RADIOLOGIC TECHNOLOGY PROGRAMS

INSTRUCTIONAL PLANNING REPORT

2013

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RADIOLOGIC TECHNOLOGY PROGRAMS
INSTRUCTIONAL PLANNING REPORT

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RADIOLOGIC TECHNOLOGY PROGRAMS

INSTRUCTIONAL PLAN

2013

I. BACKGROUND, EVALUATION AND ANALYSIS

Program Descriptions
The Radiologic Technology program began in 1960 through cooperative efforts of technologists and physicians (radiologists) of the Radiology Medical Group (RMG) and the County Hospital in Santa Cruz. In 1965 affiliation with Cabrillo College was accomplished. Education of technologists continued to be supported by RMG and in the late 1960’s, Dominican Hospital, Community Hospital of Santa Cruz and Watsonville Hospital became affiliated.

In the 1970’s more affiliates were added. The program remained a certificate only program until 1992 when the curriculum was changed to award students an A.S. degree at program completion. The A.S. degree is considered entry-level into the profession by the American Society of Radiologic Technologists (ASRT). Changes occurred in response to the increasing labor demand for diagnostic imaging professionals in and outside of Santa Cruz county. In the 1980’s the program applied for and became accredited by an outside agency, the Joint Review Committee on Education in Radiologic Technology (JRCERT).

In the 1990’s considerable maturation of the program occurred with the addition of a full-time program director and a full-time clinical coordinator, adjunct faculty, clinical instructors, program counselors and a half-time program specialist. Not only was the program expanded to include the newer areas within the field (special modalities introduction and fluoroscopy), but the program was also shortened from 24 months to 22.5 months, so students would graduate in May and be available for hire when employers typically need to hire technologists for summer coverage. These changes and improvements produced entry-level graduates who are multi-skilled and multi-competent and who are prepared for licensures mandated by the state of California and employers.

In 1999, the elective mammography program was developed and implemented. It was the first program in the State to comply with the then new federal MSQA Standards of 1998. The mammography program has maintained high quality through education of the educators and periodic review and update of instructional content and materials. The program is unique in its content of didactic, laboratory and clinical components. When students complete the program, they are qualified for application to the State of California Department of Public Health-Radiation Health Branch (CDPH-RHB) examination for certification.

In the year 2000 the college continued to improve the program by the addition of an on-site energized laboratory for students to conduct radiographic imaging laboratory experiments and radiographic positioning skills, which enabled them to create concrete results by applying abstract information acquired during classroom lecture and discussion. The facility previously
the Photography Laboratory was remodeled into the RT Laboratory (room 1602). It was furnished with three non-energized radiographic tables with upright buckys and floor mounted tube stands and one energized Phillips R/F room (1965), a donation from the Community Hospital of the Monterey Peninsula. The RT classroom was moved from room 1521 to room 1603 adjacent to the laboratory.

In Fall of 2010, the RT program moved to a new ALH building complex, including faculty offices, classroom, storage space, and a RT laboratory with 2 energized Philips General/Fluoroscopic Eleva systems and 3 non-energized radiographic workstations. The planning project spanned a period of ten years and involved the many stakeholders of the three county diagnostic imaging community. The result is the current RT curriculum that has digital radiography fully implemented, so students directly simulate radiographic procedures at a high level of technical complexity. Digital radiography is one of the greatest advances in the history of medicine and the health care industry is fast becoming dependent on its imaging systems. To date, all of the program's ten clinical education sites have adopted some form of digital radiography and incorporated this new imaging modality within their departments. This new imaging modality has the potential to improve the quality of diagnostic images and diminish radiation dose, yet not all users are aware of how to set technical factors effectively to realize these benefits. The radiologic technology program has been working with equipment vendors, physicists, professional societies and regulatory agencies to establish proper curriculum content and objectives for the entry level radiographer, as well as has acquired the necessary digital equipment for the RT laboratory. The program officials and faculty are committed to keeping step with diagnostic imaging technology in order to maintain relevant teaching to the affective domain in our community.

Current staffing includes 2 full-time faculty (Program Director and Clinical Coordinator), 3 adjunct faculty and a half-time Program Specialist.

The program earned an eight year award of continued accreditation, the highest award possible by the JRCERT, for the second accreditation cycle in a row. Graduates have, from 2002-2011, consistently passed the national licensure examination (ARRT) with a mean percentile of 89% or higher. The testing categories are: patient care, radiation protection, radiographic equipment, radiographic technique and radiographic positioning.

The radiologic technology program meets the criteria for two of the college’s primary functions: Career Technical Education (CTE) and CTE with transfer option. All students graduate with an A.S. degree in Radiologic Technology and through articulation agreements, may transfer to a four-year university and earn a Bachelor of Science degree in Radiologic Technology.

**General Diagnostic Radiologic Technology**
Radiologic technologists are medical professionals who perform diagnostic imaging examinations. The radiologic technology training is competency and performance outcomes based wherein students are educated in anatomy, patient positioning, selection of imaging techniques with emphasis on limiting radiation dose, equipment protocols, radiation safety, radiation protection and basic and advanced patient care. Students may specialize in a specific
imaging modality, such as computed tomography, mammography, magnetic resonance imaging, nuclear medicine, quality management, or diagnostic medical sonography (ultrasound).

Some of these specialized areas require additional training beyond the Associate in Science degree in Radiologic Technology. The program offers electives of sectional anatomy, mammography and magnetic resonance imaging for second-year students and graduates as outside funding permits.

Students admitted to the Radiologic Technology Program are given 22.5 months of on-campus training in the classroom and laboratory settings, as well as specialized off-campus laboratory experience at local hospitals and clinics (2000 clinical education hours). The clinical education experience requires 16 to 40 hours a week depending on the semester/session within the program. This program prepares the student for the American Registry of Radiologic Technologists examination and the California State Fluoroscopy permit examination. Venipuncture certification is attained within the core program. An Associate in Science degree is awarded when the program is successfully completed. An entering class begins once each year in the fall semester.

**Mammography Program**

Mammography is a radiographic procedure that uses low-dose radiation to create an image of breast tissue. Mammography is the best way to find breast cancer early, because it can detect pre-cancerous calcifications and breast lumps up to two years before they can be palpated. Finding a lump early significantly improves a woman’s chance of successful treatment.

This program is designed as a comprehensive theory and laboratory preparation for the California State and ARRT Advanced Level certification examinations in Mammography. The classroom component includes comprehensive theory and practice of: mammographic positioning, quality assurance/quality control, breast anatomy, and pathophysiology of the breast. The laboratory component includes instruction in breast positioning and imaging techniques; quality assurance/quality control; operation of mammographic, radiographic equipment; operation of a dedicated automatic processor and State required education in digital mammography. Clinical competencies required by ARRT must be met independently. A certificate documenting 40 hours of mammographic instruction is awarded when the program is successfully completed that qualifies completers for the State of California Mammography Certification Examination. All aspects of the program follow the MSQA/ACR regulations and recommendations. The prerequisite to the program is ARRT/CRT certification or 2\textsuperscript{nd} year Radiologic Technology Student in good standing.

**Magnetic Resonance Imaging Program**

Magnetic resonance imaging (MRI) is a sophisticated diagnostic technique that uses a magnetic field, radiowaves and a computer to generate detailed, sectional images of human anatomy. Because it produces better soft-tissue images than general diagnostic radiographs, MRI is most commonly used to obtain two-dimensional views of an internal organ or structure, especially the brain and spinal cord. In addition MRI is used to assess response to treatment, especially cancer chemotherapy or radiation therapy and also to assess sports-related injury to bones and joints.
The program is designed as a comprehensive theory and laboratory to enable the 2\textsuperscript{nd} year student and graduate students to acquire the necessary background to successfully demonstrate theoretical and clinical experience in MRI current practices. The prerequisites to the program are ARRT/CRT certification or 2\textsuperscript{nd} year Radiologic Technology Student in good standing; CPR (Health Care Provider) certification and venipuncture certification. The program includes:

CROSS-SECTIONAL ANATOMY—with an emphasis on transverse planes as related to sonography, computerized tomography and magnetic resonance imaging.

MRI PHYSICS—a comprehensive overview of the fundamentals of magnetic resonance imaging principles with emphasis on safety issues related to patients and staff. The course includes study of T\textsubscript{1}-T\textsubscript{2} relaxation, pulse sequences, image formation, contrast media and instrumentation.

MAGNETIC RESONANCE IMAGING AND PROCEDURES—includes the study of common and specialty magnetic resonance imaging methodology and procedures. The course includes study of MRI with computer applications for image acquisition, scanner operations and parameters, and patient examination procedures.

APPLIED MAGNETIC RESONANCE IMAGING LABORATORY - students apply the protocols and procedures of MRI to phantoms in the clinical setting.

MAGNETIC RESONANCE IMAGING LAB/CLINIC—clinical education in Magnetic Resonance Imaging procedures, practical application of MRI patient and imaging protocols. Students have the opportunity to demonstrate experience in some MRI procedures under supervision of a preceptor. The student participates in MRI current practices. The program was redesigned to enable completers to meet the required number of competency requirements for application to the ARRT advanced level MRI examination.

Limited Permit X-ray Technician Program

The Limited Permit X-ray Technician (LPXT) program was developed and implemented 2004-2006. Labor market needs and outside grant funding supported a one time offering in which a cohort of 20 students were enrolled and successfully completed the 9 month program. The college applied for and received LPXT School approval from the California Department of Health Services – Radiation Health Branch in 2004 and extended approval to 2008. Completers qualified for three limited California State permits in the categories of Upper and Lower Extremities, Torsoskeletal, and Chest Radiography. X-ray technicians with limited permits are employed in non-acute care clinics, doctors’ offices such as orthopedists or cardiologists and in chiropractic offices. The program created a career ladder from medical assisting to LPXT and from LPXT into radiologic technology and prompted legislative support through the California Orthopaedic Association for Senate Bill 1670 which allows LPXT’s to perform digital radiographic procedures with 20 hours of approved instruction. The LPXT program is currently deactivated, but has the potential to be reactivated when and if labor market studies or community stakeholders indicate its feasibility.
**Relationships**
Cabrillo College is the only educator of radiologic technologists in the tri-county area (Santa Cruz, San Benito, and Monterey). Cabrillo College prepares students for employment with enviable support from professional, medical, and community members. The program graduates students who are multi-skilled and multi-competent, so they are highly competitive and enjoy a high level of job satisfaction. Currently, program graduates are employed at a rate that meets the JRCERT benchmark, 75% employment, six months post graduation. ASRT labor projections indicate technologists will continue to be in high demand through 2017 and predict shortages in diagnostic imaging professionals within ten years.

**Campus Relationships**
The radiologic technology department works with the science departments to provide critical prerequisite courses for radiologic technology students. Many other departments: math, English, medical assisting, communication studies and social sciences offer additional prerequisite or degree-required courses. Since writing skills are taught and assessed in prerequisite courses, the program director continues to work with the English department to improve SLO’s. The requirement was changed in 2009 from English 100 to English 1A, a higher level of English. In addition many students on the RT waitlist take transfer courses toward a further degree as well as taking recommended courses such as ALH 101 Anatomy and Physiology Review and SPAN 20 A-Z. Employers who are on the RT Advisory Committee state that new graduates with Spanish speaking ability are more likely to be hired than those who do not.

The radiologic technology department, under direction of the ALH Director, collaborates with all the ALH departments and the Student Health Services (SHS) department to assure students are prepared for placement into clinical education in compliance with affiliate contract agreements and CDC regulations. Preparation includes health assessment specific to essential standards for a radiologic technology student, immunizations and/or titers, two tier TB testing, background checks and drug screening. Program student orientation is coordinated with the SHS department through the Clinical Compliance Coordinator.

Various student support services are presented at the student program orientation and representatives from each area present their service area to each new cohort of students. The campus areas represented at orientation are: Admissions and Records, Bookstore, Counseling, Financial Aid and Scholarships, and Library Services. A representative of Library Services and the designated RT counselor also sit on the RT Advisory Committee.

**Advisory Committee**
The RT advisory committee membership is structured to be diverse and representative of the profession and the community. Meeting twice a year, the advisory committee offers guidance and support to the campus faculty and the program advises its stakeholders of programmatic changes and future implications. Members include program officials, faculty, hospital/clinic department managers, physicians, a clinical instructor representative, 1st and 2nd year student representatives, industry equipment suppliers, a radiation physicist, college administrators and community members. This diverse collective not only supports the decision making process for curriculum development, but also takes action to provide resources. It is truly a working committee.
A sub-committee of the advisory committee oversees funding for all elective programs (mammography, fluoroscopy and MRI) as well as specific courses in sectional anatomy and preparation for the state and national board examinations. Members of the sub-committee also assist in fund raising for maintenance of the RT laboratory and an emergency fund for at risk RT students. Planning and development of the RT laboratory housed in the new Allied Health building, was guided in large part by members and referrals of the RT Advisory Committee. The RT laboratory is a true testament to the RT community effort. The program appropriately values and is responsive to committee guidance and feedback. Meetings are lively and well attended.

**Employment**

Many graduates obtain employment at one of our local affiliates: Dominican Santa Cruz Hospital, Radiology Medical Group, Palo Alto Medical Foundation, Sutter Maternity and Surgery Center, Community Hospital of the Monterey Peninsula, Hartnell Professional Center, Community Imaging Center, Natividad Medical Center, Salinas Valley Memorial Hospital, Watsonville Community Hospital, Kaiser Permanente or St. Louise Regional Hospital. The program receives and informs prospective graduates of job announcements posted by hospitals and clinics nationwide.

