

## Radiologic Sciences

- RAD 300 Clinical Education I** 2 cr  
Hospital-based laboratory allowing the student additional clinical experience in RAD 312 and RAD 304.
- RAD 301 Clinical Education II** 4 cr  
Hospital-based laboratory allowing the student to obtain clinical experience in those areas presented in RAD 307. Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.
- RAD 302 Clinical Ed III** 3 cr  
Hospital-based laboratory allowing the student additional clinical experience.
- RAD 304 Patient Care & Ethics** 3 cr  
Basic knowledge concerning patient care and ethical situations with which the radiologic technologist must be familiar. Class time is allotted for the student to practice certain techniques pertinent to obtaining vital signs, handling of patients, sterile technique, tray setup, first-aid measures, and general operating room and bedside radiography procedures.
- RAD 307 Osseous I** 4 cr  
This course includes the demonstration and practice in positioning and phantom radiography of the chest, general abdomino-pelvic viscera, and the upper and lower extremities to include shoulder and pelvic girdles.
- RAD 308 Osseous II** 4 cr  
Continuation of RAD 307 to include the axial skeleton, sternum, sternoclavicular joints and introductory topics relating to special radiographic procedures.
- RAD 309 Osseous III** 3 cr  
Continuation of RAD 308 to include demonstration and practice in positioning and phantom radiography of the cranium, facial bones, optic foramina, TMJs, orbits, overview of mastoids, stereoscopy, tomography, long bone measurements, foreign body localization and fetal imaging.
- RAD 310 Radiation Biology** 2 cr  
A study of health physics and methods used to reduce exposure to personnel and patients in diagnostic and therapeutic radiology. The biological effects of ionizing radiation are stressed along with applied mathematical principles.
- RAD 312 Princ of Radiographic Exposure** 4 cr  
A beginning study of the principles involved in image formation including exposure factors affecting image quality.
- RAD 315 Contrast Media** 2 cr  
A detailed study of contrast media, preparation and administration, radiographic positions, technique, and anatomy and physiology of the organs studied. Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.
- RAD 318 Radiologic Physics** 4 cr  
A study of the fundamentals of magnetism, basic electricity, x-ray machine circuitry, x-ray protection, and radiation physics, to give the student a basic understanding of the principles underlying the production of x-rays and their interaction with matter. Pre-requisite: RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C and RAD 300 Minimum Grade of C.
- RAD 320 Cross-Sectional Anatomy** 2 cr  
A study of cross-sectional anatomy as imaged in MRI and CT.
- RAD 335 Pediatric-Geriatric Rad** 1 cr  
A detailed study of specialized equipment, accessories and positioning techniques used in pediatric and geriatric radiography.
- RAD 403 Clinical Education IV** 4 cr  
Hospital-based laboratory allowing the student to obtain clinical experience in those areas presented in RAD 308 and RAD 310. Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.
- RAD 404 Clinical Education V** 4 cr  
Hospital-based laboratory allowing the student to obtain clinical experience. Pre-requisite: RAD 403 Minimum Grade of C and RAD 411 Minimum Grade of C and RAD 415 Minimum Grade of C.
- RAD 405 Clinical Education VI** 4 cr  
Hospital-based laboratory allowing the student to obtain clinical experience. Pre-requisite: RAD 404 Minimum Grade of C.
- RAD 407 Clinical Education I - PPC** 6 cr  
This is a hospital based laboratory allowing the student to gain additional clinical experience in general radiographic procedures. This course is designed for students who have previously completed the Radiologic Sciences program in Ultrasound or Radiation Therapy.

**RAD 408 Clinical Education II - PPC 6 cr**

This is a hospital based laboratory allowing the student to gain additional clinical experience in general radiographic procedures. This course is designed for students who have previously completed the Radiologic Sciences program in Ultrasound or Radiation Therapy. This course is a continuation of RAD 407.

Pre-requisite: RAD 407 Minimum Grade of C.

**RAD 411 Survey of Pathology 4 cr**

A general survey of diseases designed to acquaint the student with certain changes that occur in disease and their application to radiologic sciences.

Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.

**RAD 415 Diagnostic Imaging 4 cr**

This course includes principles and clinical applications of image intensification, computer applications in radiology, CR, DR, IDDR, PACS, AEC function, magnification radiography, thermography, diaphanography and bone densitometry.

Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.

**RAD 417 Ultrasound Anatomy & Scanning-W 4 cr**

This course will include lecture/clinical/laboratory demonstration and guidelines for the ultrasound evaluation of the abdomen, retro-peritoneum and superficial structures and also include a writing component.

