MEDICAL IMAGING

Sylvania Campus
Health Technology Building (HT), Room 306
971-722-4227, 971-722-4795

Health Admissions Office
College Center (CC), Room 208
971-722-4795

pcc.edu/programs/radiography/

CAREER AND PROGRAM DESCRIPTION

RADIOGRAPHY PROGRAM

Radiographers are important members of the health care team and work closely with physicians and particularly with radiologists. The radiographer is primarily concerned with providing diagnostic radiographic images (x-rays) of disease and injury and assisting in patient care. The radiographer may be employed in hospitals, clinics and medical offices.

Radiography graduates may apply to take the national certification examination offered by the American Registry of Radiologic Technologists (ARRT) and for licensure as a radiographer in the state of Oregon.

PCC’s program begins each June with an introductory course. The Radiography Program is nine terms in length (27 consecutive months). The program combines campus instruction with clinical education at affiliated hospitals in the Portland area. This program is designed to prepare the student for certification as a Registered Technologist in Radiography, R.T. (R).

CT TECHNOLOGIST TRAINING PROGRAM

CT Technologists are important members of the health care team and work closely with Radiologists to produce diagnostic CT images. Computed Tomography requires additional training beyond the primary certification earned in Radiography. Nuclear Medicine Technologists who will perform PET/CT may enroll in this program, which meets the State of Oregon requirements for CT Training.

The CT Technologist Training Program is four terms in length (12 consecutive months). The program combines campus and online instruction with clinical education at affiliated hospitals. Upon completion of this program, students will be qualified to sit for the national CT certification examination offered by the American Registry of Radiologic Technologists (ARRT).

Special admission required for registration. Applicants must be registry eligible or currently registered, in good standing, in Radiography or Nuclear Medicine to apply to the program.

Acceptance into the program is based on clinical seat availability which varies from year to year.

MRI TECHNOLOGIST TRAINING PROGRAM

MRI Technologists are important members of the health care team and work closely with Radiologists to produce diagnostic MR images. Magnetic Resonance Imaging requires additional training beyond the primary certification earned in Radiography, Nuclear Medicine, Ultrasound or Radiation Therapy. Upon completion of this program, students will be qualified to sit for the national MRI Certification examination offered by the American Registry of Radiologic Technologists (ARRT).

The MRI Technologist Training Program is three terms in length (9 consecutive months). The program combines campus and online instruction with clinical education at affiliated hospitals. Applicants must be a Registered Radiologic Technologist ARRT(R), Registered Nuclear Medicine Technologist ARRT(N) or (CNMT), Registered Radiation Therapy Technologist ARRT(T) or Registered Medical Sonographer (RDMS) in good standing with one-year experience preferred. Technologists with less than one year experience may be admitted with Director permission. Refer to College catalog for program curriculum.

MEDICAL IMAGING CONTINUING EDUCATION COURSES

College credit courses are available to A.R.R.T certified technologists for updating and re-entry knowledge and skills. See the Medical Imaging website for specific offerings each term. Special admission required for registration. Contact the Medical Imaging department for information at 971-722-4227.

DEGREES AND CERTIFICATES OFFERED

ASSOCIATE OF APPLIED SCIENCE DEGREE

Radiography

LESS THAN ONE-YEAR CERTIFICATE

Computed Tomography
Magnetic Resonance Imaging

Academic Prerequisites

Radiography

- All program applicants must have a high school diploma or a GED certificate. In addition, all applicants will be required to have satisfactorily completed (minimum letter grade "C") WR 121, MTH 111, BI 231, BI 232 and BI 233, MP 111 or the equivalent. Pass/No Pass grade is not acceptable in prerequisites.
- BI 231, BI 232, BI 233 and MTH 111 must be current within seven years of application. All prerequisites must be completed by end of winter term in the year in which you apply.
- The Radiography Program is a limited entry program with restricted enrollment. Completing admission requirements and applying to the program does not guarantee admission.
- All students must be formally admitted in order to enroll in the radiography courses. Other enrollees must have program permission.
- For information on specific application procedures and deadlines, please contact the Health Admissions Office at 971-722-4795 or visit the website www.pcc.edu/hao.