Each spring semester students attend field trips arranged by the RT program director and the senior HR specialist at Stanford University Hospital, Lucille Packard Children’s Hospital, Acuson Seimens Corporation and other facilities. These activities have proven successful in motivating students to apply for and attain employment outside our immediate region. For the past five years, the program has met the bench mark of 75% of graduates employed six months post graduation, except for the year 2010.

<table>
<thead>
<tr>
<th># GRADUATES</th>
<th>% EMPLOYED</th>
<th>BENCHMARK MET?</th>
</tr>
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<tbody>
<tr>
<td>2011</td>
<td>17</td>
<td>77%</td>
</tr>
<tr>
<td>2010</td>
<td>17</td>
<td>66%</td>
</tr>
<tr>
<td>2009</td>
<td>16</td>
<td>75%</td>
</tr>
<tr>
<td>2008</td>
<td>20</td>
<td>90%</td>
</tr>
<tr>
<td>2007</td>
<td>21</td>
<td>95%</td>
</tr>
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There is currently a projected shortage of diagnostic imaging professionals and the shortage through 2016 according to the 2010-2011 statistics recorded by the U.S. Department of Labor. The mean hourly wage for Radiologic technologists in our area is $34.00/hr and $71,000.00 annual mean wage.

**Clinical Instructor Meetings**

Regular clinical instructor meetings are held at the beginning and at the completion of each semester. Policies, procedures, results of student evaluations and the program assessment plan are systematically reviewed and revised. Clinical instructors take an active role in maintaining consistency in clinical education process and evaluation. Essential functions of the program are required at each clinical affiliation. The job category of clinical instructor is defined by JRCERT accreditation Standards and CDPH-RHB regulations and required at each of the ten clinical affiliates.
Articulation Agreement
In 1994 Cabrillo College and California State University Northridge (CSUN) developed and signed an articulation agreement. This articulation agreement has been maintained to the current time. CSUN is the only State University offering a B.S. degree in Radiologic Technology. All core program courses transfer to CSUN.

Collaboration
The program director supports inter-programmatic collaboration by participating in the following activities and organizations: frequent attendance of Radiologic Technology Certification Committee (RTCC) meetings (the RTCC is part of the regulatory process for the CDPH-RHB), member of ASRT, RTEC, AERS, Advisory Committee Member, American Cancer Society Santa Cruz Region, and the University of St. Francis, Department of Training and Development.

Costs
The radiologic technology program is efficient not only when program load is compared with the average for the college, but also when it is compared to other CTE programs within the college. In a comparison of RT with CTE, RT is efficient in the overall load because of the number of clinical courses for which teaching units are reassigned as clinical coordination. Fluctuations in FTES are attributable to running elective programs: Mammography, Sectional Anatomy, and Magnetic Resonance Imaging (MRI).

Table A compares Radiologic Technology with overall College and CTE Programs

Table A

Radiologic Technology - Program Expenditures

<table>
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<tr>
<th>Academic Year</th>
<th>Program</th>
<th>College</th>
<th>Percent of Income</th>
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</thead>
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<tr>
<td>2006/07</td>
<td>112.2</td>
<td>11,036.3</td>
<td>1.017%</td>
</tr>
<tr>
<td>2007/08</td>
<td>98.6</td>
<td>11,736.2</td>
<td>0.840%</td>
</tr>
<tr>
<td>2008/09</td>
<td>90.4</td>
<td>12,993.1</td>
<td>0.696%</td>
</tr>
<tr>
<td>2009/10</td>
<td>93.3</td>
<td>12,307.0</td>
<td>0.758%</td>
</tr>
<tr>
<td>2010/11</td>
<td>82.0</td>
<td>11,491.6</td>
<td>0.713%</td>
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<tr>
<th>Academic Year</th>
<th>Program</th>
<th>College</th>
<th>Percent of Expense</th>
<th>Income Expense Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/07</td>
<td>$194,816</td>
<td>$26,804,852</td>
<td>0.727%</td>
<td>1.40</td>
</tr>
<tr>
<td>2007/08</td>
<td>$208,197</td>
<td>$28,942,536</td>
<td>0.719%</td>
<td>1.17</td>
</tr>
<tr>
<td>2008/09</td>
<td>$214,970</td>
<td>$28,576,256</td>
<td>0.752%</td>
<td>0.92</td>
</tr>
<tr>
<td>2009/10</td>
<td>$214,247</td>
<td>$26,987,796</td>
<td>0.794%</td>
<td>0.96</td>
</tr>
<tr>
<td>2010/11</td>
<td>$199,290</td>
<td>$26,689,764</td>
<td>0.747%</td>
<td>0.96</td>
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Similar RT programs across the state average less efficient because most have 3 FTEF assigned to teaching and administrative duties (program director and clinical coordinator). Both clinical and laboratory courses must be staffed in compliance with state and other outside accrediting agencies that mandate student/faculty ratios. The state requires an 8:1 student/faculty ratio in the laboratory setting. JRCERT requires one full-time equivalent ARRT licensed technologist per each first year student assigned to clinical education as well as a designated clinical instructor. The JRCERT requires one fulltime program director and one fulltime clinical coordinator. Staffing of clinical education sites has changed significantly as the result of managed care and restructuring of health organizations. It is becoming increasingly challenging to make student assignments to facilities where students will be properly supervised and maintain patient safety. Some affiliates are currently not being utilized for placing students into clinical education by the program because of insufficient number of staff technologists and qualified clinical instructors.

Cost data when compared to FTES indicates the RT program costs less than it generates in income as it did in the previous reporting cycle. Costs averaged approximately 0.75% of the overall cost of the college while FTES generated by the program averaged 0.80% for the 2006 to 2011 reporting period. It is extraordinary and unusual when a small specialized program pays for itself, and it is exceptional that the RT program produces income for the college.

Table B compares the Program Load Factor to the college Load Factor.
Table B

RT Program

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>FTES</th>
<th>WSCH</th>
<th>FTEF</th>
<th>WSCH/FTEF = Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td>2006/07</td>
<td>47.6</td>
<td>42.5</td>
<td>1,474.8</td>
<td>1,314.2</td>
</tr>
<tr>
<td>2007/08</td>
<td>42.3</td>
<td>35.9</td>
<td>1,313.0</td>
<td>1,111.4</td>
</tr>
<tr>
<td>2008/09</td>
<td>37.4</td>
<td>34.4</td>
<td>1,161.7</td>
<td>1,065.3</td>
</tr>
<tr>
<td>2009/10</td>
<td>43.4</td>
<td>29.5</td>
<td>1,347.9</td>
<td>1,016.2</td>
</tr>
<tr>
<td>2010/11</td>
<td>37.2</td>
<td>26.6</td>
<td>1,192.3</td>
<td>970.6</td>
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Source: Datatel XFAS report [Faculty Assignment Sheets.]

College

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>FTES</th>
<th>WSCH</th>
<th>FTEF</th>
<th>WSCH/FTEF = Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td>2006/07</td>
<td>5,068.5</td>
<td>4,927.0</td>
<td>157,687.2</td>
<td>153,261.4</td>
</tr>
<tr>
<td>2007/08</td>
<td>5,405.1</td>
<td>5,248.1</td>
<td>168,320.7</td>
<td>163,414.1</td>
</tr>
<tr>
<td>2008/09</td>
<td>6,088.1</td>
<td>5,901.3</td>
<td>189,534.5</td>
<td>183,474.9</td>
</tr>
<tr>
<td>2009/10</td>
<td>5,978.4</td>
<td>5,666.0</td>
<td>186,017.0</td>
<td>177,199.9</td>
</tr>
<tr>
<td>2010/11</td>
<td>5,569.6</td>
<td>5,446.5</td>
<td>175,542.6</td>
<td>172,307.4</td>
</tr>
</tbody>
</table>

Source: Datatel XFAS report [Faculty Assignment Sheets.]

Cost data does not provide an accurate view of the program because it only accounts for semester totals. The radiologic technology program enrolls students during the winter session as well as an 11 week summer session. Student units not included for RT= 10.5 Also not factored are the program director and clinical coordinator non-instructional units that occur during the wintersession and summer sessions, but are not recognized by the faculty contract or in the occurrence of MRI clinical coordination are not remunerated by the college.

Recruitment strategies, both internal processes by the RT department and external processes by various partnerships with the health care industry have been successful. The RT program has maintained a waitlist of approximately 500 qualified applicants for the past five years. The average wait time is 5 years at the current time. A projected shortage of workers across the nation continues to drive salaries up, and all RT programs are currently experiencing an abundance of qualified applicants for a limited number of available student clinical placements. Program efficiency could be improved by adding clinical sites.

Teaching radiographic positioning skills and proper selection of radiographic technique is ultimately related to patient radiation dose and patient /public safety. It is imperative that students learn in a safe environment which is most like the environment in which they will be delivering ionizing radiation to real patients. The RT laboratory prepares students to be competent and safe in the clinical setting. Continual updating, upgrade and maintenance of the newly acquired digital radiographic equipment is essential. The program must maintain its
quality of technology based instruction, if it is to remain competitive in the industry of diagnostic imaging. In student surveys (current, graduate, and alumni), credit for their success if given to the instructors, student clinical experience, and the program reputation in the community. Retention and success rely heavily on the laboratory component of the program. Technologically relevant equipment in our RT laboratory has become a program marketing tool, as adjacent programs will also start to obtain digital radiographic equipment.

A consistent supply of RT graduates trained on technologically relevant equipment assures the integrity of local health care delivery. RT’s who have graduated from Cabrillo College contribute to the stability of the health care work force, deliver consistent high quality care, and as employees, RT’s are tax payers. The RT program is a significant economic multiplier for Santa Cruz, Monterey and San Benito counties.

**Program Assessment and Student Learning Outcomes**
The program implemented an ongoing program assessment plan (Appendix A) in 2000, which has been revised several times to be compliant with the JRCERT Standards and Objectives that also evolve over time. The current form of the Program Assessment Plan measures program goals:

- *Students will demonstrate good patient communication.*
- *Students will be clinically competent.*
- *Students will participate in professional development/growth.*
- *Students will demonstrate problem solving and critical thinking skills.*
- *Graduates will be employed and effective in the community.*

Each goal has two to five outcomes. Most outcomes are measured by two tools. The tools are instruments used in didactic, laboratory and clinical education to assure results are tabulated across all learning domains to be consistent with the affective domain. Benchmarks are set relative to each tool and are adjusted periodically to encourage program changes to improve quality. Any benchmark not met, is discussed at faculty and/or the advisory committee meetings and the minutes detail action or follow-up. Data is collected and analyzed each semester and instructional methods are changed, or new methods are implemented as appropriate to program outcomes.

The program assessment process is reviewed biannually by the program director and faculty at the fall faculty meeting of even numbered years to identify trends, recommend action(s) and adjust benchmarks (Appendix B, Meeting Minutes). The plan changes as the director and faculty realize opportunities to improve student learning. Actions the program committed to as the result of assessment in 2011 are:

- Since writing skills are taught and assessed in pre-requisite courses, the program director will continue to work with the English department to improve skills. The requirement was changed in 2009 from English 100 to English 1A, a higher level of English. For data collection purposes, instructors responsible will submit data from the content portion only, not that portion that evaluates the writing skills. Student assignments will be made 3 weeks in advance, so students may take advantage of the writing skills laboratory offered at the Learning Center.
- the program will purchase and implement interactive positioning modules for contrast procedures fall 2011. The textbook and workbook supporting contrast procedures will be updated fall 2011
- revision of Alumni Survey
- Hold an annual "RT Open House" to better inform those on the RT wait list as to the rigor of the profession.
- Adjust Completion Rate to 76% for classes of 2011 and 2012

Employer surveys, alumni surveys, examination pass rates, and job placement rates indicate the program continues to be well respected and positioned within the community, state, and nation to prepare highly competent and qualified diagnostic imaging professionals for practice.

Student Learning Outcomes (SLO's) have been measured, assessed and analyzed for all program courses for the calendar year 2012. Assessment tools were evaluation summaries, clinical competency performance evaluations, laboratory skills competency tests and final exams, dependant on whether the course being assessed was didactic, laboratory or clinical education. Changes to improve courses as the result of course assessment are:
- more time on physics review in RT83
- a graded student assignment on radiographic density relative to various pathologies in RT51
- re-write SLO's for RT71 as some were not relative to course objectives (done)
- increase pediatric exam/procedure specifics in RT71
- emphasize dose reduction in all courses
- use more visual aids to demonstrate physics concepts in RT60

**Student Success**

Learner outcomes in radiologic technology are closely aligned with the skills and competencies required to practice successfully in a variety of clinical settings. Didactic course content, laboratory skills, and clinical education are taught using strategies that require critical thinking, communication, develop the student’s problem solving ability and desire to participate in professional development activities.

The ultimate measure of success is that Cabrillo graduates from the radiologic technology program are in demand by employers and maintain their employment at a level of excellence satisfying to both employer and employee. Employer and graduate surveys are distributed and the results render findings that support this conclusion. The RT program also receives feedback from the Advisory Committee that employers are not only satisfied with program graduates, but are actively involved as a working committee to assist in program development and growth. Some Advisory Committee members are Cabrillo RT program graduates who are now diagnostic imaging administrators at local health care facilities.