Pre-requisite: EH 102 Minimum Grade of C.

**RAD 418 Ultras Anat-Scan Tech-OB-GYN-W 3 cr**

This course is a continuation of RAD 417 and is designed to provide the student with anatomy, pathology and scanning techniques of obstetrics and gynecology. It includes clinical and laboratory demonstrations. Special fee.

Pre-requisite: RAD 417 Minimum Grade of C.

**RAD 421 Ultras Physics-Instrumentation 3 cr**

A study of the basic physical principles and instrumentation of diagnostic ultrasound.

**RAD 423 Ultrasound Clinical Educ I 5 cr**

Hospital-based laboratory allowing the student to gain clinical experience in ultrasound procedures, with emphasis on abdominal exams.

**RAD 424 Ultrasound Clinical Educ II 5 cr**

Continuation of RAD 423 allowing the student to gain clinical experience in ultrasound procedures, with emphasis on OB/GYN exams.

**RAD 425 Ultrasound Clinical Educ III 5 cr**

A continuation of RAD 424 allowing the student to gain clinical experience in ultrasound procedures, with emphasis on superficial structures, pediatric scans, and ultrasound guided procedures.

**RAD 427 Procedural Guidelines in Ultra 3 cr**

This course will include a review of guidelines for ultrasound exams, ethics in ultrasound and preparation for the ultrasound registry. Assigned student papers and oral presentations addressing ultrasound topics are required.

**RAD 430 Healthcare Communication 3 cr**

This course will provide knowledge of information technology and applications of IT in the healthcare setting. Topics of discussion will include how to foster interdisciplinary communication, development of action plans for areas that are compliant/non-compliant with organizational objectives, and utilization of electronic or manual systems.

Pre-requisite: (RAD 300 Minimum Grade of C or RAD 107 Minimum Grade of C) and (RAD 304 Minimum Grade of C or RAD 104 Minimum Grade of C) and (RAD 307 Minimum Grade of C or RAD 131 Minimum Grade of C) and (RAD 310 Minimum Grade of C or RAD 265 Minimum Grade of C) and (RAD 312 Minimum Grade of C or RAD 101 Minimum Grade of C).

**RAD 432 Healthcare Human Resource Mgmt 3 cr**

This course will enable students to develop an effective recruitment and staffing program, implement a retention program, conduct staff performance evaluations, establish and develop processes to expand employee competence, implement a leadership development program, develop a succession plan and create an employee recognition program.

**RAD 433 Health Care Financial Mgmt 3 cr**

Course provides students with knowledge of both fiscal and asset management health care organization with tools and techniques to include health care accounting and financial statement, making major capital investments, determining cost and using cost information in decision making, and budgeting performance management.

**RAD 435 Health Care Operations Mgt - W 3 cr**

Provide knowledge to use surveys, focus groups, and interviews, use quality improvement methods, develop industry partnerships and develop new opportunities, develop marketing and public relations plans, develop policies and procedures to follow federal, state, and other regulatory guidelines, enforce policies and procedures with monitoring techniques, and develop a quality management program.

**RAD 437 Image Analysis 3 cr**

Student radiographs taken during the clinical periods will be viewed and critiqued within the classroom.

Pre-requisite: RAD 403 Minimum Grade of C and RAD 411 Minimum Grade of C and RAD 415 Minimum Grade of C.

