materials and Supplies Average Score 4.0

5 4 3 2 1

Faculty rate that the instructional materials and supplies as being readily available and in sufficient quantity to support quality instruction.

Faculty rate that the instructional materials are limited in amount, generally outdated, and lack relevance to program and student needs.

FERRIS STATE UNIVERSITY RADIOGRAPHY PROGRAM
Program Evaluation

Purpose:
To better enable Ferris State University radiography students to be successful in the dynamic and highly competitive field of radiography, it is the responsibility of the radiography program to perform ongoing evaluation and revision. The purpose of this policy is to outline the procedures by which the entire program's effectiveness will periodically be evaluated including its; policies, instructors, curriculum, and clinical education. This process is to include both internal and external indicators as to the strengths and weaknesses of the program. These indicators will be reviewed by program officials on a yearly basis and programmatic changes will be recommended to the advisory committee. Specific comments, observations, and recommendations will be documented and kept in the program's files. Actions taken as response to recommendations will be documented and tracked, and their effectiveness analyzed.

PROGRAM EVALUATION TOOL	DATE OF MEASUREMENT
Collection and analysis of retention and attrition rates	Annually – September
Assembling and analysis of program completion rates and program length data	Annually – October
Compilation and analysis of ARRT results	Annually – November
Program evaluation process review and revision	Annually – January
Graduate Survey distribution, collection and analysis	Annually – February (6 months post graduation)
Employer Survey distribution, collection, and analysis	Annually – February
Job (Task) Analysis	Every 5 years – March
Faculty Resource and Program Evaluation Survey distribution, collection, and analysis	Annually – April
Advisory Committee Survey distribution, collection, and analysis	Annually – May
Alumni Survey distribution, collection, and analysis	Annually – June (2 years post graduation)
ACI Survey distribution, collection, and analysis	Annually – July
First-year Survey and Resource Assessment	Annually – August (end of 1st summer semester)
Internship Survey and Resource Assessment	Annually – August (end of 2nd summer semester)
Program Evaluation	Annually – August (end of registry review)
Data Analysis Session	Annually – September
Development of Unit Action Plan	Annually – September

STUDENT EVALUATION OF PROGRAM

Method

During the Registry Review seminar (RADI 299) at the end of the last semester, the graduating students were asked to fill out the Program Evaluation questionnaire. In 2002, 43 out of 43 graduating students (100%) completed a survey. On the following pages, please find the data collected from these surveys.

Analysis

In analyzing the data from these surveys, the faculty looked closely at those criteria in which the students rated below "Fair" (3.50 on a 5 point scale) and student comments. The following are a representation of the impressions and conclusions drawn by the faculty:

1) Textbooks are not being properly utilized throughout the program.
2) The Clinical Coordinator needs to be more available to the students during internship and there is an overall lack of communication between Ferris and the interns.
3) There is a perceived need for more organization of the clinical portion of the program.
4) The students indicated that the communication between them and the clinical faculty was inadequate.
5) The program's tests, quizzes and use of audiovisual aides are pointed out as strengths of the program, however WebCT was difficult to access during internship.
6) Other strengths of the program are the competency of its ACIs and the variety of clinical experiences.

Recommendations and Actions

1) The faculty (both on- and off-campus) needs to utilize the required textbooks more. Several courses are already providing assignments that require greater use of the textbook.
2) There needs to be a better coordination of the clinical portion of the program. This can be done by a team effort of the faculty to maintain a close relationship with those students on internship. Plans have been made to have all faculty members do clinical site visits in 2002-2003 and the Program's Lab Assistant will help with communicating with interns if the Clinical Coordinator is unavailable.
3) The faculty (instructors and advisors) at Ferris needs to communicate better with the interns. This can be accomplished through phone calls, e-mail, or the above-mentioned site visits.
4) The lack of communication between students and clinical faculty may be attributed to the severe shortage of registered technologists at those sites. Many sites are so severely understaffed that at times student instruction must take a back seat to patient care. A Clinical Site Evaluation was distributed to all graduating students and the data should indicate which sites have the greatest problems with staff shortages. The program will need to analyze these data to determine which sites are capable of taking students.

2002 PROGRAM EVALUATION

5 = Excellent 4 = Good 3 = Fair 2 = Poor 1 = Unacceptable

1	Amount and practicality of required courses	6	30	6	2		3.91
2	Availability of necessary courses	11	23	7	3		3.95
3	Availability of instructors outside of class time	7	15	14	6	2	3.43
4	Organization of classes	4	24	15	1		3.70
5	Appropriateness of textbooks	6	14	15	8	1	3.02
6	Appropriateness of tests and quizzes	10	28	5	1		4.07
7	Use of audiovisual aids	14	23	4	2		4.14
8	Instructor feedback	6	22	14	2		3.73
9	Quality and quantity of educational resources	5	27	12			3.84
10	Amount and usefulness of library resources	5	17	15	3	3	3.42
11	Appropriateness and effectiveness of student advising and counseling	6	19	13	4	2	3.52
12	Overall effectiveness of academic portion of the program	5	21	15	2		3.67
13	Availability and professional ability of the clinical coordinator	1	5	10	17	11	2.28
14	Availability and professional ability of the ACI(s)	15	15	7	5	2	3.82
15	Organization of clinical program	1	18	12	8	5	3.04
16	Communication between clinical faculty and student	1	13	12	8	10	2.70
17	Helpfulness and ability of staff radiographers	9	16	13	4	2	3.59
18	Amount of time spent in clinical	9	27	4	2	2	3.89
19	Use of rotations outside of diagnostic radiography	3	18	15	7	1	3.34
20	Length of rotations or room assignments	9	22	11	2		3.86
21	Variety of clinical experiences	11	27	6			4.11
22	Overall effectiveness of clinical program	5	27	7	4	1	3.70
23	Effectiveness of program policies	3	26	13	1	1	3.66
24	Enforcement of program policies	3	26	11	4		3.64
25	Program's willingness to listen and incorporate student suggestions	5	21	12	5	1	3.63
26	Overall effectiveness of program	7	25	15	1		3.68
27	Effectiveness and leadership of college administration	2	24	14	3	1	3.52

Specific comments regarding program faculty and staff:

- Overall they did a good job.
- Mayhew & Rescoe were great! I learned a great deal from them. They both returned my phone calls when I was on internship I am very impressed w/ the two and their professionalism!
- Helpful, caring, encouraging, knowledgeable.
- When people call or write teachers it would take weeks to call or never get returned.
- Fine, but there wasn't much communication between the school & me. I felt like I never knew what was going on.
- On campus faculty and staff were pretty consistent in helping their students and making time to review materials & lab assignment given to us. Off campus (interning) our clinical coordinator no effort (seen) to provide us w/ info on how the program is run – when it comes to projects and syllabus.
- At our clinical site we felt like we were on our own. We didn't get much guidance or feedback from Mr. Holihan. It just seems as if he never had any time for us.
- Most staff is OK. One in particular is very insensitive, rude, and non-organized. For instance, not showing up for meetings, etc.
- Clinical was a joke! We basically paid for nothing! Had NO ONE around as an ACI. The first year was fine. Mr. Mayhew is a great instructor.
- Excellent!!!
- Overall the program was good. I think the classes prepare us pretty well for clinical & I got a great experience at clinical.
- Mr. Rescoe & Mr. Mayhew do a good job of explanation.
- There needs to be more dominance from Ferris in the hospitals.
- More communication.
- Good job. Clinical coordinator should be more available and better help for the students.
- Mr. Rescoe / Mayhew were good, Mr. Holihan was sometimes unreliable.
- The staff at Ferris was fine. The only problem that I ever really noticed was a lack of communication. Sometimes it was hard to even get a hold of instructors on campus.
- Helpful and encouraging.
- There needs to be more communication between faculty and the students.
- Clinicals was a really good learning experience but Ferris' role during clinicals was ridiculous.
- Faculty and staff should have been more easily accessible, but otherwise good.
- Faculty needs to be more available to students when they have questions or concerns.

Specific comments regarding the program in general:

- Stop teaching kVp charts w/ calipers. More sick days.
- We need to know what the tests have on them before we actually take tests and quizzes so that study for them and learn more.
- Too long in clinicals.
- Need to include digital radiography classes during the first year. More and more hospitals are getting digital radiography.
- Good.
- Need to work more on realistic positioning.
- More personal days.
- Great experience.

- Web CT, not good for communication or test/quiz taking.
- Overall I thought the program up here was good.
- The program doesn't carry over into the hospital. No one is treated like students. We are employees doing brunt [sic] work. The Christmas break was too long.
- Spectrum Health has staffing issues. Young techs who cannot teach because they don't know.
- We should make reviewing for the registry all year a mandatory class. Some hospitals do not like to give classroom time to review.
- Good!
-1) Get rid of both summer sems. 2) Have us go to school during winter sem.
- Should not have to pay FSU while in clinicals, they don't do anything for you.
- Clinical was too long!
- Program could be better organized – more work over clinicals to refresh memories, more emphasis on pathology and physics.
- My ACI's tests were 10X harder and more organized.
- Be more organized!!!!
- I didn't feel like we knew very much when we got to the clinical site about fluoro (c-arm) or about pathologies & tubes (NG, etc.). Once we were in clinical site I felt we lost a lot of what we learned @ Ferris – no repetition.
- My definition of a clinical coordinator is a person that has the responsibility, organization, and time for his/her students that are off-site. This is what we need for second year students off-site. The program @ FSU lacks this. Also, the program needs to communicate with the sites their students are at.
- Better communication!!!
- Quality management book could be better utilized in summer semester – like give reading assignments prior to lab. Somehow utilize labs to connect more with clinical site work – reason for what we are to accomplish.
- I would recommend it!

How would you improve the program?

- Amount of time allowed off during internship should increase.
- Organize clinical sites so everyone gets the same amt of class time, clinical instruction. ACI's should be more accountable to Ferris & give more structure.
- Be more understanding of student's needs & making all hospitals have the same protocol.
- Rather than making us spend time in other modalities & giving us "crap" homework. I would've rather had more practice quizzes or that worksheets would have been given to keep us up on things..
- More organized.
- Decrease clinical time.
- More communication with clinical coordinator.
- See above! Also eliminate CCHS classes – they are a waste of time & students money and all of the essentials are learned or taught in clinicals.
- Need to be more involved with students @ their clinical sites.
- More lab time.
- Have designated classroom time required for us to have each week.

- More flexibility in our hours and the students need more protection from the policies. The hospital owns us and there's nothing we can do about it.
- Use more of the books when we are required to by them. Some books where never used.
- More trauma first year.
- Make people / staff more available during internship – make the clinicals more uniform as far as classroom work. Some sites do a lot others nothing @ all.
- Better communication!! I felt like I never knew what was going on.
- Have a different grading system for ACI, they don't always think we are bad but not perfect & when you get all 3's your grade is a C.
- Make it more realistic for days off during the semester.
- I hate to say it but I think more time should be spent on the physics portion, that is the hardest and most confusing part.
- I know it would be more beneficial to me to break up school with clinical experience.
- No tests unless they are going to be graded.
- Four tens instead of 5 eights. That would give us time to work outside jobs and take care of personal business.
- More review on mathematical applications.
- Allow more sick days and personal days.
- Get rid of computer testing – no one cares if we don't get graded.

Do you feel that your education in this program has successfully prepared you to enter the profession of radiography?