Student success measures include retention, successful completion of required courses, and passing both state (CRT) and national (ARRT) licensing examinations. According to the state of California Department of Public Health - Radiation Health Branch exam results reports, pass rates of Cabrillo graduates have been 100% for the years 2007-2011. Cabrillo graduates score far above the national mean percentile on the ARRT exam in all five categories of the exam. The graduating Class of 2011 scored a 89.1% mean percentile.
Each Fall 23 students may be admitted to the radiologic technology program. RT is much higher in success and retention than the college average, primarily because students are prepared by prerequisite requirements and early intervention by faculty for students who demonstrate academically risky performance or behavior.

Table C, provides specific statistics.

### Table C

<table>
<thead>
<tr>
<th>Radiologic Technology</th>
<th>Course Enrollment</th>
<th>Dept. Majors</th>
<th>Course Success</th>
<th>Course Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Year</td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td>2006/07</td>
<td>341</td>
<td>238</td>
<td>196</td>
<td>189</td>
</tr>
<tr>
<td>2007/08</td>
<td>296</td>
<td>193</td>
<td>219</td>
<td>200</td>
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<tr>
<td>2008/09</td>
<td>251</td>
<td>206</td>
<td>233</td>
<td>240</td>
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<tr>
<td>2009/10</td>
<td>296</td>
<td>179</td>
<td>216</td>
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<tr>
<td>2010/11</td>
<td>274</td>
<td>168</td>
<td>260</td>
<td>265</td>
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</table>

<table>
<thead>
<tr>
<th>College Totals</th>
<th>Course Enrollment</th>
<th>Dept. Majors</th>
<th>Course Success</th>
<th>Course Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Year</td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td>2006/07</td>
<td>48,151</td>
<td>47,024</td>
<td>7,531</td>
<td>7,954</td>
</tr>
<tr>
<td>2007/08</td>
<td>51,362</td>
<td>51,727</td>
<td>8,425</td>
<td>8,572</td>
</tr>
<tr>
<td>2008/09</td>
<td>55,923</td>
<td>51,634</td>
<td>8,948</td>
<td>8,677</td>
</tr>
<tr>
<td>2009/10</td>
<td>52,836</td>
<td>49,920</td>
<td>8,726</td>
<td>8,446</td>
</tr>
<tr>
<td>2010/11</td>
<td>49,730</td>
<td>48,438</td>
<td>9,278</td>
<td>9,428</td>
</tr>
</tbody>
</table>

Student retention strategies are implemented in the radiologic technology program. Students receive information on student services at program orientation. Potential obstacles to student success are identified by faculty early, and students are counseled and referred to the appropriate college services. Program graduates are solicited for hire as tutors (supported by VTEA funds) and second year students mentor first year students. Peer tutoring is established through the RT Club. Full-time faculty, adjunct faculty and counselors provide individual assistance to at-risk students when possible.

**Results of Student Survey**
Interesting facts about Cabrillo radiologic technology students were revealed in the survey completed by 32 RT students. Students in the Cabrillo Radiologic Technology program have
achieved various levels of education prior to program entrance. Significant to note, is the high percentage who already have an A.S. degree or higher (46.9%). This is an upward trend, perhaps a result of the long wait list, approximately 3-4 years at the time of this survey. Our students are mostly female (69.0%) and males comprise 31.0% of the classes attending in 2010. The trend that we have attracted more male students to the diagnostic imaging professions continues to advance. The age range of this group is distributed over a broad range from over 21 to over 40, the largest group being between 26 and 30 years old. These facts have implications for meeting workforce needs in terms of productive workforce years. It suggests that the Radiologic Technology program has supported midlife career changes and local unemployment for community members. In addition, it highlights the need to recruit future health care providers through our outreach programs who will potentially spend increased years in the diagnostic imaging health care professions.

When our students were asked if they would recommend the program to others, 100% of them said that they would. The significance of this 100% response is that it shows the students are engaged in learning, are part of a professional learning community in which they experience shared governance. Faculty and program officials welcome constructive criticism and constantly make changes to improve the program through the ongoing Program Assessment Plan process.

Most radiologic technology students study between 4-9 hours per week. This is less than recommended by faculty and curriculum to be successful in the program. It is thought that the time spent is heavily influenced by socioeconomic issues of adult learners. Despite the low hours of reported study time, students (68.8%) reported that the overall workload assigned to students was appropriate.

The majority of students report that the classroom and laboratory facilities are excellent. Approximately, half of the respondents had experiences in the old laboratory facilities, which adds credibility to their statements. Even the new first year students make comment on how dedicated the program faculty have been to "procure very nice new equipment". The current and future challenge for the College, is maintaining and updating the laboratory equipment, due to its highly technical, sensitive and expensive components.

Several themes arise out of the open-ended questions and written comments. Students felt the radiologic technology faculty are the major strengths because they are experienced, knowledgeable, supportive, and provide personal attention to students. At times, the faculty were criticized for starting class late. This has been remedied by changing scheduled class times to accommodate various outside work schedules of instructors. They also state that the program prepares them well for the national registry examination and the state examinations and has a wonderful reputation in the community, State and nation.

The students commented on areas needing improvement. One resounding theme is the negative impact on students resulting from the long wait list. Students recommend refresher courses and occupational education prior to program entrance, so students do not withdraw after program entrance. Since this survey was taken, ALH 101 Anatomy Review, has been offered and students receive strong advisement to take this course the summer prior to the start of the
program. A mandatory RT Information Meeting each November has been implemented for students accepted to start the program as well as for students identified as alternates.

Other student input from the survey include there could be better communication through the orientation process and a recommendation to integrate more with the Nursing program. Students request more sections of lab, so they can have more hands-on experience and access to applied learning in our beautiful state-of-the-art laboratory. Images projected in the classroom setting are hard to see. The projector needs to be updated to one with a higher resolution and have a DICOM feature to show radiographic image quality. DICOM (Digital Imaging and Communications in Medicine) is a standard for handling, storing, printing, and transmitting information in medical imaging.

**Curriculum (Appendix E)**
The Radiologic Technology Program revised and analyzed each course individually and the program as a whole, revised student learning outcomes for each course and took all courses and the model program through the curriculum process. Requisites and pre-requisites for each course were reviewed. See Curricunet for current curriculum, requisite and model program overview.

The radiologic technology curriculum is designed to meet the JRCERT requirements which are the ASRT recommended curriculum. The curriculum was re-designed to include California State regulations which require 20 hours of instruction as well as the new ASRT recommendations on digital radiography. The department has integrated this instruction throughout the core program.

Learning throughout the program is progressive. Consistency is maintained from lecture to laboratory learning to clinical education by a correlated curriculum and relative evaluation processes. Multiple instructors teaching the same laboratory course in different sections follow the same syllabus and grading criteria. Laboratory syllabi are designed by the instructors who teach the correlated didactic courses. Didactic learning is then reinforced by activity in a mock patient situation that directly simulates hospital/clinic imaging procedures. Next, the clinical education is designed to reinforce the laboratory learning by requiring clinical competencies subsequent to mastering laboratory skills.

The addition of an on-campus fully digital, radiographic and fluoroscopic energized laboratory first utilized fall 2010 has positively affected program recruitment and graduate board examination scores in the area of equipment and procedures. Instructors can better teach to the affective domain using equipment that functions well and contains highly technical patient dose saving features. Students now have the opportunity to conduct laboratory experiments in a safe environment, utilizing techniques that are replicated in the clinical setting. The laboratory needs to be continually updated with current technology and maintained in order for the program to continue to realize positive student retention, employer/patient satisfaction and recruitment statistics.

**External Data Research**
The following findings are from the Career One Stop Pathways web site accessed on 2-10-13 for Radiologic Technologists. Information was obtained from Radiologic Technologists and
technicians, and includes magnetic resonance imaging technologists, but not diagnostic medical sonographers.

National wage, employment and projected growth statistics are as follows:
Median wage (2011) was $26.50 hourly and $55,120 annually.
Employment (2010) 220,000 employees
Projected Growth (2010-2020) faster than average (20%-28%)
Projected Job Openings (2010-2020) 95,100

California State wage, employment and projected growth statistics are as follows:
Median wage (2011) $32.94 hourly and $68,500 annually
Projected Growth (2008-2018) 21%

Wage and Salary Survey report conducted by the American Society of Radiologic Technologists of nearly 10,000 radiologic technologists show statistics for 2011 as follows:
Average annual compensation is $71,258, an increase of 15.1 percent over 2007’s average of $58,673.
This compares to the 19 percent increase in average annual compensation from 2001 to 2004.
California had the highest annual compensation at $75,873, followed by Massachusetts at $71,574, Washington, D.C., at $68,585, Connecticut at $66,471 and Oregon at $66,152.
The nation’s lowest base annual compensation was in West Virginia with an average annual compensation of $45,627, followed by South Dakota at $48,902, Alabama at $49,131, Arkansas at $50,244 and North Dakota at $50,601.

II. NEW DIRECTIONS

The Cabrillo College Radiologic Technology program is experiencing in unprecedented change both regionally and professionally. The major agencies that set standards for education in radiologic technology, the JRCERT and the CDPH-RHB, continually mandate changes to curriculum and the reporting of program effectiveness. The RT faculty and program officials understand and embrace this process. It has taken twenty years of participation in both national and state agencies to bring what previously were disparaging regulations into what now are considered congruent. The program goals are consistent with both national and State standards and educational regulations. The American Society of Radiologic Technology (ASRT) has clearly defined education curriculum and relative scopes of practice for educational levels along a career path from Limited Permit X-ray Technicians, to PhD. The need to constantly backfill entry level diagnostic imaging jobs as workers train up this career ladder into more advanced imaging modalities is well documented. Currently, the RT department has the potential to offer some advanced level training, but not all rungs of the ladder are in place. Once the core training and licensure is attained for RT, the career ladder is as follows: Mammography → CT → MRI. The RT department currently has Mammography and MRI programs. What is missing and what our clinical partners have requested is development of a CT program as well as continued offerings of Mammography annually and MRI on an as needed basis.

A priority is to provide training that simulates the real hospital/clinic environment as closely and as safely as possible in the laboratory environment. A major factor in meeting this goal is the
ratio of student to laboratory instructor. The RT department needs to accomplish a safe student/instructor ratio of 8:1 as specified by state regulations. Another major factor is to sustain the RT laboratory by maintaining all laboratory equipment, paying biannual registration fees, upgrading radiographic/fluoroscopic equipment commensurate to that experienced in the clinical setting. All of our clinical affiliates have transitioned from analog film imaging to digital CR and/or DR imaging systems. Although we now have the digital equipment, we now must develop a business plan for the provision of ongoing maintenance, upgrades to software and technology. The RT department recommends that the College investigate partnering with other colleges in the State who also have radiology equipment maintenance needs, for the purpose of contributing to a common fund that can be drawn upon on an "as need basis". Business models for this type of plan, exist at some of our affiliate hospitals and clinics, specifically Sutter and CHS, as reported to the RT Advisory Committee on 10-16-12.

The RT program officers and faculty are in the process of changing curriculum based on program assessment, SLO assessments and the recent change to the Cabrillo College Academic Calendar. Wintersession clinical courses will be deleted and in their place, the program will use the units to develop an Image Assessment laboratory course and a course, Medical Legal Aspects of Radiologic Technology.

The RT department has the goal to keep up with cutting-edge technology in the classroom and clinical education by improving, instructional delivery systems and program efficiency. Transition to mobile technology for students and instructors to access learning materials, track student clinical education objectives and have direct access to student competency records, evaluation tools and data collection will not only inspire students to learn, but also motivate instructors to teach to a new level of expertise.

Finally, the RT program has experienced a statistically significant increase in the number of students who are unsuccessful in the first semester of the program. In the previous reporting period (2007), when students failed academically, the course they did not pass was RT52, Radiation Physics and there were fewer failures. Currently, for this reporting period, the trend is that students are failing the RT51 Radiographic Positioning course, and the number has increased beyond the national average for program attrition. A tertiary assumption is that this is due to the long wait list, affecting the student's knowledge and ability to recall the content of the prerequisite courses Bio 4 and Bio 5, Anatomy and Physiology. along with the assistance of the Dean of Economic and Community development, the ALH department is undertaking a research project, the outcomes of which may drive adoption of a different selection process.

This instructional plan is closely integrated with the College Master Plan, facilities Master Plan and the College Technology Plan. The RT program mission statement and goals are aligned with those of Cabrillo College as stated in the RT Student Policy Handbook. The RT classroom, laboratory, image assessment area, storage space and faculty/staff offices housed in our new Health and Wellness building, were carefully planned, consistent with the facilities Master Plan. New projectors for ALH classrooms are on order, capable of displaying medical images and it is planned to incorporate mobile technology amongst students and faculty to align the RT program with the college Technology Plan.
III. PROGRAM GOALS AND RECOMMENDATIONS

1. Support students to reach program outcomes and be prepared to meet competencies for entry level into radiologic technology practice by maintaining quality and consistency of instruction by hiring full time faculty to replace all retirements and vacancies. The RT department needs to assure adequate staffing in academic, laboratory and clinical education areas. The goal is to maintain two full time contract faculty for each semester/session that students are enrolled in the program.

   A) When the current program officials retire or the program director or clinical coordinator position becomes vacant, replace 1.0 contract faculty as necessary when notice of retirement/vacancy is received as per CCFT contract or position becomes available.
       Cost: $40,000 as per CCFT contract (Maintenance of programs).