Computed Tomography Technologist Training Program

- Applicants must be registry eligible or currently registered, in good standing, in Radiography ARRT(R) or Nuclear Medicine ARRT(N) or (CNMT) to apply to the program.
- The CT Technologist Training Program is a limited entry program with restricted enrollment. Completing admission requirements and applying to the program does not guarantee admission.
- All students must be formally admitted in order to enroll in the Computed Tomography courses.
- For information on specific application procedures and deadlines, please contact the Health Admissions Office at 971-722-4795 or visit the website www.pcc.edu/hao.

Magnetic Resonance Imaging Technologist Training Program

- Applicants must be a Registered Radiologic Technologist ARRT(R), Registered Nuclear Medicine Technologist ARRT(N) or (CNMT), Registered Radiation Therapy Technologist ARRT(T) or Registered Medical Sonographer (RDMS) in good standing with one-year experience preferred. Technologists with less than one year experience may be admitted with Director permission.
- The MRI Technologist training program is a limited entry program with restricted enrollment. Completing admission requirements and applying to the program does not guarantee admission.
- All students must be formally admitted in order to enroll in the MRI courses.
For information on specific application procedures and deadlines, please contact the Health Admissions Office at 971-722-4795 or visit the website www.pcc.edu/hao.

### Academic Requirements

**Radiography**
- Students are required to satisfactorily complete the course of study with a letter grade of "C" or better in each required course and must maintain an overall grade point average of 2.0 for graduation. RAD 216 is exempt from the grade expectation as it is offered for Pass/No Pass only.

**Computed Tomography Technologist Training Program**
- Students are required to satisfactorily complete the course of study with a letter grade of "C" or better in each didactic course and a letter grade of "B" or better in the clinical courses.

**Magnetic Resonance Imaging Technologist Training Program**
- Students in the Magnetic Resonance Imaging Certificate program must complete all MRI courses with a letter grade of "C" or better.

### Non-Academic Prerequisites

**Radiography**
- The Radiography Program does not require a computer science prerequisite; however, success in a Radiography Program requires that students be computer literate, including, at least, word processing, use of spreadsheets and web searches. Students with no computer experience should discuss with an advisor ways to achieve competency prior to entering the Radiography Program.
- Potential applicants are encouraged but not required to gain health care experience by volunteering or working in the health care industry, preferably in a hospital setting to gain knowledge of professional duties and responsibilities.
- Once accepted to the program, students will be required to submit to a criminal background check and a drug screen for their clinical practicum. Students must be able to provide a valid Social Security number for the criminal background check. Proof of immunizations will also be required. For a complete listing of required immunizations, please visit our website at www.pcc.edu/rad.
- During the course of the program students will be working with ionizing radiation, processing chemicals and they will provide patient care to individuals who may have contagious diseases. Special immunization is required.

**Computed Tomography Technologist Training Program**
- Once accepted to the program, students will be required to submit to a criminal background check and a drug screen for their clinical practicum. Students must be able to provide a valid Social Security Number for the criminal background check. Proof of immunizations may also be required. For a complete list of required immunizations, please visit the Medical Imaging website.

**Magnetic Resonance Imaging Technologist Training Program**
- Once accepted to the program, students will be required to submit to a criminal background check and a drug screen for their clinical practicum. Students must be able to provide a valid Social Security Number for the criminal background check. Proof of immunizations may also be required. For a complete list of required immunizations, please visit the Medical Imaging website.

### Non-Academic Requirements

- None

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### Radiography AAS Degree

Minimum 106.5 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. In addition to required courses in the program of study, students must satisfy MTH 58/65 competency. Students should consult with program advisors for course planning.

#### COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

<table>
<thead>
<tr>
<th>Summer Term</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RAD 100 Introduction to Radiography</td>
<td>1</td>
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<tr>
<td>First Term</td>
<td></td>
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<tr>
<td>RAD 101 Radiographic Positioning I</td>
<td>3</td>
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<tr>
<td>RAD 105 Methods of Patient Care</td>
<td>3</td>
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<td>RAD 106 Radiographic Equipment I</td>
<td>4</td>
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<tr>
<td>RAD 110 Radiographic Clinic I</td>
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<tr>
<td>Second Term</td>
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<tr>
<td>RAD 102 Radiographic Positioning II</td>
<td>3</td>
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<tr>
<td>RAD 107 Radiographic Equipment II</td>
<td>4</td>
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<tr>
<td>RAD 115 Principles of Exposure I</td>
<td>3</td>
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<tr>
<td>RAD 120 Radiographic Clinic II</td>
<td>4.5</td>
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<tr>
<td>Third Term</td>
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<tr>
<td>RAD 103 Radiographic Positioning III</td>
<td>3</td>
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<tr>
<td>RAD 130 Radiographic Clinic III</td>
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<tr>
<td>RAD 132 Radiographic Image Production</td>
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<tr>
<td>General Education</td>
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<tr>
<td>Fourth Term</td>
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<tr>
<td>RAD 140 Radiographic Clinic IV</td>
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<tr>
<td>General Education</td>
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<td>Fifth Term</td>
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<tr>
<td>RAD 203 Applied Radiography Topics</td>
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<td>RAD 205 Radiographic Positioning IV</td>
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<td>RAD 210 Radiographic Clinic V</td>
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<tr>
<td>RAD 211A The Study of Imaging Modalities</td>
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<tr>
<td>General Education</td>
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<tr>
<td>Sixth Term</td>
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<td>RAD 206 Survey of Medical Imaging Diseases</td>
<td>3</td>
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<tr>
<td>RAD 209 Advanced Radiological Procedures</td>
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<tr>
<td>RAD 220 Radiographic Clinic VI</td>
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<tr>
<td>General Education</td>
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<tr>
<td>Seventh Term</td>
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<tr>
<td>RAD 122 Radiation Protection - Biology</td>
<td>3</td>
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<tr>
<td>RAD 216 Radiography Registry Review</td>
<td>2</td>
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<tr>
<td>RAD 230 Radiographic Clinic VII</td>
<td>9</td>
</tr>
</tbody>
</table>

| Total Credits | 106.5 |

### Less Than One-Year Certificate

**Computed Tomography** (p. 2)
**Magnetic Resonance Imaging** (p. 3)

#### COMPUTED TOMOGRAPHY LESS THAN ONE-YEAR CERTIFICATE

Minimum 19 credits. Students must meet all certificate requirements.

#### COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.
First Term
CTT 101 Cross-Sectional Anatomy-Abdomen & Pelvis 1
CTT 102 Cross-Sectional Anatomy- Head & Spine 1
CTT 111 CT Physics, Equipment and Instrumentation 2

Second Term
CTT 103 Cross-Sectional Anatomy - Neck & Thorax 1
CTT 104 Cross Sectional Anatomy Review 1
CTT 112 CT Procedures, Protocols and Pathology Correlation 2

Third Term
CTT 271 CT Clinical Education I 5

Fourth Term
CTT 113 CT Registry Review 1
CTT 272 CT Clinical II 5

Total Credits 19

MAGNETIC RESONANCE IMAGING LESS THAN ONE-YEAR CERTIFICATE
Minimum 32 credits. Students must meet all certificate requirements.