- Yes (20 responses)
- More review for our board exams throughout the year would be helpful, maybe give ACI an outline of things to teach.
- I think we need to review throughout the clinical year.
- I think I am prepared to enter the profession because of my ACI, not necessarily the program.
- The clinical experience is what gave me the experience.
- After spending a year in clinicals I do feel confident with performing most radiographic procedures.
- Good.
- Internship has but I can't remember much about class.
- If I pass my registry yes, if not I did everything I could, did Ferris do everything they could?
- I think I am prepared on the clinical aspect, but I was not prepared on clinicals to take the registry.
- I think Ferris did all it could do to prepare me for this program.
- No
- Only the year at clinical.
- No, the internship prepared me the most not Ferris as a whole.
- No! My ACI did!!!
- So so.
- I definitely think that the clinical site that we had completed what we really didn't learn @ Ferris.

- No, the first year was OK as in studying & bookwork. By second year because the clinical coordinator at Ferris was not communicating with us – I felt that this program was a waste of my time and money – I do not feel prepared – as a second year student I was just tossed at a site w/ no communication from FSU radiography program.
- Yes, I learned a lot @ the hospital.
- Clinical instruction needs improvement.
- Yes! Thanks to Rescoe, Mayhew & my clinical site!

Other comments or suggestions:
- A meeting w/ the faculty! I know I have shared my concerns w/ other faculty members so they know what's going on!
- I feel it would help if you go to hospital to see how things work before you intern.
- The program needs to be better organized with off-site hospitals & interns. There needs to be better communication, more study time, and more visits to FSU for reviews of the semester. This year their was barley [sic] no communication, too little study time and no organized visits for reviews, until Aug 12 – 15 registry review.
- More feedback & support from Ferris (encouragement).
- Really should think about rethinking & evaluating "certain" teachers.
- I give Mr. Mayhew & Rescoe a A+.
- Visit hospitals before you intern.
- I again stress the physics!!
- Course outlines for ACI's. Class time mandatory.

GRADUATE EVALUATION OF PROGRAM

Method

Graduate Survey forms are sent out six months after graduation (February of each year). In the 2002 survey (those students graduating in August 2001), 15 of 51 graduates responded for a return rate of 30%. The data collected from these surveys follows:

Analysis

The faculty made the following conclusions from this data:

1) 100% of the graduates surveyed indicated that they are presently employed in the field of radiography.
2) 93% indicated that it was either easy or very easy to find a job as a radiographer and 93% said that they found a job within one month of graduation.
3) 53% of the graduates related that their starting salary was above $30,000.
4) 100% rated the overall quality and effectiveness of the program as fair, good, or excellent.
5) 93% indicated that they would recommend the program to a friend or family member.
6) Many of the comments addressed concerns about individual clinical sites and the interaction between those sites and Ferris.

Recommendations and Actions

1) As with the program evaluations, it is very evident that there needs to be greater communication between Ferris and the students during their internship. Strengthening this communication needs to be a top priority of the program this (and subsequent) years.
2) It is readily apparent that the severe shortage of technologists has raised the starting salaries of graduates greatly. In future evaluations, the salary ranges need to be increased to get a more accurate impression of the present salary structure within the profession.

FERRIS STATE UNIVERSITY RADIOGRAPHY PROGRAM
Graduate Survey

n= 15

1. Year of graduation: _____2001_____

2. Are you presently employed as a radiographer? __15_ YES _____ NO

3. Name and address of employer(s):

4. If you are <u>not</u> currently employed as a radiographer, please indicate your reason(s):

_____ Looking, but can't find a job
_____ Chose other profession
_____ Other: _____
_____ Continuing education
_____ Chose to not work

5. If you are employed as a radiographer, is it: ____13___ full time or ____2____ part time?

6. If you work part time, is that your choice? _____ YES ___2__ NO

7. How did you find this job?

__10_ internship site
_____ job service
__2__ classified ad
__3__ word of mouth
__2__ friend/family
_____ other: _____

8. In which general area of radiology are you PRIMARILY employed?

__15_ Diagnostic radiography
_____ Cardiac Cath
_____ Sonography
_____ Nuclear Medicine
_____ Other: _____
_____ Mammography
_____ MRI
_____ Administration
_____ Radiation Therapy
_____ CT
_____ Angiography
_____ Education
_____ QA/QC

9. What is your approximate yearly salary?

_____ under $15,000
_____ $15,000 to 20,000
__4__ $ 20,000 to 25,000
__3__ $25,000 to 30,000
__8__ above $30,000

10. On the following scale, circle the number that indicates how difficult it was for you to find a job as a radiographer.

(11)		(3)				(1)		
5	----------	4	----------	3	----------	2	----------	1
Very easy		Easy		Moderately difficult		Difficult		Very difficult

11. Following graduation, approximately how long did you have to look before you found your first job as a radiographer?

__12_ Before graduation __2__ Within 1 month __1__ 1 – 2 months
_____ 2 – 4 months _____ 4 – 6 months _____ Yet to find a job

12. How well did you feel you were prepared clinically for a job as an entry-level radiographer?

	(6)		(8)		(1)			
5		4		3		2		1
Well prepared		Adequately prepared		Unsure		Unprepared		Very unprepared

13. How would you rate the program's overall didactic (classroom) instruction for preparing you for passing the ARRT registry?

	(4)		(4)		(5)		(2)	
5		4		3		2		1
Excellent		Above average		Adequate		Poor		Unacceptable

14. Are you considering taking one or more of the following ARRT advanced registries? Check all that apply.

__6__ CT __1_ Mammography _____ Quality Management
__1__ MRI __2__ Cardiovascular Interventional

15. What (if any) of the following areas would you be interested in taking as post-RT certificate courses at Ferris in the future? Please use the following scale to indicate your interest level in each area:

1 = Very interested 2 = Somewhat interested 3 = Not interested

__7__ CT __2__ Mammography __1__ Quality Assurance
__6__ MRI __3__ Ultrasound __2__ Cardiovascular Interventional

16. Would you be interested in taking any of the above courses at one of our off-campus locations?

__6__ Grand Rapids __1__ Flint _____ Traverse City
_____ Other: ____Detroit (2)_____

17. How would you rate the <u>overall quality and effectiveness</u> of the program?

	(5)		(8)		(2)			
5		4		3		2		1
Excellent		Good		Fair		Poor		Unacceptable

18. Would you recommend this program to a friend or family member?

__14_ YES __1__ NO

How could the program aid students in their job search?

- Besides the boards. With both Ferris and Clinicals I was ready to find a job. I also had no problems finding one.
- Find out the students interests. Search in the intenet [sic] /look in magazines.
- Give them ideas for places (internet, magazines, etc) they can begin to look for job opening. I had no idea where to begin looking. Maybe even send out sheets in Jan. of possible job openings you've heard about thru [sic] site visits, word of mouth etc. A lot of kids want to leave clinical site but afraid of not finding a job.
- Have Tech Journal at school and intern site.
- Hospitals are begging for radiographers- there's no need for a program.
- If you want to make it easy, you could ask area hospitals to submit job postings to Ferris, if they were accepting new grads.
- You guys did a really good job at this. The different radiography magazines / ad mags. are really great – even online notices.
- Letting hospitals distribute hospital and job info.
- Internet.
- As long as a person is willing to move they'll have no problem finding a job.
- Helping a little more w/ resume etc. Thank goodness for Kay & Jeff @ Spectrum!
- Yes.

NA – its up to the student to find job at that point they shouldn't need someone to hold [their] hand. Maybe as a reference on a resume??

How can we improve the clinical internship portion of the program?

-"I think they should still have test from Ferris. But, do it like Baker dose [sic] it. Instead of tests on one area., they would have a pre-board test once a month.
-Researching the clinical sites, get as much feedback as possible from the previous students who have been at these clinical sites to find out what really goes on. Also prepare the students better for the boards while they are interning. Spend more time testing or teaching the more difficult subjects.
-More staff working applying towards the registry and less projects like "case studies" your [sic] trying to study for your board and the projects end up taking up that time. The projects I felt were a waste of time and really had no relevance to what you need to learn at clinicals.
-Less winter vacation- it was difficult to get up to speed after such a long wait. Paying the student interns even 3.00 a hour.
-My int. was at Spectrum and our teachers were willing to give us homework and tests, we didn't need Ferris work on top of it.
- Make it two semesters rather than 3. It was overkill (in my opinion).

Garden City was not effective as a clinical site. No teacher time at all – no interest in training – felt like free labor for 1 yr. Hatted the place! No student / staff time.

- 1 – 2 wks of a 3rd shift rotation is enough. Especially when different clinical sites require different expectations. It should be clear and the same straight across the board.
- I just think it would be better if I could've applied the things I learned (clinically) as I learned them in the classroom.
- More frequent visits to sites (by FSU staff). Make sure students are not left alone without tech.
- Shorter.
- We needed some classroom time; it would've helped us to retain more. We also needed to be thought of more as students than techs. As I look back, we didn't get much rotation to OR, CT, MRI, mammo, U/S…
- I liked the idea of using the computer. Chat rooms are a great way for us to interact far apart.
- Clinical is going to be a shock no matter what, but students should really understand that they're not going to know everything when they get there & that's OK – I see a lot of students get frustrated over that too easy. Include more info. on pt. care & fluoro, etc. before internship.

How can we improve the classroom portion of the program?

- More emphasis on fluoroscopy, c-arm.
-Spend more time on G.I , Head work, and mock boards. I felt that Baker students and students that take x-ray school at a hospital spend more time getting ready for boards and a more prepared in these areas than I was.
-Concentrate on preparing students for their boards. Organize the program so that you spend the most time on the most important or most difficult subjects.
-Better real life simulation. What the book tells you and how you learn in class is dealing with the "perfect patient" and that is never the case. For example a hand isn't always as simple as it's being simulated in class. An AP sometimes needs a little guess work.
-I feel the classroom portion was adequate.
-Don't remember.
- Anything hands on helps more than book work when it comes to taking x-rays.
- Pathology should be more common & compared on radiographs so we can better recognize pathology.
- It was pretty good.
- I feel the class work and internship is done at the same time.
- Update equip. Get organized.
- At the very beginning of the 1st semester for the program students should job shadow in a hospital for 1 – 2 wks. Then begin the classroom portion. Also emphasize a little more on techniques in class if possible.
- More hands on – maybe time in local hospital as trainee.
- None, the classroom was managed very well.

What subject areas should be added to the curriculum?

-More time for boards.
-Separate physics class. Separate pathology class. Making the labs a little longer.
-I feel a public relations and perfesional [sic] behavior would help to deal with PT's and coworkers.
-Maybe more on pathology/reacting in situations that occur at a hospital. Ie. Cardiac arrest, etc.
- Maby [sic] DR – digital radiography – but not until its added/subed [sic] to registry.
- How to deal with real life problems. Contrast study. Info to other modalities.
- Something more with surgery aspect of clinicals. I hated this! We did not receive enough practice with the c-arm in class. I found it rather intimidating to practice using the c-arm in the middle of high stress surgery.
- I think they should go deeper into what kinds of techniques to use.
- Rx. Peds. OR – carms. Technique. Trauma – trauma – trauma.
- More pt. care. More info about fluoro would be good.

What subject areas should be de-emphasized or omitted?

-Nothing.
-Nothing should be changed.
-None. (2 responses)
- Tomo. Skull work.
- I don't think any should be omitted – maybe a little less emphasis on density.
- Chemicals (but not yet). Processing the film.