   B) Outreach within RT organizations and through program stakeholders (advisory committee and affiliate hospitals/clinics) to prepare the local labor force to fill CC and PD positions. There is an immediate need to encourage adjunct and clinical instructors to attain B.S. and M.S. degrees.
       Cost: None (Maintenance of programs)

   C) Continue to offer the Emerging Educator special modality clinical assignment in the spring semester second year of the program, where students develop teaching skills in RT61L laboratory
       Cost: None. (Maintenance of programs)

2. Support students to reach program outcomes in a safe an effective learning environment. Students are learning skills such as venipuncture where students insert angiocatheters conduct experiments on phantoms to measure radiation dose and position each other for simulated radiographic procedures. The activities in RT laboratory courses present safety issues when there are too many students per laboratory section, or the staff to student ratio is unbalanced. The current student/faculty ratio of 12:1 needs to be reduced to 8:1 to comply with California Code of Regulations, Title 17 requirements.

   A) Add 1 laboratory section to RT50L, RT51L, RT61L, RT70L, and RT71L.
       Cost: 9.44 TU = $16,500.00

   B) Add 1 TU Adjunct Faculty assignment for RT175, Advanced Patient Care: Venipuncture
       Cost: $1,735.00

3. Increase student learning maintaining all laboratory equipment and upgrading radiographic equipment commensurate to that experienced in the clinical setting. All of our clinical affiliates have transitioned from analog film imaging to digital CR and/or DR imaging systems. The students need a learning environment where they can safely operate equipment and produce radiographic images using ALARA principles as they relate to the new DICOM standards without jeopardizing patients.

   A) Ongoing maintenance and repair of laboratory equipment calculated at 10% of original cost per year.
       Cost: $10,000.00 annually (Maintenance of programs)

   B) Purchase of a new mobile C-Arm to replace the C-arm currently owned. The current C-arm has outdated technology and does not support the RT curriculum (RT70, RT70L).
       Cost: $100,000 one time (Maintenance of programs)
4. Improve student success by providing additional education support services in the lab through development of a new open laboratory course, RT109, RT Skills Practice Laboratory and provide instructional support for set up, break down, and inventory of supplies. Recognizing that academic and clinical education failure are reasons that RT students withdraw from the program, the following additions are recommended:
   A) Develop and implement RT109, RT Skills Practice Laboratory, scheduled Fridays, 11:00-12:30 p.m., fall and spring semester.
      Cost: $4,000.00 (Maintenance of programs, Innovative Scheduling and Delivery)
      2.25 TU annual cost

5. Improve program and student support by increasing the RT program specialist position from 50% to 100%. The task inventory for the RT program specialist has increased significantly to date with the addition of increased reporting mandates and data collection by the College and outside agencies. Analysis and reflection on this task inventory indicate it is reasonable to anticipate increased workload in the future.
   A) Increase PS position to 100%
      Cost: $30,000.00 on-going expense (Program Maintenance)

6. Continue to supply stakeholders with multi-skilled and multi-competent graduates by offering quality elective courses, whereby affording graduates the opportunity to be more competitive in the job market.
   A) Initiate a hybrid CT program with lecture and laboratory courses specific to computerized tomography. Course content and objectives to meet the qualifications for application to the CT ARRT examination.
      Cost: $3,000.00 one time curriculum development (Growth and development)
      $10,000 for a CT phantom - one time cost
      $3,470.00 (2 tu annually)
   B) Shift funding for the Mammography program from outside funding to the general fund, thus providing outside funding resources to grow other programs like CT indicated as a need in results of employer surveys and recommended by advisory committee.
      Cost: 5.25 TU = $10,000.00

7. Reactivate the LPXT program contingent on needs assessment to generate FTES.
   A) Re-apply to the CDPH-RHB
      Cost: $3,000.00 (1 tu for application preparation, State fee)
   B) Integrate 20 hours of digital radiography instruction into the current curriculum.
      Cost: 0.5 TU = $900.00
   C) Instruction (20.17 TU), dosimetry, mileage, and PD/CC.
      Cost: $37,500.00

8. Keep up with cutting-edge technology in the classroom and clinical education by improving, instructional delivery systems and program efficiency. Transition to mobile technology for students and instructors to access learning materials, track student clinical education objectives and have direct access to student competency records, evaluation tools and data collection.
   A) Purchase iPad2 notebooks for each student, clinical instructor and program faculty.
      Cost: $42,000 (45 students, 10 CI's, 5 faculty = 60 iPad2s @ $700 each)
B) Purchase of radiology apps to be pre-loaded onto iPads for RT clinical education and viewing of medical images
   Cost: $3,000.00
C) Insurance/Warranty for each iPad device
   Cost: $3,000.00

**Funding Sources**
The creation of the new Health and Wellness Center provides a challenging opportunity to develop outside funding sources. The Cabrillo College Foundation has an impressive record of fundraising and has organized campaigns to identify community resources and solicit financial support for the RT laboratory project, including a “naming opportunity” whereby donors could name the classroom, two energized CR/DR laboratories or the non-energized workstation area. We still have one area left to name.

The Regional Health Occupations Resource Center (RHORC) provides a bridge to grant opportunities from the California State Chancellor’s Office. The RHORC is a valuable funding resource for needed updates of the current RT laboratory.

The program has sought and successfully funded on a perpetual basis, the MRI program, Mammography program, sectional anatomy courses, a preparatory course for the state and national boards, laboratory maintenance and repair, graduation pinning ceremony expenses, and a student emergency fund from donations from program affiliations since 2000. These funds have largely been expended. Until the increasing shortage of technologists is fully realized, the willingness of hospitals and other health care providers to supply program funds will remain diminished. Our affiliate hospitals/clinics have little discretionary funding for education and will be burdened in the future to find ways to provide federally mandated care for more patients.

State instructional equipment funding becomes available annually from the Chancellors Office. The RT department submits funding proposals annually that enter the prioritization process for the College. This is a valuable resource for instructional materials and laboratory equipment.

Grants have been applied for by program faculty and have been funded. Potential major contributors are California Wellness Foundation, California Hospital Association, PEW commission, American Cancer Society and Susan B. Komen. Through investigating funding sources, it became apparent there are untapped resources in the State for the purpose of education of diagnostic imaging technologists.

It was suggested at a recent RT Advisory Committee, that since local funding has been difficult to attain, that we consider uniting with other colleges, who also have digital radiographic facilities with expensive maintenance needs and develop a perpetual funding source. Each participating college would contribute periodically to the fund and funds would be dispersed on an "as needed" basis. Projected maintenance for hospital grade equipment in an educational facility, while likely to be considerably less than that for a 24 hour use hospital facility, it is still costly, due to the nature of the electronic components.
### Appendix A

**PROGRAM ASSESSMENT PLAN**

**Class of 2011**

**Goal #1:** Students will demonstrate good patient communication.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measurement Tool</th>
<th>Benchmark</th>
<th>Time Frame</th>
<th>Person Responsible</th>
<th>Results</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication Skills</strong></td>
<td>1. Students will communicate properly while performing radiographic procedures.</td>
<td>≥ 80%</td>
<td>1st semester</td>
<td>Laboratory Instructor</td>
<td>99%</td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>2. Final CE Performance Evaluation (2nd Fall) – III, IV, V, VII, VIII</td>
<td>≥ 85%</td>
<td>2nd fall semester</td>
<td>Clinical Coordinator</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>3. RT61L Skills Competency Test – Cross-table Lateral C-spine – #1,2+18</td>
<td>≥ 90%</td>
<td>1st spring semester</td>
<td>Laboratory instructor</td>
<td>98%</td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>4. RT71 Pediatric Communication Writing Assignment</td>
<td>≥90%</td>
<td>2nd fall semester</td>
<td>Didactic instructor</td>
<td>82%</td>
<td>Not met</td>
</tr>
</tbody>
</table>

Notes: Analysis of data submitted from measurement tool #4 indicates students lost point on the assignment for writing skills, not for demonstrating knowledge of the required content. It is suggested for next year that only that portion of the grade relative to the content be submitted for the purpose of this analysis, not the writing skills portion of the grade.
### Goal #2: Students will be clinically competent.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measurement Tool</th>
<th>Benchmark</th>
<th>Time Frame</th>
<th>Person Responsible</th>
<th>Results</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Performance and Competence</td>
<td>1. Final CE Performance Evaluation (2nd Fall) – I,II,V,VIII</td>
<td>≥ 85%</td>
<td>2nd fall semester</td>
<td>Clinical Coordinator</td>
<td>100%</td>
<td>Met</td>
</tr>
<tr>
<td>2. RT 61L Skills Competency Test – Cross-table Lateral C-spine -#1,16,17</td>
<td>≥ 90 %</td>
<td>1st spring semester</td>
<td>Laboratory Instructor</td>
<td>100%</td>
<td>Met</td>
<td></td>
</tr>
<tr>
<td>2. Students will use appropriate radiation protection devices.</td>
<td>3. RT62, Test IV, #2-5</td>
<td>≥ 80%</td>
<td>1st spring semester</td>
<td>Didactic Instructor</td>
<td>100%</td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>4. RT51L Skills Competency Test, #11,14+17</td>
<td>≥ 85%</td>
<td>1st fall semester</td>
<td>Laboratory Instructor</td>
<td>99%</td>
<td>Met</td>
</tr>
</tbody>
</table>

**Notes:**
**Goal #3:** *Students will participate in professional development/growth.*

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measurement Tool</th>
<th>Benchmark</th>
<th>Time Frame</th>
<th>Person Responsible</th>
<th>Results</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Professional Development and Growth</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Students will demonstrate participation in professional events.</td>
<td>1. Student attendance and participation at Advisory Committee meeting</td>
<td>≥15%</td>
<td>1st and 2nd Fall Semester</td>
<td>Program Director</td>
<td>72%</td>
<td>Met</td>
</tr>
<tr>
<td>2. Student participation in community service.</td>
<td>2. RT Club Professional Development Attendance/Activity Sheet</td>
<td>≥25 %</td>
<td>May of graduating year</td>
<td>RT Club Secretary report to Program Director</td>
<td>65%</td>
<td>Met</td>
</tr>
<tr>
<td>3. Students will demonstrate professionalism.</td>
<td>3. Final CE Performance Evaluation – III, IV</td>
<td>≥90%</td>
<td>May of graduation year</td>
<td>Clinical Coordinator</td>
<td>100%</td>
<td>Met</td>
</tr>
</tbody>
</table>

**Notes:**
Goal #4: *Students will demonstrate problem solving and critical thinking skills.*

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measurement Tool</th>
<th>Benchmark</th>
<th>Time Frame</th>
<th>Person Responsible</th>
<th>Results</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem Solving and Critical Thinking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Students will modify procedures based on patient condition.</td>
<td>1. RT61 Final Examination, questions #10,13, 16,26 and 55</td>
<td>≥80% cumulative</td>
<td>1st spring semester</td>
<td>Didactic Instructor</td>
<td>80%</td>
<td>Met</td>
</tr>
<tr>
<td>2. Students will demonstrate knowledge of required reporting of suspected elder or child abuse.</td>
<td>2. RT61L Skills Competency Test for Trauma C-spine - #1-5</td>
<td>≥ 85</td>
<td>2nd Fall Semester</td>
<td>Laboratory Instructor</td>
<td>100%</td>
<td>Met</td>
</tr>
<tr>
<td>3. Students will demonstrate knowledge of required reporting of suspected elder or child abuse.</td>
<td>3. RT71 Written Report</td>
<td>≥ 90%</td>
<td>2nd Fall Semester</td>
<td>Didactic Instructor</td>
<td>97%</td>
<td>Met</td>
</tr>
<tr>
<td>4. Students will demonstrate knowledge of required reporting of suspected elder or child abuse.</td>
<td>4. RT71 Quiz</td>
<td>≥ 85%</td>
<td>2nd Fall Semester</td>
<td>Didactic Instructor</td>
<td>99%</td>
<td>Met</td>
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</tbody>
</table>

Notes: Lack of observation and experience with contrast examinations is thought to impact the low scores on selected critical thinking questions for RT61.
Goal #5: *Graduates will be employed and effective in the community.*

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measurement Tool</th>
<th>Benchmark</th>
<th>Time Frame</th>
<th>Person Responsible</th>
<th>Results</th>
<th>Analysis</th>
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<tbody>
<tr>
<td><strong>Program satisfaction of stakeholders</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1. Students will complete the program.</td>
<td>Program Completion Rate</td>
<td>≥ 76%</td>
<td>Fall Semester</td>
<td>Program Director</td>
<td>85%</td>
<td>Met</td>
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<tr>
<td>2. Students will pass the ARRT examination on the first attempt.</td>
<td>ARRT Exam Reports</td>
<td>≥ 85%</td>
<td>Fall Semester</td>
<td>Program Director</td>
<td>100%</td>
<td>Met</td>
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<tr>
<td>3. Graduates seeking employment will find jobs within 6 mo of graduation.</td>
<td>Job Placement Rate</td>
<td>≥ 75%</td>
<td>November</td>
<td>Graduated class rep. report to PD</td>
<td>77%</td>
<td>Met</td>
</tr>
<tr>
<td>4. Graduates will be satisfied with the program.</td>
<td>Graduate Survey items #1-24</td>
<td>Core program (items 1-24) rated ≥ 4 on a scale of 1-6</td>
<td>End of program</td>
<td>Program Director</td>
<td>All items rated 6</td>
<td>Met</td>
</tr>
<tr>
<td>5. Employers are satisfied with graduates from the program.</td>
<td>Employer Survey #1.5</td>
<td>≥ 90% of respondents report satisfaction</td>
<td>Spring Semester</td>
<td>Program Director</td>
<td>100% of respondents highly satisfied</td>
<td>Met</td>
</tr>
</tbody>
</table>

Results are reported as met, exceed or do not meet benchmarks.