COURSE OF STUDY
The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term
MRI 101 MRI Physics I - Principles, Equipment & Safety 2
MRI 111 MRI Cross-Sectional Anatomy I 2
MRI 271 MRI Clinical I 6

Second Term
MRI 102 MRI Physics II - Advanced Principles 2
MRI 112 MRI Cross-Sectional Anatomy II 1
MRI 272 MRI Clinical II 8

Third Term
MRI 130 MRI Imaging Procedures and Diagnosis 2
MRI 140 MRI Registry Review 1
MRI 273 MRI Clinical III 8

Total Credits 32

CTT 111. CT Physics, Equipment and Instrumentation. 2 Credits.
Introduces Computed Tomography theory and application, patient care, CT safety, imaging procedures, data acquisition and processing and the physical principles of image formation. Prerequisite: Department permission required.

CTT 112. CT Procedures, Protocols and Pathology Correlation. 2 Credits.
Emphasizes CT Protocol development, comparison of CT parameters, parameter tradeoffs, normal vs abnormal anatomy visualization and contrast media utilization. Prerequisite: Department permission required.

CTT 113. CT Registry Review. 1 Credit.
Provides a comprehensive review of patient care, imaging procedures, data acquisition and processing and physical principles of image formation for Computed Tomography. Prerequisites: RAD 254 or CTT 111 AND RAD 255 or CTT 112 or department permission.

CTT 271. CT Clinical Education I. 5 Credits.
Provides clinical education experience in an affiliated hospital or clinical CT department under the direct supervision of a credentialed CT technologist and radiologist. Includes the application of equipment use, manipulation and operation, CT imaging procedures, CT radiation safety and patient care. Requires attendance and completion of clinical competencies, objectives, and performance assessments. Teaches the necessary skills that are required to function in the clinical area as a CT technologist, with a professional work ethic. May be repeated one time for credit. Prerequisite: CTT 101, CTT 103, CTT 111.

CTT 272. CT Clinical II. 5 Credits.
Provides intermediate and advanced clinical education experience in an affiliated hospital or clinical CT department under the direct supervision of a credentialed CT technologist and radiologist. Includes the application of equipment manipulation and operation, CT imaging procedures, radiation safety, medicolegal and ethical protocols, record keeping and patient care. Requires attendance and completion of clinical competencies, objectives, and performance assessments. Teaches the necessary skills that are required to function in the clinical area as a CT technologist, with a professional work ethic. May be repeated one time for credit. Prerequisite: CTT 271 or RAD 270.

MRI 101. MRI Physics I - Principles, Equipment & Safety. 2 Credits.
Introduces Magnetic Resonance Imaging theory and application, patient care, MR safety, Imaging procedures, data acquisition and processing and the physical principles of image formation. Department permission is required.

MRI 102. MRI Physics II - Advanced Principles. 2 Credits.
Continues Magnetic Resonance Imaging theory and application, patient care, MR safety, imaging procedures, data acquisition and processing and the physical principles of image formation. Department permission required. Prerequisite: MRI 101.

MRI 111. MRI Cross-Sectional Anatomy I. 2 Credits.
Introduces the normal appearance of anatomical structures of the head, soft tissue neck, spine and lower extremity in normal planes. Enables students to differentiate between normal and abnormal anatomical structures. Requires students to differentiate between normal and abnormal anatomical structures. Prerequisite: MRI 101.

MRI 112. MRI Cross-Sectional Anatomy II. 1 Credit.
Introduces the normal appearance of anatomical structures of the upper extremity, chest, abdomen and pelvis in normal planes. Enables students to differentiate between normal and abnormal anatomical structures. Prerequisite: MRI 101.

MRI 130. MRI Imaging Procedures and Diagnosis. 2 Credits.
Correlates and compares the normal appearance of anatomy in all body sections with pathologic findings. Discussion to include comparisons of T1 vs T2 imaging techniques as they correlate to imaging protocols and diagnosis. The pathology section of the course is designed to give the student an in depth consideration of disease processes. Special equipment, fat suppression and coil considerations will be discussed in all sections. The role of contrast agents in diagnosis will be discussed in all sections. Department permission required. Prerequisite: MRI 102, MRI 112, MRI 272.