What area of your educational experience in the radiography program was the best?

-Clinical Internship.
-Working as a team with my classmates, putting together a skeleton. At the time it was quite a challenge.

-The internship was best because you learned the most by doing hands on and everything came together. I had a better understanding of Radiography and everything made more sense.
-All of it was pretty good nothing stuck out more than the other everything was covered real well. I was very happy with the program overall. I felt well prepared for the registry and real life. Thank you.
-Internship.
- Classroom at Ferris.
Spectrum Health – clinical site. The final summer semester with the awesome overall review.
- Nothing really sticks out – I think it was all good.
- Clinical.
- Clinical, it was an exciting time to be out there actually doing what you'd been learning about for a year.
- Clinicals – because we could finally apply what we learned the year before.
- Patient care.
- All of it. I wanted to get in and out in two years with a good degree & I did. It worked out well. Thank you.

Additional Comments:
- I was satisfied with both the classroom and clinical aspects of the program.
-I think that the program needs to better prepare students for their boards, especially during internship. I think that the program should offer a time to meet once a month at Ferris for review (for boards) and make this an option for the interns. I think this would help prepare students better for their boards. Just a suggestion.
- All 3 of you did a fine job. You prepared me very thourouly [sic] for my job.
- I had a bad internship in the area of favoritism. I feel that there should be more Ferris evolvement maybe if schooling and internship were at the same time.
- I really think that a more clinic-based program would help us to learn more effectively. But classes were great!
- As students at T.C. MMC site we were used as techs and expected to run rooms by ourselves – personally I was not only uncomfortable but unprepared to run an ER-trauma room by myself – I was completely capable but did not think it was in the best interest of pt. I think skull work was way over emphasized—we spent a whole summer on skull and they all go to CT!!! What a waste of a summer!!!
- Maybe prepare students for the real world by letting them know they'll probably be treated like dirt by doctors and nurses … I wasn't prepared at all.
- More than 1 sick day should be allowed. 3 seems more reasonable. That is the # of days a student teacher gets.
- I miss Ferris – that was the best part. Great classroom time at Ferris, but bad experience at G.C. for internship – drop them.

FACULTY EVALUATION OF PROGRAM

Method

Two Faculty surveys were distributed to the three full-time tenure-track and one supplemental faculty members. For each survey, all four forms were completed (100%) and the data was tabulated and analyzed. The Faculty Curriculum Survey was intended to identify specific areas of the present curriculum that may need to be strengthened. The Faculty Survey identified the overall strengths and weaknesses of the program.

Analysis

The faculty cites programatic strength in:

1) the technical resources (computers, classroom equipment, and lab equipment) available
2) the quality of the clinical sites and the ability of the unpaid adjunct clinical instructors
3) the excellence of the overall program, particularly with the new curriculum in place
4) the dedication of the faculty and staff of the program

The faculty perceives deficiencies in the following areas:

1) areas of concern for the curriculum:
    a) even though there is an unprecedented shortage of qualified technologists today, the faculty felt that there needs to be more focus on career skills within the program.
    b) it is strongly felt by the faculty that the entrance requirement of MATH 110 is not adequate to meet the needs of the program.
    c) much of the CAHS "core" courses are not relevant to the practice of radiography and the credit hours could be used much more effectively within the professional content.
    d) all of the program's entrance requirements need to be reviewed and altered appropriately.
2) a lack of communication between the program and the clinical sites, and the organization of the overall clinical portion of the program
3) a lack of communication between the faculty and the administration
3) the need for additional space in the lab

Recommendations and Actions

1) The faculty is proposing that the program's eligibility requirements be upgraded to attract a higher level of entering student and to reduce attrition.
2) The program must increase the number of credit hours allotted to the program by eliminating the core courses from the curriculum.
3) The program is beginning a process to have better communications between the faculty and the clinical sites.
4) Additional space needs to be found to house the equipment and supplies in the lab. This will become even more important if the proposed certificate programs are adopted.

Faculty Curriculum Survey

This survey was designed to determine the faculty member's opinion of how well the program and the University are providing the student with the proper knowledge and skills in the following areas:

5----------4----------3----------2----------1

Exceeds expectations	Meets expectations	Needs minor improvement	Needs major improvement	Unacceptable

5	4	3	2	1	Average
Oral and written communication		1	3			3.25
Anatomy and physiology		3		1		3.5
Pathology		1	3			3.25
Pharmacology		2	1	1		3.25
Patient care		3	1			3.75
Radiation physics		3	1			3.75
Radiation biology and protection		4				4.0
Medical ethics and legal issues		2	1	1		3.25
Medical terminology		1	3			3.25
Instrumentation		4				4.0
Application of radiologic sciences theory and techniques		4				4.0
Quality assessment		3	1			3.75
Computer applications		3	1			3.75
Competency-based clinical education		1	3			3.25
Career skills		1	2	1		3.0
Critical thinking		3	1			3.75
Mathematics			1	2	1	2.5
Positioning and procedures		4				4.0
Laboratory experiences	1	3				4.25
Emergency procedures / CPR		2	1		1	3.4
Affective / interpersonal skills		2	2			3.5
Professionalism		1	3			3.25

What current curriculum area(s) are most useful to the student?

- Positioning and procedures
- Technique
- Rad protection
- Nursing skills

What area(s) of the current curriculum are least useful to the student?

- CCHS 101 and 102 are worthless!! The courses take up valuable teaching time.
- COMM 105 – students already demonstrate communication skills in the lab and clinical, there is no need for additional credits to be used.

What area(s) should be added to the current curriculum?

- Biomedical ethics should be required.
- Registry review should be expanded.
- Digital radiography, PACs system.
- Health communication

What area(s) need to be improved or more fully developed?

- Basic math skills.
- Quality assurance.
- Digital radiography

What curriculum area(s) should be deleted or de-emphasized?

- CCHS 101
- COMM 105

Faculty Survey 2002

5----------4----------3----------2----------1
Excellent Good Fair Poor Unacceptable

		5	4	3	2	1	Average
1	Curriculum designed to facilitate student learning		4				4.0
2	Faculty empowerment in program development and long-term strategy		1	3			3.25
3	Faculty participation in program development		1	3			3.25
4	Organization and structure of courses		3				4.0
5	Use of course and program objectives		4				4.0
6	Use of labor market analysis		1	1	2		2.75
7	Appropriateness of student textbooks			1	3		2.25
8	Availability and student use of computers and the internet	2	2				4.5
9	Adherence to JRCERT standards and principles		4				4.0
10	Integration and use of student follow-up information		1	3			3.25
11	Relevance and availability of supportive courses			2	2		2.5
12	Administrative response to faculty input			2	2		2.5
13	Quality and number of available internship sites	2	1	1			4.25
14	Overall quality of clinical education		2	1	1		3.25
15	Technical and teaching ability of adjunct faculty (ACIs)		3		1		3.5
16	Technical, organization, and teaching ability of Clinical Coordinator			2	1	1	2.25
17	Program communication with and response to clinical sites				4		2.0
18	Program availability and accessibility to students and potential students		2	2			3.5
19	Program recruitment efforts		1	3			3.25
20	Program efforts to achieve a bias-free environment		1	3			3.25
21	Provisions, availability, and relevance of student advisement		4				4.0
22	Faculty participation in college and university committees		4				4.0
23	Use and timeliness of Advisory Committee			1	3		2.25
24	Availability and accessibility of adequate classrooms and AV equipment	1	2		1		3.75
25	Size and configuration of laboratory space		1	1	2		2.75
26	Quality and availability of teaching/learning aids		2	2			3.5
27	Quality and quantity of radiographic (lab)		1	3			3.25

	equipment						
28	Availability of office equipment and supplies		2	2			3.5
29	Size and layout of office space		1	3			3.25
30	Quality and applicability of computer equipment for instructors	2	2				4.5
31	Availability and timeliness of computer support		2	2			3.5
32	Applicability and accessibility of library resources		1	3			3.25
33	Faculty and/or student use of Allied Health Sciences Library						N/A
34	Availability of fiscal resources sufficient to provide quality instruction		2	2			3.5
35	Availability of textbooks and periodicals to instructors			2	2		2.5
36	Overall program quality		4				4.0
37	Faculty works together as a team		2	2			3.5
38	College and university administration foster a positive work environment			4			3.0
39	Availability of college administration				4		2.0
40	Adequate education to meet national standards (JRCERT, etc.)			1	3		2.25

Comments on Individual Statements:
(7) Textbooks are appropriate but need to be better utilized in class and clinic.
(11) CCHS 101, CCHS 102, and COMM 105 are a waste of student time and credits
(12) Administration should be more supportive of faculty
(13) The internship sites are the greatest strength of the program.
(14) The clinical education is outstanding, but there needs to be more emphasis on review
(15) They are a huge asset to the program.
(16) Coursework needs to be better organized and there needs to be better communication with clinical sites.
(17) This is getting much better this semester.
(18) On campus -- good, off campus -- poor.
(23) The committee needs to be better utilized.
(24) VFS 328 is outstanding!!
(25) There is not enough room in the lab for all of the equipment and supplies.
(27) Room F needs to be replaced. Digital equipment needs to be purchased to keep up with advancements in the field.
(29) A window would be nice!
(30) Mary and her staff try hard to be there when needed.
(31) Library services are rarely used by the program.
(33) Usually if we need it, we get it.
(35) ACIs need textbooks.
(35) Lab assistant needs textbooks.
(36) With the curriculum revision, the program has improved greatly.
(37) A vast improvement from the past.
(40) The ARRT scores do not suggest this, but the new curriculum should help.

ADDITIONAL COMMENTS CONCERNING COURSES / CURRICULUM

- There are not enough credits allotted to the program to adequately prepare the student for an entry-level position (successful passing of the registry). CCHS 101, CCHS 102, and COMM 105 only take up valuable credits that are needed to give the student the education that he or she is paying for.

ADDITIONAL COMMENTS CONCERNING CLINICAL INTERNSHIP

- Things are improving with cooperation and teamwork. Registry review must be emphasized throughout clinical for the student to be successful on the registry

ADDITIONAL COMMENTS CONCERNING QUALITY OF INSTRUCTION

- The instructors should be willing to devote more time and effort to improving their skills via national conferences and practical experience. They should become more involved with national organizations and participate in a profession-wide policy making.

ADDITIONAL COMMENTS CONCERNING ADMINISTRATIVE / STAFF SUPPORT

- With more administrative support, this program could evolve into a national leader. New initiatives should be championed and new ideas to improve the quality of the program should be prioritized above the bottom line.

ADDITIONAL COMMENTS CONCERNING AVAILABILITY OF RESOURCES

- The position of Lab Assistant is integral to the program and should be full-time. The program could not survive without Lisa, and the additional 8 hours per week would allow her to perform needed tasks like integrating the classroom and clinical portions of the program, inventory control, enhancement of labs, etc.

ADDITIONAL COMMENTS CONCERNING OVERALL PROGRAM QUALITY

- The program has come a long way, but it needs to keep moving forward to maintain its integrity and to make sure that the education is at least at par with other programs across the country. The program has a huge amount of potential, but it will take effort from the faculty and administration to truly become a great program. We have always been one of the most productive programs on campus, but we now need to make the quality of the program and the outcomes of the students our number one concern.

EMPLOYER EVALUATION OF PROGRAM

Method

As part of the Graduate Survey, each student is asked to indicate the name and address of their present employer. Of the 16 employers sent surveys, 9 responded (57%). The data from those surveys are on the following pages.