Minutes of the respective meetings (faculty, advisory) will detail action and follow-up plans of any Benchmark indicated above as not being met.

This process will be reviewed biannually by the program director and faculty at the Fall faculty meeting of even numbered years to identify trends, recommend action(s) and adjust benchmarks.
Appendix B

Biannual Program Assessment Meeting

4-11-11

MINUTES

Attendance: Ann Smeltzer, Mary Hagler, Leslie Stiff, and Eileen Ness

1. Feedback on student achievement (student learning outcomes)
   • instructors commented on the possible affect of the wait list selection process. Students in the "Class of 2012" waited 4-5 years after completing pre-requisite courses to start the program. The average scores on program didactic course tests has declined.
   • Student learning outcomes that require English writing skills produce low results.
   • learning outcomes for contrast media exams are low.
   • increased attrition, some due to number of students entering the program before they realize the profession is not a fit for them.

2. Strategies for improving program effectiveness
   • implementation of a different selection process is being discussed at the ALH program chair meetings as all programs (Nursing, Dental Hygiene, and Medical Assisting) are considering changing to a more effective selection process.
   • 66% employment for the "Class of 2010" was believed to be a result of the current recession. The local 3-county area labor market projections indicate need for over 250 diagnostic imaging professionals in the next 5 years.

3. Upward or downward trends?
   • increased attrition
     students not familiar with job expectations prior to entering the program
     students not prepared to enter program (compliance, health assessment completed, socioeconomic)
     increase in academic failures
4. Adjustment of benchmarks?
   - Change the benchmark for Program Completion to that of the national average: 24% Attrition = 76% Benchmark = 76%

5. Are tools measuring what we want?
   - The Alumni survey needs to be revised. Asking students to comment on program coursework will not inspire substantive program changes because our curriculum is based on ASRT guidelines, ARRT Test specifications and California Title XVII.
   - Pediatric Writing Assignment and Reporting of Elder and Child Abuse do measure the students' ability to analyze and come to reasonable conclusions.

6. Corrective actions
   - Since writing skills are taught and assessed in pre-requisite courses, the program director will continue to work with the English department to improve SLO's. The requirement was changed in 2009 from English 100 to English 1A, a higher level of English. For data collection purposes, instructors responsible will submit data from the content portion only, not that portion that evaluates the writing skills. Assignment will be made 3 weeks in advance, so students may take advantage of the writing skills laboratory offered at the Learning Center.
   - the program will purchase and implement interactive positioning modules for contrast procedures fall 2011. The textbook and workbook supporting contrast procedures will be updated fall 2011
   - revision of Alumni Survey
   - Hold an annual "RT Open House" to better inform those on the RT wait list as to the rigor of the profession.
   - Adjust Completion Rate to 76% for classes of 2011 and 2012
**Appendix C**

**SLO Instructor Data Sheet**

<table>
<thead>
<tr>
<th>COURSE</th>
<th>DATE</th>
<th>SLO</th>
<th>TOOL</th>
<th>% SUCCESSFUL STUDENTS</th>
<th>SATISFIED OR NOT SATISFIED</th>
<th>IMPROVEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT51</td>
<td>Fall 2011</td>
<td>1. Judge the proper transverse and longitudinal centering criteria for radiography of the chest, abdomen, upper and lower extremities on completed radiographic procedures. 2. Analyze radiographs of the chest, abdomen, upper and lower extremities for proper projection, collimation, marker placement, exposure factors, artifacts, demonstration of appropriate anatomy and overall image quality. 3. Modify exposure factors for the presence of pathology and to lower patient dose. 4. Assess the difference between routine and non-routine radiographic procedures of the chest, abdomen, upper and lower extremities.</td>
<td>FE,#16,46,60 Cumulative Score</td>
<td>86%</td>
<td>S</td>
<td>Students to turn in terminology/exposure assignment for a homework grade.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Analyze radiographs of the chest, abdomen, upper and lower extremities for proper projection, collimation, marker placement, exposure factors, artifacts, demonstration of appropriate anatomy and overall image quality.</td>
<td>FE, #32,74</td>
<td>79%</td>
<td>S</td>
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<tr>
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<td>3. Modify exposure factors for the presence of pathology and to lower patient dose. 4. Assess the difference between routine and non-routine radiographic procedures of the chest, abdomen, upper and lower extremities.</td>
<td>FE 27, 31,58</td>
<td>60%</td>
<td>NS</td>
<td></td>
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<tr>
<td></td>
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<td>1. Demonstrate competency in chest, abdomen, upper and lower extremities radiography on mock patients. 2. Assess proper usage of radiation protection devices for the patient, technologist and ancillary personnel. 3. Solve novel problems related to equipment manipulation and idiosyncracies.</td>
<td>Lab Comp</td>
<td>100%</td>
<td>S</td>
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</tr>
<tr>
<td>RT51L</td>
<td>Fall 2011</td>
<td>1. Demonstrate competency in chest, abdomen, upper and lower extremities radiography on mock patients. 2. Assess proper usage of radiation protection devices for the patient, technologist and ancillary personnel. 3. Solve novel problems related to equipment manipulation and idiosyncracies.</td>
<td>Lab Comp #14</td>
<td>94%</td>
<td>S</td>
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<td></td>
<td>Lab Comp</td>
<td>89%</td>
<td>S</td>
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<tr>
<td>RT71</td>
<td>Spring 2012</td>
<td></td>
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<tr>
<td>4. Instruct mock patients while performing routine and non-routine radiographic procedures of the chest, abdomen, upper and lower extremities. 5. Critique radiographs for overall image quality including positioning criteria and selection of exposure factors.</td>
<td>Calcaneous Lab Comp, #2 90% S</td>
<td></td>
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<tr>
<td></td>
<td>Lab Comp, Final Summary 100% S</td>
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</table>

<table>
<thead>
<tr>
<th>RT71L</th>
<th>Spring 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Critically assess proper positioning of the skull, facial bones, orbits, petromastoids, mandible and temporal mandibular joints. 2. Solve novel problems related to a patient's skull and/or cervical spine injury as well as problems related to previous surgery. 3. Analyze each procedure for proper radiation protection measures. 4. Analyze anatomical structures best visualized on each projection. 5. Evaluate radiographic images for related pathology. 6. Compare and contrast radiographic images for positioning accuracy. 7. Analyze radiographic exam outcomes for the pediatric patient.</td>
<td>Lab Comp 100% S</td>
</tr>
</tbody>
</table>

| FE Class Average | FE #20,69 99% S |
| No Tool | N/A NS |
| FE, #18,24,33 100% S |
| FE, #69 100% S |
| FE, #22,23,24 89% S |
| FE,#87-90 66% NS |

Remove SLO – not pertinent to course objective

Change lecture material to include more procedures
| Course | Spring 2012 | 1. Critically assess proper positioning of the ribs, the entire vertebral column, gastrointestinal tract and biliary system. | FE | 84% | S |
|        |            | 2. Solve novel problems related to patient care when contrast media are utilized. | FE, #13 | 87% | S |
|        |            | 3. Justify procedures that promote safe utilization of equipment in compliance with safety precautions. | FE, #26 | 87% | S |
|        |            | 4. Analyse each procedure for proper radiation protection measures. | FE, #77 | 38% | NS |
|        |            | 5. Analyse anatomical structures best visualized on various | | | |

Students did not know gonadal dose for lat rectum is high.
| RT61L | Spring 2012 | 1. Demonstrate competency in upper and lower gastrointestinal tract, urinary, cholecystogram, vertebral column, ribs, and sternum radiography on mock patients. | FE. #16 | 87% | S |
|       |            | 2. Assess proper usage of radiation protection devices for the patient, technologist and ancillary personnel. | FE. #59 | 99% | S |
|       |            | 3. Solve novel problems related to equipment manipulation and idiosyncracies. | FE. #61 | 92% | S |
|       |            | 4. Instruct mock patients while performing routine and non-routine radiographic procedures of the gastrointestinal tract, urinary system, biliary tract, vertebral column, ribs, and sternum. | FE. #10 | 87% | S |
|       |            | Final Eval Summary | 98% | S |
|       |            | Lab Comp | 98% | S |
|       |            | Lab Comp | 99% | S |
|       |            | Lab Comp | 100% | S |
5. Critique radiographs for overall image quality including positioning criteria and selection of technical factors.

<table>
<thead>
<tr>
<th>RT82</th>
<th>Spring 2012</th>
<th>1. Critically assess proper sectional images of the cranium, abdomen, and spine.</th>
<th>FE, Short Answer</th>
<th>96%</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Critically assess angiograms of the cranium, thorax and abdomen.</td>
<td>FE, #81,82,86</td>
<td>78%</td>
<td>S</td>
</tr>
<tr>
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<td></td>
<td>3. Solve novel problems related to patient pathology and angiographic procedures.</td>
<td>FE #71, 72</td>
<td>99%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Analyze each imaging procedure for anatomical structures best visualized.</td>
<td>FE #26,60,62</td>
<td>84%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Evaluate radiographic images for related pathology.</td>
<td>FE #27</td>
<td>99%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Synthesize two dimensional information into three dimensional imagery.</td>
<td>FE #11</td>
<td>100%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Diagram energy conversion from electronic analog to digital display.</td>
<td>FE, 16-25</td>
<td>89%</td>
<td>S</td>
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<tr>
<td></td>
<td></td>
<td>8. Construct a computer application flow-chart beginning with a photon and ending with a diagnostic image.</td>
<td>FE, 16-25</td>
<td></td>
<td></td>
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<tr>
<td>RT185</td>
<td>Spring 2012</td>
<td><strong>1.</strong> Analyze radiographs of the breast for proper projection, marker placement, exposure factors, artifacts, demonstration of appropriate anatomy and overall image quality.</td>
<td>FE, #16-25</td>
<td>89%</td>
<td>S</td>
</tr>
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<tr>
<td></td>
<td></td>
<td><strong>2.</strong> Critically assess and modify exposure factors for the presence of pathology.</td>
<td>FE, #A31,B55,B67</td>
<td>100%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3.</strong> Anticipate, analyze, and solve positioning challenges caused by patient habitus, physical and/or emotional disabilities, and department limitations.</td>
<td>FE, #B6</td>
<td>100%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>4.</strong> Anticipate, analyze, and solve QA/QC problems with regard to daily, monthly, semi-annual, and annual test requirements.</td>
<td>FE, #B32</td>
<td>100%</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>5.</strong> Critically assess the needs of diagnostic mammography patients versus screening mammography patients and adjust examination protocol accordingly.</td>
<td>FE, #B50,B51,B56</td>
<td>82%</td>
<td>S</td>
</tr>
</tbody>
</table>

Page 32
| RT185L | Spring 2012 | 1. Solve novel positioning problems. | Final Eval Summary | 87% | S |
| RT185L | Spring 2012 | 2. Investigate, assess, and solve QA/QC test procedure issues. | Final Eval Summary | 87% | S |
| RT185L | Spring 2012 | 3. Evaluate the patient, the patient history, and positioning limitations prior to performance of mammography. | Final Eval Summary | 87% | S |
| RT185L | Spring 2012 | 4. Compare and contrast patient films for contrast, density, detail, and positioning. | Final Eval Summary | 87% | S |
| RT185L | Spring 2012 | 5. Anticipate and facilitate physician involvement in patient care. | Final Eval Summary | 87% | S |

| RT185C | Spring 2012 | 1. Independently apply theoretical knowledge and clinical decision making skills while performing both screening and diagnostic mammographic procedures. | Final Eval Summary | 87% | S |
| RT185C | Spring 2012 | 2. Assess patient care concerns and | | | |

FE.#A39,A71 100% S
3. Critically assess patient physical needs, emotional needs, and legal privacy issues prior to, during and post-mammographic examination.