MRI 140. MRI Registry Review. 1 Credit.
Provides a comprehensive review of patient care, imaging procedures, data acquisition and processing and physical principles of image formation. Prerequisite: MRI 102, MRI 112, and MRI 272.
MRI 271. MRI Clinical I. 6 Credits.
Provides clinical education experience in an affiliated hospital Magnetic Resonance Imaging Department under the supervision of a Registered MR Technologist and Radiologist. Includes application of equipment manipulation and operation, MR imaging procedures, MR safety, medicolegal and ethical protocol, record keeping and patient care. Requires clinical competencies, objectives, performance assessment and attendance. The student will learn the necessary skills that are required to function in the clinical area as a MR Technologist and will develop and exhibit proper professional work ethic. Department permission required. Prerequisite: MRI 271 or MRI 121.

MRI 272. MRI Clinical II. 8 Credits.
Provides intermediate clinical education experience in an affiliated hospital Magnetic Resonance Imaging Department under the supervision of a Registered MR Technologist and Radiologist. Includes application of equipment manipulation and operation, MR imaging procedures, MR safety, medicolegal and ethical protocol, record keeping and patient care. Requires clinical competencies, objectives, performance assessments and attendance. The student will learn the necessary skills that are required to function in the clinical area as a MR Technologist, and will develop and exhibit proper professional work ethic. Department permission required. Prerequisite: MRI 272 or MRI 122.

RAD 100. Introduction to Radiography. 1 Credit.
Introduces the healthcare team and various aspects of radiological sciences. Includes medical ethics, professional organizations, medicolegal considerations, communication, cultural diversity, basic radiation protection, fundamental technical components, radiological history, healthcare organizations, and medical specialties. Prerequisite: Department permission required.

RAD 101. Radiographic Positioning I. 3 Credits.
Introduces basic positioning techniques used in radiography of the respiratory system, abdomen, upper, and lower extremities. Includes a lab experience with peer positioning, film critique, anatomical identification, pathologies, and an energized section using phantoms. Prerequisite: RAD 100.

RAD 102. Radiographic Positioning II. 3 Credits.
Covers basic positioning techniques used in radiography of the digestive system, urinary system, and the upper and lower extremities. Includes a lab experience with peer positioning, film critique, anatomical identification, pathologies, and an energized section using phantoms. Prerequisite: RAD 101.

RAD 103. Radiographic Positioning III. 3 Credits.
Covers basic positioning techniques used in radiography of the bony thorax, spinal column, and pelvic girdle. Includes a lab experience with peer positioning, film critique, anatomical identification, pathologies, and an energized section using phantoms. Prerequisite: RAD 102.

RAD 105. Methods of Patient Care. 3 Credits.
Covers general care of patients in radiology department. Emphasizes radiographer’s role regarding patient care with cardiac arrest, vital signs, accident victims, bedside procedures, aseptic techniques, contagious disease control, blood borne pathogens, venipuncture, administration of medication and contrast media reactions. Introduces fundamentals of urinary catheterization. Lab provides application of theory. Department permission required.

RAD 106. Radiographic Equipment I. 4 Credits.
Covers the safe operation of generators, timers, x-ray tubes, recording devices, physiology of sight, image intensifiers, television camera/monitors, digital radiography, tomography, toleradiography, mobile radiography and fluoroscopic equipment. Prerequisite: RAD 106.

RAD 107. Radiographic Equipment II. 4 Credits.
Covers fundamental concepts of energy and measurements, atomic structures, molecules, electricity, magnetism, electromagnetism, transformers, and rectifiers in relation to radiographic equipment. Prerequisite: RAD 100.

RAD 108. Radiographic Equipment III. 3 Credits.
Covers contrast media, fluoroscopic exams and special procedures involving the following systems: CNS, biliary, mammary, female reproductive, respiratory, pancreatic, and salivary. Covers techniques and equipment used to catheterize the vascular system, indications for various vascular procedures, contrast agents used for specific procedures, and selective vascular anatomy. Prerequisite: RAD 105.