Analysis

1) In almost all areas surveyed, the employers indicated that their employees met or exceeded standards.
2) In two areas ("attitude toward work" and "interpersonal skills") one employer indicated that their employee was below standards. This was supported by several comments elsewhere on the survey.
3) Most areas of concern seem to be within the affective domain (i.e.: motivation, interpersonal skills, and confidence).

Recommendation and Actions

1) It appears that, in general, employers are satisfied with the program's graduates.
2) To better evaluate their skills in the affective domain, the program has initiated a behavioral evaluation process for the on-campus students. This process will begin this fall with mid-term and final faculty evaluations of such areas as: interpersonal skills, motivation, attendance and self-reliance. If a student has been determined to have a deficiency in any area evaluated, the student will be required to meet with the faculty to jointly decide an appropriate corrective course of action. A behavioral evaluation has always been done each semester on the students in internship and this will be continued.

EMPLOYER SURVEY DATA 2002

n = 9

4 = Exceeds Standards 3 = Meets Standards 2 = Below Standards 1 = Unacceptable

#		4	3	2	1	Average
1	Technical ability	4	5			3.44
2	Broad radiographic knowledge	4	5			3.44
3	Quantity of work produced	2	7			3.22
4	Ability to work independently	2	7			3.22
5	Attitude toward work	2	7	1		3.11
6	Interpersonal skills	5	3	1		3.44
7	Patient care skills	5	4			3.55
8	Professional behavior	5	4			3.55
9	Adaptability	4	5			3.44
10	Reliability	4	5			3.44
11	Overall performance	4	5			3.44

Please list the professional strengths and weaknesses that you have found in our recent graduate(s)

- The last group of graduates were the best prepared group we've seen. Two of the four we hired went right into specialty areas, CT & mamms.
- Above average skills. Lack of confidence.
- Great student! Adapts well to all situations. Shows tremendous willingness to "jump" in on all procedures. Will make a class "A" tech.

- This student needs to be encouraged on occasion – lacks a little drive – perhaps it's just a little nervousness that makes them hold back. Will be a great tech with some experience.
- This student will make a great tech in the long run. Shows a little hesitation when something [is] unfamiliar. Experience & time will benefit this student.

Please list any areas that you think Ferris State needs to better prepare its students for an entry-level position in radiography.
- The four we hired were interns at our facility. More emphasis on medical ethics and interpersonal skills the first year would prepare them for the healthcare environment.
- Less bookwork, tests at the ending of the program. This is the time they need to practice their skills not worry about taking exams (too distracting).

ADVISORY COMMITTEE EVALUATION OF PROGRAM

Method

In August 1998, a survey form was sent to each of the following members of the Advisory Committee:

1. Radiology Administrators (Employers) (2)
   - Ben Andrus – Mercy Hospital, Cadillac
   - Bill Erickson – Mercy Health Partners, Muskegon
2. Adjunct Clinical Instructors (2)
   - Howard Rankins – Covenant Hospital, Saginaw
   - Kay Williams – Spectrum Health, Grand Rapids
3. Radiologist (1)
   - Dr. Karsama – Mecosta County Hospital, Big Rapids
4. Business Representative (1)
   - Randy Robinson – Radiology Imaging Solutions, Inc., Grand Rapids
5. Career Tech Center Representative (1)
   - Leeann Fountain, Traverse Bay Area Career Tech Center
6. Alumni (1)
   - Beth Anderson – Clare Hospital
7. Second-year Student (1)
   - Clarissa Leach
8. First-year Student (1)
   - Amy Fath

From these ten mailing, four members responded (40% return rate).

Analysis

1) In general, it appears the advisory committee believes that the program is meeting the needs of the students and the profession.
2) Areas that need to be addressed:
   a) the length of the breaks (especially the Christmas break) have been noted by the advisory committee, clinical sites, faculty, and students as detrimental to the learning process
   b) communications needs to be enhanced between the program and the communities of intreat
   c) there are numerous new technologies that need to be taught within the program
   d) professionalism is a viewed as a weakness of the graduating students

Recommendations and Actions

1) The program's communication with its employers is in the process of being strengthened. This is being accomplished by adding several responsibilities for communication with the hospitals to the lab assistant.
2) More credit hours need to be added into the program to accommodate the advent of new technologies and procedures.
3) The new system of affective evaluation during the first year of the program should help provide students with a better understanding of their professional responsibilities.

Ferris State University Advisory Committee Survey

n = 4	Excellent 5	Good 4	Acceptable 3	Below Expectations 2	Poor 1	Average
The current curriculum meets the need of our graduating students.	3	1				4.75
The program provides students with the necessary skills for entering the job market.	3			1		4.25
The program meets the current trends in Radiography.	3		1			4.5
Program is continually reviewed and improved to keep up with changes in the field.	3		1			4.5
Students have a strong understanding of radiography concepts upon graduating.	3	1				4.75
Equipment used in labs is representative of equipment being used in the clinical environment.	1	1	1	1		3.5
Students and sites display enthusiasm for the program.	3		1			4.5
The advisory committee is utilized appropriately for input on program improvement.	2	2				4.5
There is appropriate communication between the programs communities of interest.	2		1	1		3.75
The faculty is meeting the needs of the students.	3	1				4.75

What do you feel are the future trends in Radiography in the next 10 years?
- Increased need for radiologic techs due to changes in Michigan C.O.N. law – creating increased demand for rad techs to move to specialized areas (i.e.: C.T., digital imaging, and PACS).
- Multi-slice CT, MRI, PET scanning.

What are the programs strengths?
- Good knowledge of physics related, good positioning, and knowledge of anatomy.

What areas does the program need to improve upon?
- Teaching professionalism. Reduce the number of extended breaks from training (creates too many relearning periods)

What important issues do you feel the program needs to address immediately?
- Continue to schedule students to rotate weekends and off shifts.

Thank you for taking the time to fill out this survey. Any suggestions you have are greatly appreciated.

ADJUNCT CLINICAL INSTRUCTORS EVALUATION OF PROGRAM

Method

In late July or August of each year, the program sponsors an Adjunct Clinical Instructor's meeting here on campus. One of the primary functions of this meeting is to gather input from the ACIs as to the effectiveness of the program. It is at this meeting that the Adjunct Clinical Instructor's Survey is distributed with instructions to complete and return it as soon as possible. In 2002, 12 of the 20 ACIs attended the meeting and of these 7 returned survey forms (58%). Data from the surveys follows.

Analysis

1) The greatest area of concern appears to be with the communication between Ferris and the clinical sites.
2) Another concern is timeliness and appropriateness of testing during internship.
3) Two ACIs responded that the program's preparedness of the student in the area of radiographic equipment was less that acceptable.
4) Comments were overall very positive, and additional ACI meetings were recommended.

Recommendations and Actions

1) A process of evaluating and monitoring the communication process between Ferris and the clinical sites has been initiated. The Lab Assistant will be responsible for communicating with students and ACIs when the Clinical Coordinator is unavailable.
2) The testing system used to evaluate interns (through webCT) is presently being modified to make sure tests are timely and appropriate.
3) The curriculum subject matter that includes radiographic equipment (RADI 103) was redesigned this summer. It is hoped that this will increase the student's skills in this area. The program must also remind the clinical sites that we cannot insure student competency on every piece of radiographic equipment at every hospital. We can provide the basic information, but it is up to the clinical sites to instruct the student on their particular equipment.
4) It has been recommended that a second ACI meeting be held in the spring of each year. This will allow a better flow of information from Ferris to the ACIs as well as between ACIs.

Adjunct Clinical Instructor Survey 2002

#		5	4	3	2	1	Average
1	Availability of Clinical Coordinator	1	2	4			3.57
2	Competence and clinical ability of Clinical Coordinator	1	4	1	1		3.71
3	Communication between CC and ACI(s)	1	2	3		1	3.29
4	Appropriateness and timeliness of tests and quizzes		4	2	1		3.43
5	Appropriateness of clinical policies	1	6				4.14
6	Program's adherence to and enforcement of clinical policies	2	5				4.29
7	Program's willingness to listen to and incorporate ACI suggestions	3	3	1			4.29
8	Organization of clinical program	1	5	1			4.00
9	Program administration's leadership and communication	1	3	2	1		3.57
10	Program's response to perceived clinical needs	1	6				4.14
11	Overall impression of clinical program	1	6				4.14
12	Student's general understanding of radiographic concepts	1	6				4.14
13	Student's psychomotor ability	2	4	1			4.14
14	Student's patient care skills	1	5	1			4.00
15	Student's professional behavior and interpersonal skills	1	2	4			3.57
	Student's understanding of:						
16	Radiographic positioning and procedures	1	5	1			4.00
17	Anatomy and physiology	2	5				4.29
18	Technical factors		5	2			3.71
19	Radiographic physics		4	3			3.57
20	Principles of patient care and handling	1	3	3			3.71
21	Radiographic processing	2	4		1		4.00
22	Radiation protection and radiation biology	2	4	1			4.14
23	Radiographic equipment	1	4		2		3.57

How would you improve the clinical program?
- New curriculum has established excellent results.
- Communication!!!
- CI meeting very helpful. Would like more interaction between Ferris & hospital. Could there be a CI meeting also in the spring or summer?
- Less time off for Christmas break and use that time as more personal days.
- Do ½ day clinical hands-on site visits.

How would you improve the overall program?
- More clinical time, less time off for University vacations.
- Ferris is responsible for interns at clinical site even if school is not in session according to Ferris lawyer so why not shorten Christmas break and extend personal days. By rewarding interns for perfect attendance they get more time off. One month break over Christmas really hurts intern's education.
- Could we have a complete agenda we have to follow & how you expect us to follow it.
- Communication!!!
- More ACI meetings on campus. We can compare teaching techniques & cooperating with our peers.

What specific areas of the curriculum should be enhanced or added?
- Developing skills in the affective domain.
- Patient satisfaction. Team working. Radiology more than taking a good film. Cleaning organization, kindness, patient interactions, etc. What things it takes to become a great technologist.

What specific areas of the curriculum should be de-emphasized?
- None.

Comments regarding program faculty, staff, administration, and the program in general:
- I am very impressed.
- Excellent support from Ferris State. Always there if I need them.

CURRICULUM EVALUATION

At present, the Radiography Program's curriculum is a mixture of profession-specific, supportive, and general education courses. The foundations of this curriculum are the sequential Radiography (RADI) courses. One sequence of courses (RADI 101, 102, 103) concentrates on radiographic positioning and procedures and integrates positioning labs with lecture. RADI 110 and 111, which focus on the formulation of technical factors, also have a major lab component. These labs allow the student to practice psychomotor skills, apply didactic theory, follow radiation safety procedures, employ accepted patient care practices, manipulate equipment, and learn proper professional behavior. The remaining first-year courses (RADI 121, 122, 123) are lecture courses. The contents of all of the radiography courses are integrated with each other, and preceding courses are requisite to succeeding ones.

The second year is comprised of a clinical internship experience that uses all of the knowledge and skills learned in the first year. In each successive semester of clinical, the student shows mastery in an increasing number of radiographic procedures, and gains experience in numerous areas within the radiology department. It is intended that by graduation, the student has gained the knowledge and skills necessary not only to pass the national registry, but also to be an effective and in-demand entry-level radiographer. In addition to the practicum portion of the internship, there are didactic courses taught on-line by the Clinical Coordinator. There are two on-line courses in the fall and winter semester and one in the summer. The program culminates in an intensive one-week registry review and capstone course (RADI 299) during which the students receive on-campus instruction and review that should allow them to successfully pass the national registry.