4. Evaluate QA/QC outcomes, investigating and solving current or anticipated problems.

<table>
<thead>
<tr>
<th></th>
<th>Final Eval Summary</th>
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<td>Final Eval Summary</td>
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<td>COURSE</td>
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<td>SLO</td>
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<td>Final, Images</td>
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SLO Instructor Data Sheet

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<th>DATE</th>
<th>SLO</th>
<th>TOOL</th>
<th>% SUCCESSFUL STUDENTS</th>
<th>SATISFIED OR NOT SATISFIED</th>
<th>IMPROVEMENTS</th>
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<tbody>
<tr>
<td>RT52</td>
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<td>Test 1</td>
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<tr>
<td>5</td>
<td>Final: 52 Exam 1: 1 &amp; 2</td>
<td>77% 85%</td>
<td>Yes</td>
<td>Ohm’s Law Inverse Square Law</td>
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<td>Exam 2</td>
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<td>7</td>
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<td>8</td>
<td>Final, 8?</td>
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<td></td>
<td>3</td>
<td>Final</td>
<td>93%</td>
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<td>RT175 Fall 2011</td>
<td>2</td>
<td>Final, #24</td>
<td>100%</td>
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<td>Final, #33</td>
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<td>Final, #12</td>
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### SLO Instructor Data Sheet

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<thead>
<tr>
<th>COURSE</th>
<th>DATE</th>
<th>SLO</th>
<th>TOOL</th>
<th>% SUCCESSFUL STUDENTS</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>RT 62</td>
<td>Spring 2012</td>
<td>1. Analyze current topics from media coverage of radiation or radiation safety issue.</td>
<td>Sample of oral reports with written commentary</td>
<td>100%</td>
<td>20/20 points poss.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Contrast and compare the application of radiation safety procedures.</td>
<td>Concurrent Performance Evaluation sample</td>
<td>100%</td>
<td>Scores from section I</td>
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<tr>
<td></td>
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<td>3. Critically assess technique formulation in order to reduce radiation exposure to patient and technologists.</td>
<td>RT 62 Final question #9</td>
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<tr>
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<td>4. Justify the use of x-ray beam production and technique use in reducing radiation doses.</td>
<td>RT 62 Final question #11</td>
<td>100%</td>
<td></td>
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<tr>
<td>RT 64</td>
<td>Wintersession 2012</td>
<td>1. Solve novel problems regarding radiologic positioning and procedures and patient care and safety.</td>
<td>Performance evaluation sample</td>
<td>100%</td>
<td>Scores from section VII positioning and Section VIII Patient care.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Synthesize the structure and organization of comparable radiologic management and patient information systems.</td>
<td>Performance evaluation sample</td>
<td>100%</td>
<td>Scores from section IX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Critically assess</td>
<td>Performance</td>
<td>100%</td>
<td>Scores from</td>
</tr>
</tbody>
</table>
previous and new radiographic and fluoroscopic procedures as they relate to health services, patient care, use of radiographic/fluoroscopic equipment, surgical procedures, mobile radiography, mobile fluoroscopy, and radiation safety for the patient, student technologists, and staff.

erial sample section V

<table>
<thead>
<tr>
<th>SLO</th>
<th>DATE</th>
<th>TOOLS</th>
<th>% SUCCESSFUL STUDENTS</th>
<th>SATISFIED OR NOT Satisfied</th>
<th>IMPROVEMENTS</th>
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<tbody>
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<td>RT50</td>
<td>Fall 2011</td>
<td>1 Final, 9?</td>
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<tr>
<td></td>
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<td>2 Final, 4?</td>
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<td></td>
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<td></td>
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<td></td>
<td>3 Skills Test</td>
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<td>COURSE</td>
<td>DATE</td>
<td>SLO</td>
<td>TOOL</td>
<td>% SUCCESSFUL STUDENTS</td>
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<td>COURSE</td>
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<td>SLO</td>
<td>TOOL Description</td>
<td>% SUCCESSFUL STUDENTS</td>
<td>SATISFIED OR NOT SATISFIED</td>
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<td>RT53A</td>
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<td>*PE, 3 sections</td>
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<td>2</td>
<td>*PE, 1 section</td>
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<td>*PE, 4 sections</td>
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<td>*PE, 1 sections</td>
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<td>RT53C</td>
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<td>RT63</td>
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<td>*PE, 2 sections</td>
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<td>*PE, 1 section</td>
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<td>EE, 1 section</td>
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</tr>
<tr>
<td>8</td>
<td>EE, 4 sections</td>
<td>100%</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>EE, 2 sections</td>
<td>100%</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>EE, all sections</td>
<td>100%</td>
<td>Yes</td>
<td></td>
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</tr>
</tbody>
</table>
Appendix D

Occupational Program Assessment Analysis

Use the form below to summarize the results of the department meeting in which you discussed the results of your program’s assessment process. Include this form in your Instructional Plan and incorporate the results into the narrative of your instructional plan.

<table>
<thead>
<tr>
<th>Department</th>
<th>Radiologic Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Date</td>
<td>9-27-07</td>
</tr>
<tr>
<td>Number of Faculty in Attendance (% of full time and adjunct plus total)</td>
<td>1 full-time 1 adjunct</td>
</tr>
<tr>
<td>Number of Faculty sharing Assessment Results – if applicable (% of full time and adjunct plus total)</td>
<td>2 full-time 1 adjunct</td>
</tr>
<tr>
<td>SLO(s) Competency Measured</td>
<td>All program courses in program Assessment Plan Class of 2006</td>
</tr>
</tbody>
</table>
| Assessment Tool (Briefly describe assessment tool) | • Evaluation Summaries  
• Clinical Competency Performance Evaluation  
• Competency Skills Tests  
• Final Exams (cumulative results + individual questions)  
• Written Assignments  
• ARRT Exam Reports  
• Graduate surveys  
• Alumni Surveys  
• Employer Surveys |
| Assessment Results (Summarize the overall results of your department including any students needs and issues that emerged) | • Assess usefulness of data being collected  
• The Alumni Surveys needs to be revised to add a place to indicate where and when the graduate was/is employed. Employment may be per diem or full time and still count toward the benchmark of 75% of the graduated class being employed 6 months past graduation. The survey needs to collect that data for the program assessment plan. |
<table>
<thead>
<tr>
<th><strong>Next Step in the Classroom to Improve Student Learning</strong>&lt;br&gt;<em>(list all the items faculty felt would help them improve student learning)</em></th>
<th>• Clinical instructors need to spend more time one to one with students</th>
</tr>
</thead>
</table>
| | + State goals or objectives of assignment/activity more explicitly  
| | + Revise content of assignment/activities  
| | o Revise the amount of writing, oral, visual, clinical or similar work  
| | o Revise activities leading up to assignment  
| | o Increase in-class discussions and activities  
| | o Increase student collaboration and/or peer review  
| | o Provide more frequent feedback on student progress  
| | o Increase guidance for students on assignments  
| | o Use methods of questions that encourage competency  
| | o State criteria for grading more explicitly  
| | o Increase interaction with students outside of class  
| | o Ask a colleague to critique assignment  
| | o Collect more data  
| | o Nothing; assessment indicates no improvement necessary  
| | o Other (please describe) |

| **Next Step in the Department to Improve Student Learning**<br>*(check all that the department felt would help them improve student learning)* | • Offer/encourage attendance at seminars, workshops or discussion groups about teaching methods  
| | + Consult teaching and learning experts about teaching methods  
| | o Encourage faculty to share activities that foster competency  
| | o Write collaborative grants to fund departmental projects to improve teaching  
| | o Prove articles/books on teaching about competency  
| | o Visit classrooms to provide feedback (mentoring)  
| | o Create bibliography of resource material  
| | o Have binder available for rubrics and results  
| | o Analyze course curriculum to determine that competency skills are taught, so that the department can build a progression of skills as students advance through courses  
| | o Nothing; assessments indicate no improvements |
| Priorities to Improve Student Learning | 1. Assess usefulness of data being collected  
| 2. Revise Alumni Survey  
| 3. Motivate and inspire clinical instructors to spend more one to one time with students. |
| Implementation | 1. Review of surveys used for program assessment.  
| 2. Review and revise Alumni Survey  
| 3. Clinical Instructor Self-Evaluation |
| Timeline for Implementation | 1. Review of surveys used for program assessment, October 2007  
| 2. Review and revise Alumni Survey, spring 2008  
**Occupational Program Assessment Analysis**

Use the form below to summarize the results of the department meeting in which you discussed the results of your program’s assessment process. Include this form in your Instructional Plan and incorporate the results into the narrative of your instructional plan.

<table>
<thead>
<tr>
<th>Department</th>
<th>Radiologic Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meeting Date</strong></td>
<td>4-11-11</td>
</tr>
</tbody>
</table>
| **Number of Faculty in Attendance (% of full time and adjunct plus total)** | 2 full-time  
2 adjunct |
| **Number of Faculty sharing Assessment Results – if applicable (% of full time and adjunct plus total)** | 2 full-time  
2 adjunct |
| **SLO(s) Competency Measured** | All program courses in program Assessment Plan Class of 2011 |
| **Assessment Tool** (Briefly describe assessment tool) | • Evaluation Summaries  
• Clinical Competency Performance Evaluation  
• Competency Skills Tests  
• Final Exams (cumulative results + individual questions)  
• Written Assignments  
• ARRT Exam Reports  
• Graduate surveys  
• Alumni Surveys  
• Employer Surveys |
| **Assessment Results** (Summarize the overall results of your department including any students needs and issues that emerged) | • Instructors commented on the possible effect of the wait list selection process. Students in the "Class of 2012" waited 4-5 years after completing pre-requisite courses to start the program. The average scores on program didactic course tests have declined.  
• Student learning outcomes that |
require English writing skills produce low results.

- Learning outcomes for contrast media exams are low.
- Increased attrition, some due to number of students entering the program before they realize the profession is not a fit for them.

### Next Step in the Classroom to Improve Student Learning

**(list all the items faculty felt would help them improve student learning)**

<table>
<thead>
<tr>
<th>+State goals or objectives of assignment/activity more explicitly</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Revise content of assignment/activities</td>
</tr>
<tr>
<td>o Revise the amount of writing, oral, visual, clinical or similar work</td>
</tr>
<tr>
<td>o Revise activities leading up to assignment</td>
</tr>
<tr>
<td>o Increase in-class discussions and activities</td>
</tr>
<tr>
<td>o Increase student collaboration and/or peer review</td>
</tr>
<tr>
<td>o Provide more frequent feedback on student progress</td>
</tr>
<tr>
<td>o Increase guidance for students on assignments</td>
</tr>
<tr>
<td>o Use methods of questions that encourage competency</td>
</tr>
<tr>
<td>o State criteria for grading more explicitly</td>
</tr>
<tr>
<td>o Increase interaction with students outside of class</td>
</tr>
<tr>
<td>o Ask a colleague to critique assignment</td>
</tr>
<tr>
<td>o Collect more data</td>
</tr>
<tr>
<td>o Nothing; assessment indicates no improvement necessary</td>
</tr>
<tr>
<td>+Other (please describe)</td>
</tr>
<tr>
<td>o Implement interactive positioning modules for contrast procedures, fall 2011</td>
</tr>
<tr>
<td>o Hold annual “RT Open House” to better inform wait listed students as to the rigor of the profession.</td>
</tr>
</tbody>
</table>

### Next Step in the Department to Improve Student Learning

**(check all that the department felt would help them improve student learning)**

| +Offer/encourage attendance at seminars, workshops or discussion groups about teaching methods |
| +Consult teaching and learning experts about teaching methods                                  |
| o Encourage faculty to share activities that foster competency                               |
| o Write collaborative grants to fund                                                           |
| Priorities to Improve Student Learning | **1.** Hold “RT Open House”  
**2.** Use of interactive positioning modules  
**3.** Give students more lead time on written assignments |
|---------------------------------------|---------------------------------------------------------------------------------------------------|
| **Implementation**                    | **1.** RT Information Night, October 2011  
**2.** Bontrager, E-book positioning modules required text, August 2011  
**3.** RT71 written assignments in syllabus first day of class, fall 2011 |
| **Timeline for Implementation**      | **1.** RT Information Night, October 2011  
**2.** Bontrager, E-book positioning modules required text, August 2011  
**3.** RT71 written assignments in syllabus first day of class, fall 2011 |

- departmental projects to improve teaching
  - Prove articles/books on teaching about competency
  - Visit classrooms to provide feedback (mentoring)
  - Create bibliography of resource material
  - Have binder available for rubrics and results
  - Analyze course curriculum to determine that competency skills are taught, so that the department can build a progression of skills as students advance through courses
  - Nothing; assessments indicate no improvements necessary
  - Other (please describe)
Occupational Program Assessment Analysis

Use the form below to summarize the results of the department meeting in which you discussed the results of your program’s assessment process. Include this form in your Instructional Plan and incorporate the results into the narrative of your instructional plan.

<table>
<thead>
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<td>Number of Faculty sharing Assessment Results – if applicable (% of full time and adjunct plus total)</td>
<td>100% Fulltime 100% Adjunct</td>
</tr>
<tr>
<td>SLO(s) Competency Measured</td>
<td>All program courses</td>
</tr>
<tr>
<td>Assessment Tool (Briefly describe assessment tool)</td>
<td>evaluation summaries, clinical competency performance evaluations, laboratory skills competency tests and final exams,</td>
</tr>
</tbody>
</table>

Assessment Results (Summarize the overall results of your department including any students needs and issues that emerged)

- more time on physics review in RT83
- a graded student assignment on radiographic density relative to various pathologies in RT51
- re-write SLO’s for RT71 as some were not relative to course objectives (done)
- increase pediatric exam/procedure specifics in RT71
- emphasize dose reduction in all courses
- use more visual aids to demonstrate physics concepts in RT60

Next Step in the Classroom to Improve Student Learning (list all the items faculty felt would help them improve student learning)

- State goals or objectives of assignment/activity more explicitly
- Revise content of assignment/activities
- Revise the amount of writing, oral, visual, clinical or similar work
  - Revise activities leading up to assignment
- Increase in-class discussions and activities
| Next Step in the Department to Improve Student Learning | +Offer/encourage attendance at seminars, workshops or discussion groups about teaching methods
| | o Consult teaching and learning experts about teaching methods
| | +Encourage faculty to share activities that foster competency
| | o Write collaborative grants to fund departmental projects to improve teaching
| | o Prove articles/books on teaching about competency
| | o Visit classrooms to provide feedback (mentoring)
| | o Create bibliography of resource material
| | o Have binder available for rubrics and results
| | o Analyze course curriculum to determine that competency skills are taught, so that the department can build a progression of skills as students advance through courses
| | o Nothing; assessments indicate no improvements necessary
| | o Other (please describe)

| Priorities to Improve Student Learning | • physics concepts demonstrated with more visual aids
| | • RT51 pathology/density assignment - graded
| | • emphasize patient dose more in all courses

| Implementation | RT83, physics concepts demonstrated with more visual aids
| | RT51, pathology/density assignment - graded
| | RT60, emphasize patient dose

| Timeline for Implementation | RT83 Spring 2013
| | RT51 Fall 2013
| | RT60 Spring 2013
Appendix E

Catalog 2012-2013 Radiologic Technology Courses

RADIOLOGIC TECHNOLOGY
Health, Athletics, Wellness, and Kinesiology Division
Kathleen Welch, Division Dean
Division Office, Room 1102
Ann Smeltzer, Program Chair, (831) 479-5056
Aptos Counselor: (831) 479-6274 for appointment
Watsonville Counselor: (831) 786-4734
Call (831) 479-6461 for more information
http://www.cabrillo.edu/programs

Radiologic Technology A.S. Degree

Program Description:
Radiologic Technology Occupational Program
This is a two-year Associate in Science Degree program providing professional training for radiologic technologists. Radiologic Technologists work in a professional environment at a hospital, clinic or private office. Skill categories include patient care, positioning, operating X-ray equipment, image quality, assessment, technical factors, and interacting with the general public, ancillary workers and physicians.
The RT Program is accredited by the Joint Review Committee on Education in Radiologic Technology and the state of California Department of Health. This program has earned the highest level of accreditation awarded by the JRCERT. A new class begins each year at the start of fall semester. Students who successfully complete the program are eligible for State Certification in Diagnostic Radiography and to take the State Permit exam in Fluoroscopy. Program graduation also provides eligibility to sit for the American Registry of Radiologic Technology (ARRT) national board examination. Program applications are accepted on a first come, first served basis.