RAD 200. Radiographic Clinic II. 4.5 Credits.
Provides clinical education experience in an affiliated hospital radiology department under the supervision of a registered radiographer and radiologist. Includes knowledge and application of fluoroscopic equipment manipulation and operation, radiological and fluoroscopic imaging procedures, radiation protection, medicolegal and ethical protocol, record keeping and patient care. Requires clinical competencies, objectives, performance assessment and attendance. Prerequisite: RAD 120.

RAD 202. Radiographic Positioning IV. 3 Credits.
Examines legal principles in radiography by looking at a variety of topics related to medical/professional ethics. Includes discussions on the code of ethics and bioethical issues in radiography. Covers the attitudes and communication knowledge needed to develop critical thinking skills in patient care with diverse populations. Prerequisite: RAD 140.

RAD 203. Applied Radiography Topics. 2 Credits.
Covers basic positioning techniques used in radiography of the bony thorax, spinal column, and pelvic girdle. Includes a lab experience with peer positioning, film critique, anatomical identification, pathologies, and an energized section using phantoms. Prerequisite: RAD 102.

RAD 204. Survey of Medical Imaging Diseases. 3 Credits.
Covers principles and processes of disease, characteristics of neoplasms and systems with related disease as it applies to the radiological science imaging. Department permission required.

RAD 205. Advanced Radiological Procedures. 2 Credits.
Covers the safe operation of generators, timers, x-ray tubes, recording devices, physiology of sight, image intensifiers, television camera/monitors, digital radiography, tomography, toleradiography, mobile radiography and fluoroscopic equipment. Prerequisite: RAD 106.

RAD 206. Survey of Medical Imaging Diseases. 3 Credits.
Covers basic principles and processes of disease, characteristics of neoplasms and systems with related disease as it applies to the radiological science imaging. Department permission required.

RAD 208. Advanced Radiological Procedures. 2 Credits.
Covers contrast media, fluoroscopic exams and special procedures involving the following systems: CNS, biliary, mammary, female reproductive, respiratory, pancreatic, and salivary. Covers techniques and equipment used to catheterize the vascular system, indications for various vascular procedures, contrast agents used for specific procedures, and selective vascular anatomy. Prerequisite: RAD 105.

RAD 210. Radiographic Clinic V. 7 Credits.
Provides clinical education experience in an affiliated hospital radiology department under the supervision of a registered radiographer and radiologist. Includes application of equipment manipulation and operation, radiological imaging procedures, radiation protection, medicolegal and ethical protocol, record keeping and patient care. Includes an observation through the Angiography/Cardiac Cath Lab suite. Prerequisite: RAD 140.
RAD 211A. The Study of Imaging Modalities. 2 Credits.
Introduces computed tomography, magnetic resonance, nuclear medicine, sonography, and radiation therapy. Prerequisite: RAD 107 and department permission.

RAD 216. Radiography Registry Review. 2 Credits.
Provides review of the major content areas appearing in the national certification examination. Reviews radiation protection, equipment operation and maintenance, image production and evaluation, radiographic procedures and patient care. Requires the completion of unit examinations and at least one mock registry exam. Prerequisite: Department permission required.

RAD 220. Radiographic Clinic VI. 7 Credits.
Provides clinical education experience in an affiliated hospital radiology department under the supervision of a registered radiographer and radiologist. Includes application of equipment manipulation and operation, radiological imaging procedures, radiation protection, medicolegal and ethical protocol, record keeping and patient care. Includes a rotation through all other medical imaging modalities. Prerequisite: RAD 210.

RAD 230. Radiographic Clinic VII. 9 Credits.
Provides clinical education experience in an affiliated hospital radiology department under the supervision of registered radiographer and radiologist. Includes application of equipment manipulation and operation, radiological imaging procedures, radiation protection, medicolegal and ethical protocol, record keeping, and patient care. Includes a three-week rotation to another clinic site. Prerequisite: RAD 220.