In response to student, employer, and faculty concerns, the program's entire curriculum was revamped in 2000. Courses were restructured and renumbered, content was added or deleted, clinical internship was reorganized, and faculty responsibilities were redefined to better provide the student with the education necessary to become a successful radiographer. The class of students that graduated in 2002 was the first to go through the program under the new curriculum. When outcomes of this class (ARRT scores, graduate surveys, employer evaluations, etc.) become available, the program will reevaluate the present curriculum to determine what, if any, changes still need to be made.

The addition of the College of Allied Health "Core" Curriculum coincided with the program's curriculum renovation. Four new courses were added to the program's curriculum: CCHS 101, CCHS 102, CCHS 103, and COMM 105. To accommodate for these "core" courses (without increasing the total number of credits hours necessary for graduation to 88), major portions of essential radiography content had to be eliminated or condensed. This is a major concern of the faculty because there is simply not enough contact hours allotted to the program to fulfill its mission of producing qualified entry-level radiographers (please see ARRT results, page 10). The sphere of knowledge and skills necessary to be a competent radiographer is expanding at an even faster rate. New and more advanced technology and procedures are being created every year and it is the responsibility of the radiographer to be able to effectively use this new technology. It is the responsibility of programs like ours to stay at the forefront of this

information boom and to provide our students with the requisite knowledge and skills. The only way to do supply this depth and breadth of knowledge to our students is to provide more time in the classroom and laboratory than we presently do. The concept of "core" is fine, but it should never interfere with the program's ability to give the student the education that he or she is paying for. This is especially true when much of the "core" content is not relevant to the practice of radiography and the students strongly feel that it is a waste of their time and money.

As mentioned previously, the program's pass rate on the ARRT certifying examination is an on-going concern. It is true that the pass rate has risen steadily for the past five years, however, it is still below the JRCERT's threshold of 75% and well below the national average of approximately 90%. The program needs to take serious steps to rectify this situation for two reasons: 1) if we cannot meet or exceed the JRCERT's standard, they WILL NOT accredit us (and our present accreditation elapses this year) and 2) it is our ethical responsibility to provide our students with the education they pay for, and if they cannot pass the registry following graduation, we simply are not doing them justice. To help rectify this problem, the program is doing an exhaustive investigation into possible solutions. Some of the initial recommendations are:

1) With the first group of students just graduating under the new curriculum, the registry scores need to be scrutinized closely when they come out in early November. This will indicate if the new curriculum and changes in faculty responsibilities have made a notable difference in the pass rates. If the rates remain low, the curriculum needs to be reevaluated.

2) The registry review (RADI 299) course needs to be strengthened and expanded to make sure that the graduating students have the basic knowledge necessary to pass the registry.

3) Reviewing for the registry needs to become a mandatory part of the internship portion of the program and especially emphasized during the summer semester. At present it is strongly encouraged that students study over the summer semester, but as has been repeatedly proven during RADI 299, that very few do so. This makes the registry review very ineffective and drastically decreases the student's chances of passing the registry.

4) The radiography program has the lowest eligibility requirements of any program in the College of Allied Health Sciences: a 2.5 GPA and math proficiency (MATH 110 or equivalent). It is felt by the faculty that these requirements need to be raised at least to match the University's intention to bring in more highly qualified students. The program is proposing to raise the minimum GPA to 2.7 and to require at least one year of high school or college biology (with a grade of B or better) before entering the program. It is not believed that this change will drastically alter the number of entering students each year, however, it is hoped that it will eliminate the student that has little or no real chance to pass the registry.

5) It is strongly felt by the on-campus faculty that there is simply not enough time dedicated to the program content to give the student the breadth and depth of knowledge to pass the registry. All of the present on-campus courses are so severely constrained by their credit hours that all of the content required by the ARRT and the profession cannot be taught. Instructors are being required to eliminate needed content from each course. It is felt that at least 5 more credit hours are needed by the program One credit hour needs to be added to each of the

following courses: RADI 101, RADI 102, RADI10, RADI 111, and RADI 123. The problem is exacerbated by the fact that the program is already at 80 credit hours for an Associate Degree. The only way to add these credits to the program is to 1) raise the minimum number of credits necessary for graduation to 85 or 2) to eliminate the CCHS (core) requirements from the program. The first alternative is the least attractive because of the shear number of credits and because there is no place within the structure of the program to put 5 more credits. Therefore, we are proposing to eliminate the CCHS courses from the program.

The faculty of the program consists of three full-time tenure-track members:

Robert Holihan, BS, RT(R)	Clinical Coordinator
Joel Rescoe, MS, RT(R)	Full-time Faculty Member
Jim Mayhew, MS, RT(R) (QM)	Program Coordinator
Lisa Wall, MS, RT(R)	Part-time Lab Assistant

Each faculty member is in good standing with the American Registry of Radiologic Technologists.

FERRIS STATE UNIVERSITY
COLLEGE OF ALLIED HEALTH SCIENCES
RADIOGRAPHY PROGRAM

NOTE: Meeting requirements for graduation is the responsibility of the student. Your advisor is available to assist you.

FIRST YEAR

Fall Semester

	Grade	
BIOL 109 Basic Human Anat. & Physiology	4	____
Social Awareness Elective	3	____
RADI 101 Rad. Positioning & Procedures 1	3	____
RADI 110 Rad. Imaging 1	3	____
RADI 121 Rad. Physics & Image Prod.	3	____
	16	

Winter Semester

*CCHS 102 Safety Issues in Health Care	1	____
*ENGL 150 English 1	3	____
*CCHS 101 Orient. to Health Care	3	____
RADI 102 Rad. Positioning & Procedures 2	3	____
RADI 111 Rad. Imaging 2	3	____
RADI 122 Rad. Protection and Biology	3	____
	16	

Summer Semester

*CCHS 103 Clinical Skills	1	____
*COMM 105 Interpersonal Communication	3	____
OR		
*COMM 221 Small Group Decision Making		
*ENGL 250 English 2	3	____
RADI 103 Advanced Rad. Procedures	3	____
RADI 123 Rad. Processing and QA	2	____
**Cultural Enrichment Elective	3	____
	15	

SECOND YEAR

Fall Semester

	Grade	
RADI 201 Rad. Quality Control	1	____
RADI 202 Rad. Pathology	1	____
RADI 291 Clinical Practicum 1	10	____
	12	

Winter Semester

RADI 211 Pharmacology for Rads.	1	____
RADI 212 Radiology Management	1	____
RADI 292 Clinical Practicum 2	10	____
	12	

Summer Semester

RADI 222 Advanced Imaging Modalities	1	____
RADI 293 Clinical Practicum 3	7	____
RADI 299 Radiography Review	1	____
	9	
CAHS Computer Competency Requirement		____
***Medical Terminology Competency		____

MATH 110, equivalency or proficiency (Math ACT subscore of 19 or better) required for admission.

A grade of C or better is required for all RADI courses and BIOL 109.

* This course is part of the CAHS Core Curriculum. A grade of C or better is required for graduation.

** HUMN 220 or HUMN 320 is recommended.

*** MRIS 102, equivalency or proficiency is required.

80 semester hours required for graduation

Ferris State University
Radiography Program
Labor Market Analysis

Overview:

It is indeed a good time to be a radiographer. Graduates seeking employment in their area of specialization enjoy 100% placement.[1] The current personnel shortage and subsequent need for qualified entry level radiographers exceed that of the well publicized nursing profession.[2] Increased respect, compensation and expanding occupational responsibilities continue to enhance the stature of the radiographer as an important member of the modern health care team. The rapid pace of change in the radiographic professions, along with the need for multicompetent, flexible and adaptive radiographers, further solidifies the position of the Ferris Radiography Program as an agent that meets the mission of Ferris State University, satisfies the needs of employers and most important, prepares graduates for a meaningful occupation and secure future.

Information from several sources was collected to arrive at the findings of this Radiography Program Labor Market Analysis. Much of the data is the most current available in the attempt to accurately convey existing and future occupational trends regarding graduate employment. Upon review of the findings, it will become apparent that the Ferris Radiography Program satisfies expectations of stakeholders and communities of interest with respect to employment and career satisfaction.[1,3] The data will convey a healthy growth in graduate employment opportunities at least until the end of the decade.[4] These indicators substantiate a strong program in aspects of occupational employment. This report will articulate data regarding the current and future radiographer job market from which the APRC may develop informed conclusions for appropriate program recommendations and action. Members of the APRC are encouraged to review accompanying/available documentation supporting the findings of this analysis for a more complete picture of future educational direction and employment trends in radiography.

Discussion and Findings:

Duties of the entry-level radiographer encompass manipulation of general diagnostic equipment, patient care, assisting the medical staff in radiographic procedures, production of diagnostic images and compliance with department protocols.[4] There is increasing expectation from employers that graduates possess enhanced ability in problem solving, professional judgment, communication, team skills and patient education.[5] Most full time, long term career centered jobs require some measure of experience or multicompetence skills.[6] Diverse and multiple professional proficiencies are the best insurance for sustained employment, career flexibility and growth for radiographers.[7] This fact of course carries with it academic implications for our radiography program. Our associate degree program is now designed to address competence in entry-level skills. We must adapt curriculum to address current and future employability needs for our graduates and industry if we are to maintain program prominence in the profession. We are attempting to do that by developing certificate programs that provide training in

mammography, quality control or computed tomography (CT), along with laddering options into the existing nuclear medicine, sonography or health care systems administration programs.[4] Core skill initiatives within the CAHS and curriculum emphasis upon problem solving, critical thinking and other evolving skills indicate the program is responding to perceived needs. Also under consideration is the possibility of a baccalaureate level professional program. Results of a professional educational summit indicate that future radiographer proficiencies and responsibilities are commensurate with this degree of education.[8] This outcome requires a higher academic caliber of enrolled student to insure reasonable probability of success associated with a more rigorous professional path. In any case, there is still much work to do regarding the development of an efficacious curriculum that grows and adapts to the occupational demands of the future.

Demographic trends indicate 6,140 Radiologic Technologists in Michigan in 1998.[9] Approximately 20% of these jobs are part time. More than half of the jobs for technologists are in hospitals with the remaining positions in physician's offices, clinics and diagnostic imaging centers. Highest growth is expected in the clinic type environments from the present to 2008.[4] The projected job growth in Michigan through 2008 for radiography is ranked much higher than average compared to other occupations, estimated at 5% (116 job openings annually).[9] Nationally, the occupational outlook is even better, with the growth rate ranging from 20% to 35% through 2008.[10,11] It is also important to note that the number and distribution of job vacancies tend to be regional and cyclical depending upon factors such as population growth or state legislation/regulation of the profession (such as licensure). Many Ferris graduates are hired at the in clinical sites in which they interned during their radiography program training. Although job prospect are good everywhere nationally, most job opportunities are currently located in southeast and northeastern states, with some opportunities in the southwest.