Requirements for application include: Successful completion of the program prerequisites listed below, and the completion of the application process. Selection is based on completion of all required prerequisites with the appropriate GPA, clinical space available, and date of application. The program has a separate selection process and requires separate application in addition to the general College admission. For students not currently enrolled at Cabrillo College, general college application materials are available in the Admissions Office and on the Cabrillo College web site. Radiologic Technology program applications are available on the RT web site. Two official transcripts must be sent with the program application. After reading the appropriate sections of the Cabrillo College Catalog and the Radiologic Technology program website, please contact the RT office at (831) 479-6461 for specific directions on application. Due to the course load, it is advisable to complete as many of the general education requirements as possible before entering the program. Meeting minimum requirements does not guarantee immediate entry into the program as enrollment is limited due to clinical space availability. Job opportunities are abundant in all modalities and well compensated.

Prerequisites
BIO 4 Human Anatomy ............................................. 4
BIO 5 *Human Physiology ........................................ 4
PHYS 10 Introduction to Physics ............................ 3
PSYCH 1 General Psychology .............................. 3
or
PSYCH 1H Honors General Psychology .................. 3
MA 70 Medical Terminology .......................... 3
ENGL 1A/1AH/1AMC/1AMCH .......................... 3
*A course such as CHEM 30A or CHEM 32 is the prerequisite for BIO 5; Elementary Algebra (MATH 154) or placement into Intermediate Algebra (MATH 152) by assessment is a prerequisite to CHEM 30A or CHEM 32. Please see a counselor or check www.assist.org for more information if you are interested in transfer to a 4-year university in Radiologic Technology. All prerequisite and published curriculum courses must be completed with a grade of “C” or better with the exception of MA 70, which requires a minimum grade of “B” or better. These prerequisites may also be used to satisfy appropriate general education areas.

Your GPA will not improve with repetition of prerequisite courses with passing grades of either A, B, or C. Substandard grades (D or F) can be retaken and your GPA can be modified.

Elective Not Required for Radiologic Technology Degree
ALH 101 A Review of Anatomy and Physiology ............ 2

General Education Courses
This A.S. Degree requires completion of a 21-unit general education pattern (see Cabrillo College Catalog under Associate in Science Degree or the A.S. Degree worksheets available in Counseling Division or on the Transfer and Articulation website.) ...................... 21
A Bachelor of Science/Bachelor of Arts Degree from a regionally accredited college or university will satisfy all general education and competency requirements for Cabrillo’s non-transfer A.A. and A.S. Degrees, with the exception of the multicultural requirement and program specific graduation requirements.

Program Learning Outcomes:
1: Students will demonstrate good patient communication.
2: Students will be clinically competent.
3: Students will participate in professional development/growth.
4: Students will demonstrate problem solving and critical thinking skills.
5: Graduates will be employed and effective in the community.

General Education Units 21
Core Courses (63.75 Units)
RT 50 Introduction to Radiologic Technology/Patient Care. 2
RT 50L R.T. Patient Care Laboratory ......................... 0.25
RT 51 Radiographic Positioning I .......................... 2
RT 51L Positioning Laboratory I .......................... 1
RT 52 Radiation Physics .................................. 2
RT 53A Introduction to Radiologic Technology Laboratory/ Clinic I ......................... 5.5
RT 53B Radiologic Technology Lab/Clinic II ................. 1.5
RT 53C Radiologic Technology Laboratory/ Clinic III ......... 5.5
RT 53D Radiologic Technology Laboratory/ Clinic IV ...... 8
RT 60 Principles of Radiographic Imaging .................. 2
RT 60L Applied Principles of Radiographic Imaging Lab . 0.5
RT 61 Radiographic Positioning II .......................... 2
RT 61L Radiographic Positioning Lab II ....................... 1
RT 62 Principles of Radiation Protection ..................... 2
RT 63 Advanced Positioning Lab/Clinic IV ................. 8
RT 64 Advanced Positioning Lab/Clinic VI .................. 1.5
RT 65 Advanced Positioning Lab/Clinic VII .................. 8
RT 70 Principles of Fluoroscopy .......................... 1
RT 70L Applied Principles of Fluoroscopy .................. 0.5
RT 71 Radiographic Positioning III ......................... 2
RT 71L Positioning Laboratory III .......................... 1
RT 72 Advanced Diagnostic Imaging Research ............ 2

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RT 73 Medical Imaging Pathology ....................... 1
RT 82 Advanced Diagnostic Imaging .................. 1
RT 83 Preparation for State and National Boards ...... 2
RT 175 Advanced Patient Care:
Venipuncture for Radiographers ..................... 0.5

Electives-Magnetic Resonance Imaging
RT 190 Magnetic Resonance Imaging (MRI) Physics ... 3
RT 191 Magnetic Resonance Imaging and Procedures ... 2
RT 191L Applied MRI Protocol and Procedures ........ 0.5
RT 192 Magnetic Resonance Imaging Lab/Clinic ....... 8
RT 193 Advanced Magnetic Resonance Imaging Lab/Clinic 13

Electives-Mammography
RT 185 Principles of Mammography .................... 2
RT 185C Principles of Mammography Lab/Clinic ....... 1
RT 185L Principles of Mammography Lab ............... 1

Elective-Sectional Anatomy
RT 189A Sectional Anatomy .......................... 1
RT 189AL Sectional Anatomy Laboratory ............... 0.5

Total Units 84.75

Skills Certificate: Venipuncture
Required Course:
RT 175 Advanced Patient Care:
Venipuncture for Radiographers ..................... 0.5

Mathematics Competency Requirement
The A.S. Mathematics Requirement may be met by successful completion of intermediate algebra or equivalent or a higher-level mathematics course with a grade of "C" or better. Successful completion must be verified by an official college transcript or by an appropriate score on the Cabrillo mathematics assessment.

Multicultural Requirement
An approved multicultural course is required for graduation. This course may be double counted with general education or other program graduation requirements. Courses taken at other regionally accredited colleges can be used when approved by a Cabrillo counselor.

Security Screening
To comply with state and local regulations for health care providers, students accepted to the Cabrillo College Radiologic Technology program are required to meet vaccination and drug testing requirements and provide documentation to the Student Health Services Center before enrolling in the program. Students are also required to complete criminal background checks and may be required to undergo fingerprinting.

Radiologic Technology Courses
RT 50
Introduction to Radiologic Technology/Patient Care
2 units; 2 hours Lecture
Prerequisite: BIO 4; Selection to the Radiologic Technology Program. Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Introduces fundamentals of radiologic technology with emphasis on basic patient care. Includes topics related to appropriate care of patients for general radiographic procedures. Review of standard precautions, HIPAA, health management systems, medical ethics, and professional standards.
Transfer Credit: Transfers to CSU.

RT 50L
R.T. Patient Care Laboratory
0.25 unit; 0.75 hour Laboratory
Prerequisite: Selection to the Radiologic Technology Program.
Corequisite: RT 50.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Introduces the fundamentals of patient care in radiologic technology
with laboratory instruction and demonstration of safe practices in medical
imaging. Includes practical applications of radiation protection, body
mechanics, contrast media preparation, vital signs, asepsis, HIPAA regulations,
and standard precautions.
Transfer Credit: Transfers to CSU.

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RT 51
Radiographic Positioning I
2 units; 2 hours Lecture
Prerequisite: Selection to Radiologic Technology Program.
Corequisite: RT 51L.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Radiographic positioning and related anatomy of the chest, abdomen,
upper and lower limbs. Includes basic radiographic terminology. Review
of related pathologies and their radiographic appearances. Includes routine
and non-routine radiographic procedures.
Transfer Credit: Transfers to CSU.

RT 51L
Positioning Laboratory I
1 unit; 3 hours Laboratory
Prerequisite: Selection to Radiologic Technology Program.
Corequisite: RT 51.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Apply radiographic anatomy and positioning of the chest, abdomen,
upper and lower extremities. Structured, individualized instruction
accompanied by laboratory demonstration. Principles of anatomy and
physiology are applied to discussions and practice in problems in positioning.
Transfer Credit: Transfers to CSU.

RT 52
Radiation Physics
2 units; 2 hours Lecture
Prerequisite: PHYS 10 Selection to the Radiologic Technology Program.
Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility
for MATH 154.
Provides a basic understanding of the physical principles underlying
the production of X-rays and interaction with matter, a study of the fundamentals
of: atomic structure, X-ray tubes, circuits, types, measurement
and properties, types of X-ray machines, principles of magnetism,
elements of electricity, electrical power, current, resistance, transformers,
rectifiers and quality assessment.
Transfer Credit: Transfers to CSU.

RT 53A
Introduction to Radiologic Technology
Laboratory/ Clinic I
5.5 units; 16.5 hours Laboratory
Prerequisite: Selection to the Radiologic Technology Program.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Applies classroom theory (RT 51) and laboratory practice (RT 51L) in
clinical education facilities by assignment.参与在临床介绍
introduction
to radiographic procedures, radiology management systems,
computerized patient systems and radiation safety and patient care under
direct supervision.
Transfer Credit: Transfers to CSU.

RT 53B
Radiologic Technology Lab/Clinic II
1.5 units; 4.5 hours Laboratory
Prerequisite: RT 53A.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
Continuation of applied classroom theory (RT 51) and laboratory practice
(RT 51L) in clinical education facilities by assignment. Participates in
radiographic procedures, radiology management systems, computerized
patient systems, basic radiation safety and basic patient care under
direct supervision.
Transfer Credit: Transfers to CSU.

RT 53C
Radiologic Technology Laboratory/ Clinic III
5.5 units; 16 hours Laboratory
Prerequisite: RT 53A.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
Clinical application of classroom theory (RT 51 and 61) and laboratory
practice (RT 51L and 61L) in clinical education facilities by assignment.
The student radiographer, under direct supervision, participates in
and/or performs radiographic procedures.
Transfer Credit: Transfers to CSU.

RT 53D
Radiologic Technology Laboratory/ Clinic IV
8 units; 24 hours Laboratory
Prerequisite: RT 53C.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
Applies classroom theory (RT 51 and 61) and laboratory practice (RT
51L and 61L) in clinical education facilities by assignment. The student
radiographer, under direct supervision, participates in radiographic/fluoroscopic
procedures, radiology management systems, computerized
patient systems, radiation safety, and patient care.
Transfer Credit: Transfers to CSU.

RT 60
Principles of Radiographic Imaging
2 units; 2 hours Lecture
Prerequisite: RT 52
Corequisite: RT 60L.
Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility
for MATH 154.
Reviews the techniques employed in the use and control of x-ray
equipment in radiographic procedures. Introduces darkroom chemistry,
film processing, film/cassettes types and construction and the impact of
contrast and density, and technique formulation. Studies the fundamentals
of the photographic process; digital and computerized radiographic
principles and general radiographic QA/QC.
Transfer Credit: Transfers to CSU.

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RT 60L
Applied Principles of Radiographic Imaging
Lab
0.5 unit; 1.5 hours Laboratory
Prerequisite: RT 52.
Corequisite: RT 60.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Applies theory of RT 60 to the lab setting. Studies the effects of techniques
and technique selection, radiographic film cassettes, intensifying
screens, collimation, grid and Bucky use, darkroom procedures and processing.
Reviews computerized radiography and digital radiography principles and application.
Transfer Credit: Transfers to CSU.

**RT 61**

**Radiographic Positioning II**
2 units; 2 hours Lecture  
Prerequisite: RT 51.  
Corequisite: RT 61L.  
Recommended Preparation: Eligibility for ENGL 100 and READ 100.  
Teaches positioning principles, management of contrast media, related radiation protection, technical factors and nursing skills related to genitourinary, gastrointestinal tract, spine, ribs, sacrum and coccyx. Both routine and non-routine projections are presented.  
Transfer Credit: Transfers to CSU.