Salary is competitive compared to other associate degrees and many baccalaureate degrees. The median salary for radiographers in hospitals is $36,000, with entry level salaries between $25-30,000.[4] Competitive salary, in combination with low academic cost (associate degree), opportunities for career advancement and job availability make radiography a highly desirable program from the student point of view. Our program has been at or near quota since 1996.[12]

Standards of our professional accrediting agency, the Joint Review Committee on Education in Radiologic Technology, establish a program job placement rate expectation of not less than 75% within six months of graduation. Although some graduates prefer part time employment, it seems reasonable to assume that many graduates expect meaningful full time employment with benefits to the extent that a family can be comfortably supported within a reasonable time frame of about a year. The Ferris State University Radiography Program continues to enjoy very good employment of graduates (95-100% over the past three years) according to graduate surveys and Ferris placement center data.[1]

Summary: Relative to many other occupations, medical services, specifically medical imaging careers, has benefited from more than a decade of sustained growth. Trends indicate this growth and subsequent positive employment outlook for graduates will continue through the at least the end of the decade. The Ferris State University Radiography Program currently enjoys a good reputation from employers in providing the necessary applied skills for entry level employment,[3] but vigilance and prudent planning are required to maintain our competitive edge. Curriculum must reflect the preparation of graduates with skills most desired by employers to maintain this advantage.
There is presently greatest demand for employees with diverse professional and interpersonal skills (multicompetence), in addition to the traditional entry level skills. Such job expectation and proficiency may also require a higher academic caliber of enrolled students and curriculum content. The Ferris State University Radiography Program continues to monitor and respond efficaciously to the forces of employment and Labor Market dynamics in order to meet or exceed the expectations of communities of interest.

Rescoe/data/prp/labor2002

References:

1. Graduate Survey Data for Ferris State University Radiography Program, 2001.

2. Farella, Mary C. "A Guide to Your Future." The Flint Journal. August 1, 2002.

3. Employer Survey Data for Ferris State University Radiography Program Graduates, 2002.

4. "Occupational Outlook Handbook-Radiologic Technologists." U.S. Department of Labor, Bureau of Labor Statistics. 2002-03. [Online] http://stats.bls.gov/oco/ocos105.htm

5. Terrell-Nance, Sheila, and Julie Thomas. "Managers' Expectations Of Radiographers: A Survey." Radiologic Technology 62, no.5 (May/June 1991) : 79-104.

6. Akroyd, Duane, and Bonnie Wold. "Radiologic Science and Education." Association of Educators in Radiological Science. 3, no.1 (1996) : 6-15.

7. Excerpts from "Additional Skills Could Boost Opportunities for RT Graduates," Wavelength. Date and volume unspecified. Text refers to date of 1994.

8. American Society of Radiologic Technologists. "Final Report Of the National Educational Concensus Conference In the Radiologic Sciences." Radiography-The Second Century, Nov. 1996, 1-9.

9. State of Michigan Occupational Employment Forecasts. 1998-2002. [Online] http://www.michlmi.org/LMI/occ_proj/oct_02.htm

10. State Occupational Projections 1998-2008. [Online] http://almis.dws.state.ut.us/occ/projections.asp?page=DisplayResults

11. Projections for All Occupations>Health Practitioners>Radiographers 2002. [Online] http://www.des.calstate.edu/scripts/des/occall1.idc

12. Radiography Program Attrition/Retention Rate Data.

Supplemental References:

A. Hayfield, Scott. "Developing Educational Guidelines To Help Future Technologists." **Advance** for Radiologic Science Professionals. 16 Jun. 1997, 6-7.

B. Classified job listings, Representative Examples from newspapers, employer solicitations and professional journals. 2002.

C. CAHS Employment Prospectus, undated.

D. Finocchio, Leonard and Christopher Johnson, "Core Curriculum in Allied Health Education." Pew Health Professions Commission. January, 1995.

E. Radiography Jobs Clearinghouse [Online] www.rtjobs.com

Evaluation of Facilities and Equipment

Strengths:

Room H was recently replaced and has been a real asset to the program. Students have already commented on how much they like the room and are eager to use it. Room E is a rather new room and is also used a great deal by the students.

FSU has one of the few radiography programs that has a C-arm, a portable machine and fluoroscopy equipment for the students to learn procedures on prior to internship. This is a huge asset for the students understanding, and becoming comfortable with the equipment. This is often seen and commented on by clinical sites.

Last year the program received a new processor and back-up processor. This has greatly improved labs. A lab never needs to be rescheduled due to the processor breaking down, instead the back up processor can be used.

The radiography program has a large selection of QA tools. Students again can learn prior to internship how to use the equipment and apply it to their clinical experience.

The radiography scanner will be an excellent tool for scanning radiographs in and having students point out items of interest. Students will also have access to films from other hospitals that have the system. They will be exposed to real life situations and can expand their knowledge.

The lab is equipped with 2 full size skeleton models. This is an excellent learning tool for the students. The lab also has many smaller models that the students are quizzed on.
A 3-D model and cross-sectional model are also used to aide in students learning of anatomy.

Many books are available to enhance students learning. Books are kept in an accessible location for all students to use.

The lab is also equipped with 2 wheelchairs and 4 stretchers. Students are required to do patient transfers, just as they would in the clinical environment. Other tools such as IV poles, oxygen tanks, crutches etc. are also available for the students to practice with.

Improvements:

- Room F replaced.

There is a great need for new equipment in room F. Room F is a huge safety concern due the equipment being so outdated. The bucky must be manually removed from the table and placed in the upright bucky. This concerns faculty because the upright bucky tends to ascend towards the ceiling when the student is attempting to load the bucky. The equipment is also very worn and gives inadequate quality readings, which is very necessary for the experiments the students perform. Films often are clipped and of poor quality due to the tube not lining up properly with

the bucky. This tends to be frustrating for the students who have the position correct but because of the machine achieve a poor radiograph. The equipment does not reflect current clinical instrumentation.

- Digital Equipment.

Most of the hospitals FSU works with for clinical internship have switched to digital equipment. To keep up with current trends in the radiography field it is necessary to have current equipment in the labs. Students need to be exposed to digital imaging prior to their internship.

- Space.

There is a lack of space in the radiography lab. Equipment is being stored currently in the mammography room. This needs to be relocated in order to get the machines running. The equipment that is stored in this room is extremely large and will require a lot of space. Ideally the equipment should be stored next to the lab in the storage area occupied by clinical lab sciences. The C-arm and portable machine are the two largest pieces of equipment the faculty would prefer to not have to move onto the elevator to bring down to lab. There is also a fire hazard with equipment being stored in the main hallway by the rooms. Currently, the portable is stored in the hallway and takes up a great deal of room.

- Repairs and improvement to the lab.

The radiography lab is in great need of painting. Walls currently have water damage (stains) that have never been repaired. There are also spots where old equipment has been taken down and never repainted. Scuffmarks and dents are in every room where students have run into the walls with equipment. Doors are also in need of repainting.
Ceiling tiles have water damage and need to be replaced. The floor in room H is stained from where the old equipment was removed and the new equipment doesn't cover as much space. Students are currently using tables and chairs from the old library that are torn and stained. Tables take up a lot of space and students would be more comfortable with smaller tables and better chairs. The counters and cabinets in the lecture portion of lab need to be removed to give the students more space.

- New computers and printer in Radiography Lab.

<u>There is a need for 2 new computers and printer in the lab. The computers need to include the latest windows program including: Word, PowerPoint, Access, Excel and Internet access.</u>

Students perform the following in lab using the computers:

- Use of CD's for physics, anatomy, processing etc.
- Radiographic Scanner.
- Presentation research for lab activities.
- Computer Competencies.
- Image Manipulation.
- Internet Research and RadFerris on-line.

- Database for Radiographs (Developed in Access. Students will be required to obtain patient information in database, as they would in clinical.)
- Lab activities available to students on-line and on PowerPoint. Will be developing more activities for students with Radiographic Scanner that will be set up to a computer in lab. (Extremely large in size.)
- Electronic Correspondence with Clinical Agencies.
- Access to Campus Pipeline and WebCT.
- High-speed net connection, to connect to clinical sites.

- Video and Software Programs.

The video library needs to be updated. A majority of the videos are 20 years old and outdated. Students would benefit greatly by seeing current trends in the radiography field. Current technology and procedures not easily simulated in lab could be shown to the student, rather then explained. Students would gain a lot of insight to the profession through the videos.

Students would also benefit from new software. New software exists on anatomy, med terminology, and positioning, and the students would benefit from using these CD's.

- Phantoms.

New phantoms are needed for each room. Currently the phantoms are missing fingers, and the arms are detached. New models hold positions more efficiently. For example the fingers are able to bend and move. The phantoms are more realistic, and the students will feel as though they are working with a live patient.

ENROLLMENT TRENDS

The enrollment in the Radiography Program has been remarkably stable over the past five years. Typically, the enrollment capacity for the program has been 60 incoming students per year. For the fall 1996 and fall 1997 classes, the program enrollment was agreed to be increased to 72 students. This increase was a temporary measure to accommodate the large number of students on the program's waiting list. In the fall 1998, the program returned to its original quota of 60 students per year. The program has been at or near its quota every year since 1993. Even on the years when it did not make quota, the program was full at the beginning of the fall semester and students left the program before the seven-day count.

Year	Number of Students Entering Program*	Total Number of Students in Program**	Number of Students in Pre-Radiography**
1997	66***	109	65
1998	61	110	48
1999	59	106	39
2000	58	107	28
2001	55	91	28
2001	58	100	39

* Data from the seven-day count
** Data from the 20001 – 2002 FSU Fact Book
*** In 1996 and 1997, the class capacity was raised to 72

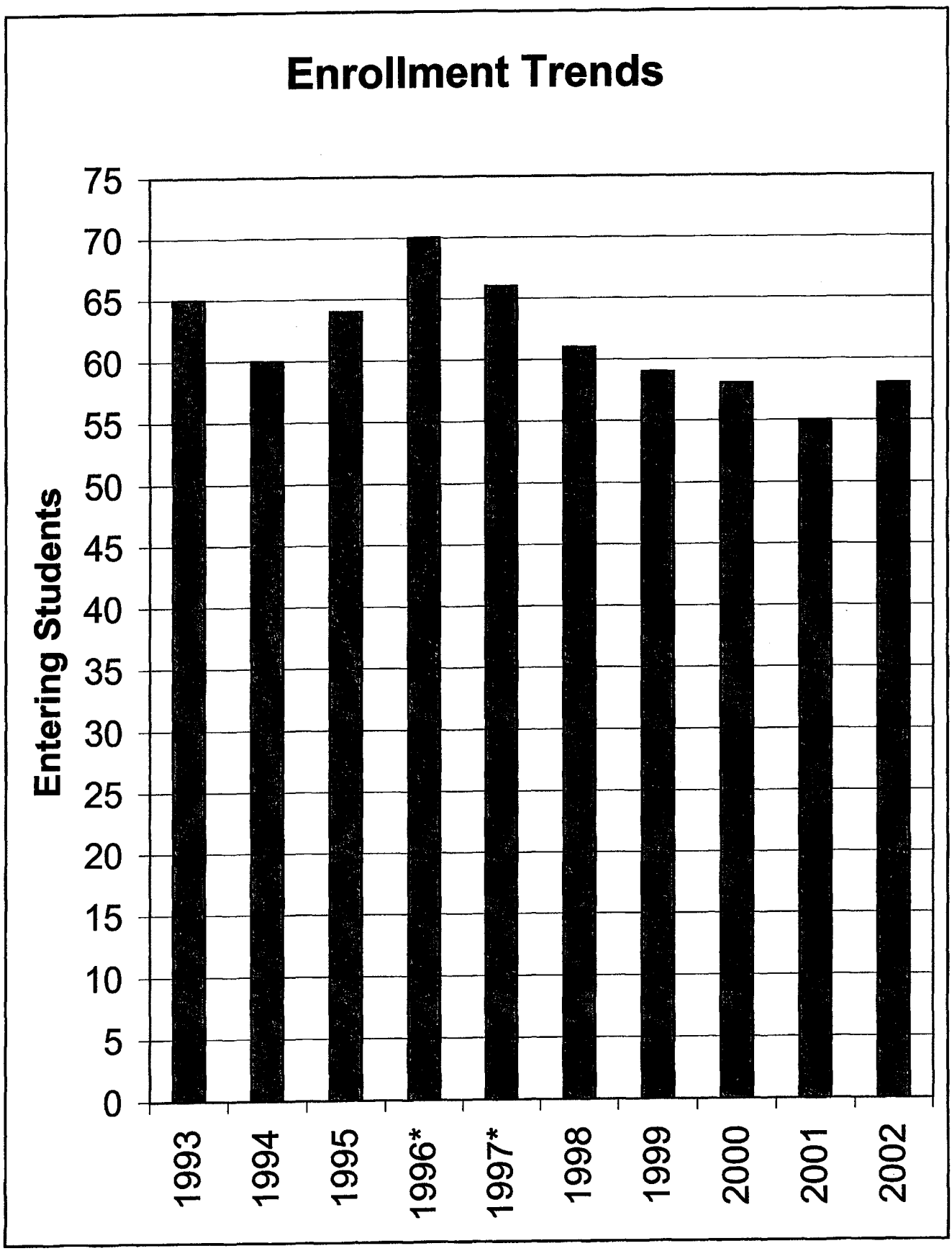
Enrollment Trends
Entering Students
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1993
1994
1995
1996*
1997*
1998
1999
2000
2001
2002