**RT 61L**

**Radiographic Positioning Lab II**
1 unit; 3 hours Laboratory  
Prerequisite: RT 51L.  
Corequisite: RT 61.  
Recommended Preparation: Eligibility for ENGL 100 and READ 100.  
Apply laboratory assignments as related to concurrent instruction in RT 61. Students apply positioning principles and criteria in a mock situation. Both routine and optional positions are presented.  
Transfer Credit: Transfers to CSU.

**RT 62**

**Principles of Radiation Protection**
2 units; 2 hours Lecture  
Prerequisite: RT 52.  
Recommended Preparation: Eligibility for ENGL 100 and READ 100.  
Repeatability: May be taken a total of 2 times.  
Studies state and federal laws which govern and control the use of ionizing radiation and the manufacture and use of radiation equipment. An introduction to radiation protection with methods of protection from radiation for the patient and the technologist and radiobiology with emphasis on absorption of radiation and its effects upon biological tissue.  
Transfer Credit: Transfers to CSU.

**RT 63**

**Advanced Positioning Lab/Clinic IV**
8 units; 24 hours Laboratory  
Prerequisite: Selection to the Radiologic Technology Program.  
Recommended Preparation: Eligibility for ENGL 100 and READ 100.  
Repeatability: May be taken a total of 2 times.  
Applies classroom theory (RT 51, 61, and 71) and laboratory practice (RT 51L, 61L, 71L) in clinical education facilities by assignment. The student under indirect/direct supervision where appropriate, participates in radiographic procedures, radiology management systems, computerized patient system, radiation safety, and patient care appropriate to the program level.  
Transfer Credit: Transfers to CSU.

**RT 64**

**Advanced Positioning Lab/Clinic VI**
1.5 units; 5 hours Laboratory  
Prerequisite: RT 63.  
Recommended Preparation: Eligibility for ENGL 100 and READ 100.  
Repeatability: May be taken a total of 2 times.  
Applies classroom theory (RT 51, 61, and 71) and laboratory practice (RT 51L, 61L, 71L) in clinical education facilities by assignment. The student, under indirect/direct supervision where appropriate, participates in and/or performs radiographic procedures, radiology management systems,
computerized patient system, radiation safety, and patient care appropriate to the program level.
Transfer Credit: Transfers to CSU.

**RT 65**

**Advanced Positioning Lab/Clinic VII**

8 units; 24 hours Laboratory

Prerequisite: Selection to the Radiologic Technology Program.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.

Applies classroom theory (RT 51, 61, and 71) and laboratory practice (RT 51L, 61L, 71L) in clinical education facilities by assignment. The student under indirect/direct supervision where appropriate, participates in radiographic procedures, radiology management systems, computerized patient system, radiation safety, and patient care appropriate to the program level.

Transfer Credit: Transfers to CSU.

**RT 70**

**Principles of Fluoroscopy**

1 unit; 1 hour Lecture

Prerequisite: ARRT/CRT License.
Corequisite: RT 70L.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.

Provides an overview of the State of California Fluoroscopy regulations, radiation safety, equipment image intensifiers, closed circuit T.V., image recording devices, mobile image intensified units, anatomy and physiology of the eye and relative 3-D anatomy.

Transfer Credit: Transfers to CSU.

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**RT 70L**

**Applied Principles of Fluoroscopy**

0.5 unit; 1.5 hours Laboratory

Prerequisite: ARRT/CRT License or 2nd year Radiologic Technology Student.
Corequisite: RT 70.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.

Studies scattered radiation effects, the appropriate use of collimation, fluoroscopic equipment selection and use, control of automatic brightness control (ABC), quality assurance practices, and quality control of radiographic and fluoroscopic equipment in Fluoroscopy Laboratory.

Transfer Credit: Transfers to CSU.

**RT 71**

**Radiographic Positioning III**

2 units; 2 hours Lecture

Prerequisite: Selection to the Radiologic Technology Program.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Apply Part III of the radiographic positioning course sequence including the cranium, facial bones, and paranasal sinuses.

Transfer Credit: Transfers to CSU.

**RT 71L**

**Positioning Laboratory III**

1 unit; 3 hours Laboratory

Prerequisite: Selection to the Radiologic Technology Program.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Apply Part III of the radiographic positioning laboratory course sequence, including the cranium, facial bones, and paranasal sinuses.

Transfer Credit: Transfers to CSU.
RT 72
**Advanced Diagnostic Imaging Research**
2 units; 2 hours Lecture
Prerequisite: Selection to the Radiologic Technology Program.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Teaches the analysis of technically advanced imaging modalities including CT, MRI, PET and other imaging modalities.
Transfer Credit: Transfers to CSU.

RT 73
**Medical Imaging Pathology**
1 unit; 1 hour Lecture
Prerequisite: RT 61.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
A survey of pathologies and their manifestations in medical imaging.
Physiology of the human body as it relates to medical imaging and how pathology commonly impacts body functions are reviewed in case studies.
Transfer Credit: Transfers to CSU.

RT 82
**Advanced Diagnostic Imaging**
1 unit; 1 hour Lecture
Prerequisite: RT 72.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Presents advanced radiographic procedures to include advanced modalities of computerized tomography, computed radiography, and angiography.
Transfer Credit: Transfers to CSU.

RT 83
**Preparation for State and National Boards**
2 units; 2 hours Lecture
Prerequisite: Graduation from accredited RT program or 2nd year Radiation Technology Student.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
Analyzes, evaluates and critiques the theory and practice of the following: care and management of the patient; radiologic analysis and positioning, radiation protection for radiography and fluoroscopy; darkroom chemistry; radiation physics, radiographic and fluoroscopic equipment, fluoroscopy principles and principles of radiographic techniques.
Included is a comprehensive review of the State of California's Health, Title XVII regarding fluoroscopic radiation laws.
Transfer Credit: Transfers to CSU.

RT 175
**Advanced Patient Care: Venipuncture for Radiographers**
0.5 unit; 0.5 hour Lecture, 0.5 hour Laboratory
Prerequisite: RT 61; Current CPR/Healthcare Provider Card; RT enrollment, ARRT or CRT.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 4 times.
Basic instruction and practice of venipuncture methods/procedures for the administration of contrast agents. Routes of administration, safety, basic pharmacology, dosage calculations and emergency procedures.

RT 184A-Z
**Special Topics in Radiologic Technology**
1 - 3 units; 3 hours Laboratory
Prerequisite: Selection to the Radiologic Technology Program.
Repeatability: May be taken a total of 4 times.
Enrichment program in the radiologic sciences. Course is tailored to individual needs and interests as enrichment or expansion of subject area material through lab and/or field work, learning lab or directed reading. May be taken a total of four times or a maximum of 12 units of different topics.

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**RT 185**

**Principles of Mammography**

2 units; 2 hours Lecture

Prerequisite: CRT or ARRT license or within one year of graduation in a Radiologic Technology Program.

Corequisite: RT 185L.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Studies the theory and practice of mammographic positioning, quality assurance/quality control, and imaging the anatomy and pathophysiology of the breast. Course prepares the student for the state and national certification exams in mammography.

**RT 185C**

**Principles of Mammography Lab/Clinic**

1 unit; 3 hours Laboratory

Prerequisite: Certified Radiologic Technologist (CRT) or American Registry of Radiologic Technologists (ARRT) license or within one year of graduation in a Radiologic Technology Program.

Corequisite: RT 185 and RT 185L.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Clinical application of classroom theory and laboratory skills (RT185 and RT185L) with practical use of Mammography patient and imaging protocols. Demonstration of competency in current mammographic practices to meet qualifications under the Mammography Quality Standards Act (MQSA Federal regulations) in conjunction with California state certification requirements.

**RT 185L**

**Principles of Mammography Lab**

1 unit; 3 hours Laboratory

Prerequisite: ARRT/CRT or 2nd year Radiologic Technology student.

Corequisite: RT 185.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Laboratory component to RT 185. Breast positioning and imaging techniques; quality control/quality assurance; operation of mammographic equipment; operation of dedicated automatic processor.

**RT 189A**

**Sectional Anatomy**

1 unit; 1 hour Lecture

Prerequisite: BIO 4.

Corequisite: RT 189AL.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Studies sectional human anatomy for health care professionals. Emphasis on transverse planes as related to sonography, computerized tomography and magnetic resonance imaging.

**RT 189AL**

**Sectional Anatomy Laboratory**

0.5 unit; 1.5 hours Laboratory

Corequisite: RT 189A.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Sectional human anatomy laboratory with practical application of the
content and theories of RT 189A. Emphasis on multiplanar sections as related to sonography, computerized tomography and magnetic resonance imaging. Case studies utilizing various cross-sectional modalities will be presented. Concurrent enrollment in or prior completion of RT 189A.

RT 190
Magnetic Resonance Imaging (MRI) Physics
3 units; 3 hours Lecture
Prerequisite: ARRT certification or CRT License or 2nd year RT student; and CPR (Health Care Provider) certification and venipuncture certification.
Corequisite: RT 191.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
Reviews the fundamentals of magnetic resonance imaging (MRI) principles.
Includes study of T1-T2 relaxation, pulse sequences, image formation, contrast media and instrumentation.

RT 191
Magnetic Resonance Imaging and Procedures
2 units; 2 hours Lecture
Prerequisite: ARRT certification or CRT License or 2nd year RT student; and CPR (Health Care Provider) certification and venipuncture certification and RT 189A or equivalent.
Corequisite: RT 190.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 3 times.
Reviews common and specialty magnetic resonance imaging methodology and procedures. Studies magnetic resonance imaging with computer applications, scanner operations, and patient examination procedures.

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RT 191L
Applied MRI Protocol and Procedures
0.5 unit; 1.5 hours Laboratory
Corequisite: RT 191.
Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.
Repeatable: May be taken a total of 3 times.
Applies classroom theory (RT190 and RT191) to the lab setting.
Studies the effects of computer applications, scanner operations and patient examination procedures on MRI.

RT 192
Magnetic Resonance Imaging Lab/Clinic
8 units; 24 hours Laboratory
Prerequisite: RT 190 RT 191.
Recommended Preparation: Eligibility for ENGL 100 and READ 100.
Repeatability: May be taken a total of 2 times.
Introduces clinical education in the practice of Magnetic Resonance Imaging procedures. Demonstration of competency of MRI current practices.

RT 193
Advanced Magnetic Resonance Imaging Lab/Clinic
13 units; 40 hours Laboratory
Prerequisite: RT 192.
Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.
Provides advanced clinical education in the practice of Magnetic Resonance Imaging procedures and opportunity for student competency in MRI current practices.
### Rad Tech Program Planning

#### Goals and Recommendations

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When the current program officials retire or the program director or clinical coordinator position becomes vacant, replace 1.0 contract faculty as necessary when notice of retirement/vacancy is received as per CCFT contract or position becomes available.</td>
<td>As per CCFT contract (Maintenance of programs)</td>
</tr>
<tr>
<td>2. Outreach within RT organizations and through program stakeholders (advisory committee and affiliate hospitals/clinics) to prepare the local labor force to fill CC and PD positions. There is an immediate need to encourage adjunct and clinical instructors to attain B.S. and M.S. degrees.</td>
<td>None</td>
</tr>
<tr>
<td>3. Continue to offer the Emerging Educator special modality clinical assignment in the spring semester second year of the program, where students develop teaching skills in RT61L laboratory</td>
<td>None. (Maintenance of programs)</td>
</tr>
<tr>
<td>4. Add 1 laboratory section to RT50L, RT51L, RT60L, RT70L, and RT71L</td>
<td>9.44 TU = $16,500.00</td>
</tr>
<tr>
<td>5. Add Adjunct Faculty assignment for RT175, Advanced Patient Care: Venipuncture</td>
<td>1 TU = $1,735.00</td>
</tr>
<tr>
<td>6. Ongoing maintenance and repair of laboratory equipment calculated at 10% of original cost per year; biannual x-ray tube registration fees (CDPH-RHB)</td>
<td>$10,000.00 annually (Maintenance of programs); $1,544.00 biannually</td>
</tr>
<tr>
<td>7. Purchase of a new mobile C-Arm to replace the C-arm currently owned. The current C-arm has outdated technology and does not support the RT curriculum (RT70, RT70L).</td>
<td>$100,000 one time (Maintenance of programs)</td>
</tr>
<tr>
<td>8. Develop and implement RT109, RT Skills Practice Laboratory, scheduled Fridays, 11:00-12:30 p.m., fall and spring semester.</td>
<td>$4,000.00 (Maintenance of programs, Innovative Scheduling and Delivery)</td>
</tr>
<tr>
<td>9. Shift funding for the Mammography program from outside funding to the general fund, thus providing outside funding resources to grow other programs like CT indicated as a need in results of employer surveys and</td>
<td>5.25 TU = $10,000.00</td>
</tr>
<tr>
<td>10. Purchase iPad2 notebooks for each student, clinical instructor and program faculty.</td>
<td>$42,000 (45 students, 10 CI's, 5 faculty = 60 iPad2s @ $700 each)</td>
</tr>
<tr>
<td>Purchase of radiology apps to be pre-loaded onto iPads for RT clinical education and viewing of medical images</td>
<td>$3,000.00</td>
</tr>
<tr>
<td>Insurance/Warranty for each iPad device</td>
<td>$3,000.00</td>
</tr>
</tbody>
</table>