Table I

Degree Program Costing Summary
Alpha Listing of Programs
1999-00

Program Name	Prog Crs Req	Total Instructor Cost*	Total Dept Cost**	Total Dean's Cost***	Total Program Cost	Instructor Cost Per SCH	Dept Cost Per SCH	Dean's Cost Per SCH	Total Cost Per SCH
Nursing BSN (Yrs 3 & 4)	84	$10,363.44	$3,941.31	$1,530.42	$15,835.17	$123.37	$46.92	$18.22	$188.51
Operations Management BS	125	$12,548.55	$3,019.36	$1,439.01	$17,006.92	$100.39	$24.15	$11.51	$136.06
Opticianry AAS	68	$15,156.72	$2,021.15	$1,758.08	$18,935.95	$222.89	$29.72	$25.85	$278.47
Optometry OD (Professional Yrs 1,2,3,4)	163	$60,093.28	$10,036.16	$15,992.48	$86,121.92	$368.67	$61.57	$98.11	$528.36
Ornamental Horticulture Technology AAS	60	$7,751.70	$1,970.56	$520.17	$10,242.43	$129.19	$32.84	$8.67	$170.71
Performance Machining Certificate	12	$1,931.31	$947.46	$235.59	$3,114.37	$160.94	$78.96	$19.63	$259.53
Performance Motorsports Certificate	10	$1,292.79	$789.55	$196.33	$2,278.67	$129.28	$78.96	$19.63	$227.87
Pharmacy BS (Professional Yrs 1,2 & 3)	94	$12,613.89	$4,198.66	$3,685.12	$20,497.67	$134.91	$44.91	$39.41	$219.23
Pharmacy/All Options Pharm.D. (Professional Y	149	$33,628.52	$6,808.79	$6,081.66	$46,518.97	$226.45	$45.85	$40.95	$313.26
Plastics Engineering Technology BS (Yrs 3 & 4	64	$10,174.99	$3,019.21	$1,022.12	$14,216.32	$158.98	$47.18	$15.97	$222.13
Plastics Technology AAS	64	$8,684.33	$2,589.28	$875.85	$12,149.46	$135.69	$40.46	$13.69	$189.84
Pre-Criminal Justice AA	64	$5,491.95	$1,950.56	$980.61	$8,423.13	$85.81	$30.48	$15.32	$131.61
Pre-Engineering AS	73	$8,386.59	$1,427.38	$671.63	$10,485.60	$114.88	$19.55	$9.20	$143.64
Pre-Law AA	60	$6,613.30	$1,394.93	$739.83	$8,748.06	$110.22	$23.25	$12.33	$145.80
Pre-Mortuary Science AS	68	$5,436.23	$1,622.27	$605.85	$7,664.36	$79.94	$23.86	$8.91	$112.71
Pre-Optometry AS	88	$7,380.66	$2,319.40	$711.40	$10,411.45	$83.87	$26.36	$8.08	$118.31
Pre-Pharmacy AS	61	$5,144.98	$1,451.11	$502.74	$7,098.82	$84.34	$23.79	$8.24	$116.37
Pre-Public Administration AA	60	$5,150.72	$1,452.07	$980.54	$7,583.33	$85.85	$24.20	$16.34	$126.39
Pr ance AS	60	$5,462.07	$1,569.01	$646.70	$7,677.79	$91.03	$26.15	$10.78	$127.96
Pre-Social Work AA	60	$5,332.23	$1,607.87	$748.36	$7,688.47	$88.87	$26.80	$12.47	$128.14
Pre-Teaching (Elementary or Secondary) AA	63	$6,014.57	$1,826.04	$890.23	$8,730.84	$95.47	$28.98	$14.13	$138.58
Pre-Technical & Professional Communications	60	$5,690.35	$1,642.17	$823.68	$8,156.20	$94.84	$27.37	$13.73	$135.94
Printing & Digital Graphic Imaging Technology	63	$13,647.03	$3,146.57	$1,051.07	$17,844.67	$216.62	$49.95	$16.68	$283.25
Printing Management BS (Yrs 3 & 4)	64	$8,984.80	$2,412.85	$899.79	$12,297.44	$140.39	$37.70	$14.06	$192.15
Product Design Engineering Technology BS (Y	68	$9,388.33	$3,199.16	$1,045.19	$13,632.68	$138.06	$47.05	$15.37	$200.48
Professional Golf Management BS	124	$12,124.89	$3,633.93	$1,494.27	$17,253.10	$97.78	$29.31	$12.05	$139.14
Professional Tennis Management BS	124	$12,310.41	$3,633.38	$1,457.39	$17,401.18	$99.28	$29.30	$11.75	$140.33
Public Administration BS	124	$13,123.56	$3,251.27	$1,926.02	$18,300.84	$105.84	$26.22	$15.53	$147.59
Public Relations BS	124	$16,909.99	$3,688.75	$1,498.32	$22,097.05	$136.37	$29.75	$12.08	$178.20
Public Relations Certificate	12	$3,564.87	$475.30	$144.58	$4,184.75	$297.07	$39.61	$12.05	$348.73
Quality & Productivity Management BS	124	$12,973.88	$3,429.04	$1,656.69	$18,059.61	$104.63	$27.65	$13.36	$145.64
Quality Engineering Technology BS (Yrs 3 & 4)	68	$10,186.74	$2,909.00	$1,059.32	$14,155.05	$149.80	$42.78	$15.58	$208.16
Quality Improvement for Managers Certificate	9	$1,229.20	$402.44	$189.90	$1,821.54	$136.58	$44.72	$21.10	$202.39
Quality Technology Certificate	12	$2,422.31	$732.53	$235.59	$3,390.43	$201.86	$61.04	$19.63	$282.54
Radiography AAS	78	$5,364.12	$2,602.02	$2,307.30	$10,273.44	$68.77	$33.36	$29.58	$131.71
Real Estate AAS	63	$6,761.80	$1,513.32	$713.94	$8,989.06	$107.33	$24.02	$11.33	$142.68
Real Estate Certificate	9	$1,359.44	$263.65	$135.59	$1,758.68	$151.05	$29.29	$15.07	$195.41
Recreation Leadership & Mgt/Corp Fitness-Well	128	$13,088.59	$3,356.08	$2,616.18	$19,060.85	$102.25	$26.22	$20.44	$148.91
Recreation Leadership & Mgt/Leisure Service T	128	$13,286.71	$3,356.94	$2,521.12	$19,164.78	$103.80	$26.23	$19.70	$149.72
Recreation Leadership & Mgt/Outdoor-Adv Edu	128	$13,421.10	$3,403.83	$2,551.09	$19,376.02	$104.85	$26.59	$19.93	$151.38
Recreation Leadership & Mgt/Sports Manageme	128	$14,221.99	$3,287.55	$2,493.97	$20,003.50	$111.11	$25.68	$19.48	$156.28
Resort Mgmt/Facilities Operations Mgmt Concer	128	$16,416.02	$3,773.89	$1,780.55	$21,970.45	$128.25	$29.48	$13.91	$171.64

* ructor Cost - ***Salary & Fringe***
** Depatment Cost - ***Departmental Level Non Instructor Compensation, Supplies and Equipment***
*** Dean's Cost - ***Dean's Level Non Instructor Compensation, Supplies and Equipment***

Source: Office of Institutional Research, g:\...\progcost\9900\alphaprg.rsl

Ferris State University
Degree Program Costing 1999 - 2000 (Summer, Fall, and Winter)

College : Allied Health Sciences
Department : Hospital Related

Program Name: Radiography AAS

Program Credits Required (Total credits to graduate) 78

*Instructor Cost per Student Credit Hour(SCH) (Average for program)	$68.77
**Department Cost per Student Credit Hour	$33.36
***Dean's Cost per Student Credit Hour	$29.58
Total Cost per Student Credit Hour (Average for program)	**$131.71**
Total Program Instructor Cost (Assumes a student will complete program in one year)	$5,364.12
Total Program Department Cost	$2,602.02
Total Program Dean's Cost	$2,307.30
Total Program Cost (Assumes a student will complete program in one year)	**$10,273.44**

Course ID	Level	Instructor Cost	Dept Cost	Dean's Cost	SCH's Produced	Instructor Cost/SCH	Dept Cost/SCH	Dean's Cost/SCH	Credits Required	Program Instructor Cost	Program Dept Cost	Program Dean's Cost
BIOL109	L	$109,411	$44,403	$9,176	1144	$96	$39	$8	4	$383	$155	$32
ENGL150	L	$549,468	$70,827	$51,473	6417	$86	$11	$8	3	$257	$33	$24
ENGL250	L	$431,435	$52,351	$38,045	4743	$91	$11	$8	3	$273	$33	$24
HLTH128	N	$10,996,372	$3,600,213	$1,698,828	80513	$137	$45	$21	1	$137	$45	$21
HUMN220	L	$39,030	$7,109	$3,706	462	$84	$15	$8	3	$253	$46	$24
ISYS105	L	$310,365	$136,524	$43,048	3573	$87	$38	$12	3	$261	$115	$36
MRIS102	L	$64,282	$12,232	$8,150	223	$288	$55	$37	1	$288	$55	$37
RADI120	L	$19,262	$8,690	$8,771	240	$80	$36	$37	4	$321	$145	$146
RADI130	L	$28,880	$8,690	$8,771	240	$120	$36	$37	4	$481	$145	$146
RADI140	L	$21,669	$8,256	$8,332	228	$95	$36	$37	4	$380	$145	$146
RADI150	L	$28,880	$8,256	$8,332	228	$127	$36	$37	4	$507	$145	$146
RADI160	L	$21,660	$8,871	$8,954	245	$88	$36	$37	5	$442	$181	$183
RADI217	L	$5,364	$5,214	$5,263	144	$37	$36	$37	3	$112	$109	$110
RADI218	L	$5,364	$5,214	$5,263	144	$37	$36	$37	3	$112	$109	$110
RADI219	L	$3,937	$6,300	$6,359	174	$23	$36	$37	3	$68	$109	$110
RADI225	L	$16,092	$15,968	$16,117	441	$36	$36	$37	9	$328	$326	$329
RADI226	L	$16,092	$15,316	$15,459	423	$38	$36	$37	9	$342	$326	$329
RADI227	L	$11,810	$18,901	$19,077	522	$23	$36	$37	9	$204	$326	$329
SOCAELE	E	$1,447,253	$377,260	$175,262	20110	$72	$19	$9	3	$216	$56	$26

* Instructor Cost - ***Salary & Fringe*** - the actual cost to teach a course
** Depatment Cost - ***Departmental Level Non Instructor Compensation, Supplies and Equipment*** - departmental average applied to all course prefixes within a department
*** Dean's Cost - ***Dean's Level Non Instructor Compensation, Supplies and Equipment*** - college average applied to all course prefixes within a college

FERRIS STATE UNIVERSITY

Student Credit Hours (SCH), Full Time Equated Faculty (FTEF) and SCH/FTEF Aggregated by Course Prefix within College and Department

Prefix	Year	Student Credit Hours				Full Time Equated Faculty				SCH/FTEF			
		Summer	Fall	Winter	F + W (a)	Summer	Fall	Winter	Avg F + W (b)	Summer	Fall	Winter	F + (a
College of Allied Health Sciences													
Hospital Related Department													
RADI	1997-98	912.00	1,153.00	1,112.00	2,265.00	2.50	3.02	3.22	3.12	364.80	381.79	345.34	725
RADI	1998-99	896.00	1,227.00	1,142.00	2,369.00	2.50	2.92	3.00	2.96	358.40	419.76	380.67	799
RADI	1999-00	950.00	1,066.00	1,023.00	2,089.00	2.50	3.00	3.00	3.00	380.00	355.33	341.00	696
RESP	1996-97	264.00	275.00	358.00	633.00	1.05	2.00	2.00	2.00	251.43	137.50	179.00	316
RESP	1997-98	266.00	276.00	335.00	611.00	0.61	2.00	1.00	1.50	436.07	138.00	335.00	407
RESP	1998-99	166.00	202.00	297.00	499.00	1.84	2.00	2.00	2.00	90.22	101.00	148.50	249
RESP	1999-00	168.00	234.00	301.00	535.00	1.00	2.00	2.00	2.00	168.00	117.00	150.50	267
Nursing & Dental Hygiene													
DHYG	2000-01	77.00	1,303.00	1,178.00	2,481.00	1.00	5.40	5.00	5.20	77.00	241.15	235.60	476
NURS	2000-01	351.00	1,143.00	1,029.00	2,172.00	2.48	9.46	8.92	9.19	141.53	120.87	115.36	236
Nursing Department													
NURS	1996-97	665.00	2,499.00	1,796.00	4,295.00	5.52	17.75	15.37	16.56	120.47	140.79	116.85	259
NURS	1997-98	597.00	1,808.00	1,377.00	3,185.00	4.74	12.76	12.56	12.66	125.97	141.69	109.63	251
NURS	1998-99	792.00	2,057.00	1,494.00	3,551.00	7.31	14.55	15.96	15.26	108.34	141.37	93.60	232
NURS	1999-00	574.00	1,855.00	1,499.00	3,354.00	4.37	12.97	13.42	13.19	131.35	143.05	111.70	254

FERRIS STATE UNIVERSITY

Student Credit Hours (SCH), Full Time Equated Faculty (FTEF) and SCH/FTEF Aggregated by Course Prefix within College and Department

Prefix	Year	Student Credit Hours				Full Time Equated Faculty				SCH/FTEF			
		Summer	Fall	Winter	F + W (a)	Summer	Fall	Winter	Avg F + W (b)	Summer	Fall	Winter	F (a
College of Allied Health Sciences													
Health Management Department													
MRIS	1996-97	461.00	949.00	1,115.00	2,064.00	2.79	4.45	5.44	4.95	165.48	213.14	204.95	41
MRIS	1997-98	388.00	870.00	720.00	1,590.00	2.66	3.88	3.97	3.93	145.86	224.01	181.15	40
MRIS	1998-99	349.00	710.00	743.00	1,453.00	2.55	4.31	3.89	4.10	137.11	164.67	191.12	35
MRIS	1999-00	317.00	439.00	556.00	995.00	1.70	4.82	4.64	4.73	186.35	91.11	119.72	21
Health Related Programs													
CLLS	2000-01	201.00	210.00	327.00	537.00	2.50	3.00	3.00	3.00	80.49	70.00	109.00	17
NUCM	2000-01	60.00	438.00	335.00	773.00	1.00	2.00	2.00	2.00	60.00	219.00	167.50	38
OPHT	2000-01	48.00	206.00	0.00	206.00	0.65	2.42	0.00	1.21	73.85	85.12		17
OPTI	2000-01	0.00	0.00	144.00	144.00	0.00	0.00	2.00	1.00			72.00	14
RADI	2000-01	847.00	1,161.00	1,068.00	2,229.00	2.65	3.00	3.00	3.00	319.62	387.00	356.00	74
RESP	2000-01	192.00	164.00	232.00	396.00	1.00	2.00	2.00	2.00	192.00	82.00	116.00	19
Hospital Related Department													
NUCM	1996-97	108.00	618.00	498.00	1,116.00	1.00	2.00	2.00	2.00	108.00	309.00	249.00	55
NUCM	1997-98	94.00	557.00	458.00	1,015.00	1.00	2.00	2.00	2.00	94.00	278.50	229.00	50
NUCM	1998-99	110.00	632.00	515.00	1,147.00	1.00	2.00	2.00	2.00	110.00	316.00	257.50	57
NUCM	1999-00	82.00	505.00	443.00	948.00	1.00	2.00	2.00	2.00	82.00	252.50	221.50	47
OPHT	1999-00	44.00	270.00	194.00	464.00	1.00	2.95	2.42	2.68	44.00	91.61	80.17	17
RADI	1996-97	892.00	1,220.00	1,112.00	2,332.00	2.50	3.11	3.00	3.05	356.80	392.28	370.67	76

FERRIS STATE UNIVERSITY

Ranked Listing of Student Credit Hours (SCH) / Full Time Equated Faculty (FTEF), Aggregated by Course Prefix Fall + Winter Semesters 2000-2001

Course Description	Course Prefix	Student Credit Hours/ Full Time Equated Faculty (SCH/FTEF)
Professional Tennis Management	PTMG	1,117.07
History	HIST	973.85
Political Science	PLSC	893.20
Economics	ECON	850.18
Art History	ARTH	840.00
Humanities	HUMN	815.66
Psychology	PSYC	804.85
Sociology	SOCY	800.16
Pharmaceutics	PHAR	774.45
Physical Science	PHSC	768.00
Radiography	RADI	743.00
Business	BUSN	716.31
Geography	GEOG	711.62

CONCLUSIONS

Centrality to the FSU mission

The radiography program is the very essence of the mission of Ferris State University. It is a two-year program that that provides its student with the ability to become a valued member of a highly technical and in-demand career. It provides not only West Michigan, but also the entire state with a large number of skilled and dedicated technologists. Additionally, the program and its faculty strive to stay at the forefront of the technology tidal wave of the radiography profession. This program is exactly what Woodbridge Ferris saw as the mission of the institution.

Uniqueness and visibility

As one of the largest radiography programs in the country, Ferris and its graduates are very visible throughout Michigan and across the United States. It is unique that it is the only University-based radiography program in the state and its reputation among employers is unsurpassed. Its system of clinical education sites stretches from one end of the state to the other and therefore students can come to Ferris knowing that they can return to their home to do their internship. One faculty member is presently a site visitor for the JRCERT and recently gave a seminar to the International Society of Radiologic Technologists in Mexico.

Service to the state and the nation

As has been previously said, there is presently an unprecedented shortage of qualified radiographers everywhere in the US. Ferris State, as the largest program in the state and one of the largest in the country, places a large number of qualified radiographers into the medical system annually.

Demand by students

Over the past five years, the number of students entering all of the allied health professions has ebbed, but in contrast, the demand for the radiography program has stayed high. Admittedly, the wait-list for the program is not as long as it has been in the past, but every year we begin with or about our maximum number of students.

Quality of instruction

With the new curriculum and the reassignment of faculty, the quality of instruction for the radiography program has never been better. This is not to say however, that the program cannot ascend even farther. We are constantly monitoring the efficacy of the instruction and will make the appropriate changes in content or delivery when necessary.

Demand for graduates

Unless something drastically changes, the next decade will see an increase in the already great demand for our graduates. The aging population, wholesale retirements within the profession, and the closing of many hospital-based radiography programs only mean more job opportunities in the future. Employers all across the country are now being forced to give large sign-on bonuses, salary increases, and scholarships to attain and retain qualified radiographers. Each of our graduates indicated that they had found employment either before or shortly after graduation and there is no reason to believe that this will not continue.

Placement rate and average salary

As has been stated in numerous places within this document, all of our graduates have found jobs with little or no trouble. Of the students that wanted to find work, 100% have found one or more jobs available. It has also been noted that the salaries and other compensation (sign-on bonuses, etc.) have increased sharply in the last two years. In fact, it was realized, unfortunately too late for this year, that the salary question on the Graduate Survey is not within a reasonable range. Many students make more than the $30,000 top salary on the form. According to salary.com, the average salary in Grand Rapids is over $41,000 and the national average is just over $40,000 for radiographers.

Service to non-majors

As a stand-alone and quota program, radiography does not include non-majors in its courses, however, its faculty has taught other courses (CCHS 102 and FSUS 100) which do contain students from all CAHS disciplines.

Facilities and equipment

The program's major equipment concerns are: (1) room F in the radiography lab is in desperate need of replacing. The room not only does not produce the quality of radiographs necessary to properly instruct students, but it is also a potential health hazard to students and instructors. (2) The program needs to purchase digital x-ray equipment to stay close to the industry standard. Approximately 40% of the program's present clinical sites have digital x-ray equipment with most of the remaining going toward digital in the next ten years. It is imperative that Ferris State keeps current with industry by providing students with hands-on instruction on digital equipment.

Library information services

The program is very satisfied with the library holdings (both books and periodicals) on radiography subjects. Each year we are asked if there are books that we would like to have and usually the ones requested are purchased. With the advent of the Internet and the emphasis on web-based instruction, the use of library references by both students and faculty is obviously lessened over the years, but the fact that hardbound volumes are available is heartening.

Cost

The radiography program has always been one of the most productive programs on campus. With the number of student hours generated and with only having three full-time faculty members (2.5 FTEs in the summer), Radiography stands only behind Professional Tennis Management with regards to programatic productivity. This can be attributed to the large number of student credit hours generated each year, as well as the relatively small number of faculty.

Faculty: professional and scholarly activities

Each of the faculty is registered by the ARRT that requires at least 24 continuing education units (CEUs) every two years. In addition one faculty member attended numerous seminars at the Radiology Society of North America annual meeting in Chicago and another faculty member