- RAD 440 Radiology Management Preceptor 1 cr**  
To achieve the aims of the Radiology Management program, students require experience in a variety of settings, in addition to learning theory content in their management courses. This course will provide a valuable component of student development by providing an opportunity to work with professional radiology managers/supervisors/administrators in the field of Radiology.  
Pre-requisite: RAD 430 Minimum Grade of C and RAD 432 Minimum Grade of C and RAD 433 Minimum Grade of C and RAD 435 Minimum Grade of C.
- RAD 441 Clinical Education I 5 cr**  
Through structured sequential assignments in clinical education settings, concepts of team practice, patient-centered clinical practice, and professional development are presented. Course designed to provide development, application, analysis, integration, synthesis, and evaluation of concepts and theories in radiation therapy.
- RAD 442 Clinical Education II 6 cr**  
A continuation of RAD 441. Through structured sequential assignments in clinical education settings, concepts of team practice, patient-centered clinical practice, and professional development are presented. Course designed to provide development, application, analysis, integration, synthesis, and evaluation of concepts and theories in radiation therapy.
- RAD 443 Clinical Education III 7 cr**  
A continuation of RAD 442. Through structured sequential assignments in clinical education settings, concepts of team practice, patient-centered clinical practice, and professional development are presented. Course designed to provide development, application, analysis, integration, synthesis and evaluation of concepts and theories in radiation therapy.
- RAD 446 Orientation to Oncology - W 3 cr**  
Examines Oncology terminology, concepts of diagnosis and treatment, orientation to equipment and procedures and the role of the radiation therapist. Ethical, legal and quality assurance concerns will also be discussed.
- RAD 448 Radiation Therapy Physics 3 cr**  
Processes in radiation production, interactions, detection, and measurement, units, calibration, are presented. Routine and emergency protection procedures for radiation-producing devices and radioactive sources are emphasized. Includes discussions on quality assurance methods, treatment unit calibration, dose monitoring, beam verification, and radiation protection for the patient, health-care worker, and the public.
- RAD 450 Patient Care in Oncology 1 cr**  
Fundamentals of oncology patient care with emphasis on physical and psycho-social needs assessment, treatment and disease side-effect management, nutritional care and pain management.
- RAD 452 Prin Pract of Rad Oncology I 3 cr**  
A study of techniques used for simulation and treatment delivery. Includes general and site-specific instruction, with attention given to technical details aimed at optimizing the dose delivery planned during simulation and accomplished during treatment. Time will be dedicated to demonstration of techniques.
- RAD 453 Prin Prac of Rad Oncology II 3 cr**  
A study of techniques used for simulation and treatment delivery. Includes general and site-specific instruction, with attention given to technical details aimed at optimizing the dose delivery planned during simulation and accomplished during treatment. Time will be dedicated to demonstration of techniques.
- RAD 454 Quality Mgt In Rad Oncology 1 cr**  
Components of quality management in Radiation Oncology will be studied, to include quality control and assurance checks for the clinical aspects of patient care, medical records, treatment delivery and localization equipment and treatment planning equipment. The role of various team members in continuous quality improvement will be discussed as well as legal and regulatory implications.  
Pre-requisite: RAD 441 Minimum Grade of C and RAD 448 Minimum Grade of C and RAD 446 Minimum Grade of C and RAD 450 Minimum Grade of C and RAD 452 Minimum Grade of C.
- RAD 455 Dosimetry and Tx Planning I 3 cr**  
Content designed to examine factors that influence and govern clinical planning treatment. Encompasses isodose characteristics, contouring of relevant structures, dosimetric calculations, compensation, and clinical application of treatment beams. Optimal treatment planning is emphasized.
- RAD 456 Dosimetry and Tx Planning II 2 cr**  
A continuation of RAD 455. Content designed to examine factors that influence and govern clinical planning of patient treatment. Encompasses isodose characteristics, contouring of relevant structures, dosimetric calculations, compensation, and clinical application of treatment beams. Optimal treatment planning is emphasized.
- RAD 458 Cancer Mgt in Oncology - W 3 cr**  
This course examines special topics in Radiation Oncology and places emphasis on current literature related to various aspects of practice.
- RAD 460 Vascular Radiograph I 4 cr**  
Advanced practice in, and in-depth study of, the principles of vascular radiography.  
Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.

- RAD 461 Vascular Radiography II** 4 cr  
Advanced practice in, and in-depth study of, the principles of vascular radiography.  
Pre-requisite: RAD 403 Minimum Grade of C and RAD 411 Minimum Grade of C and RAD 415 Minimum Grade of C and RAD 460 Minimum Grade of C.
- RAD 462 Vascular Radiography III-W** 4 cr  
Advanced practice in, and in-depth study of, the principles of vascular radiography.  
Pre-requisite: RAD 461 Minimum Grade of C.
- RAD 464 Computerized Tomography I** 4 cr  
Advanced practice in, and in depth study of, computerized tomography.  
Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.
- RAD 465 Computerized Tomography II** 4 cr  
Advanced practice in, and in-depth study of, computerized tomography  
Pre-requisite: RAD 403 Minimum Grade of C and RAD 411 Minimum Grade of C and RAD 415 Minimum Grade of C and RAD 464 Minimum Grade of C.
- RAD 466 Computerized Tomog III-W** 4 cr  
Advanced practice in, and in-depth study of, computerized tomography.  
Pre-requisite: RAD 464 Minimum Grade of C and RAD 465 Minimum Grade of C.
- RAD 468 Magnetic Resonance Imaging I** 4 cr  
An in-depth study of the principles and clinical applications of MRI.  
Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.
- RAD 469 Magnetic Res Imaging II** 4 cr  
An in-depth study of the principles and clinical applications of MRI.  
Pre-requisite: RAD 403 Minimum Grade of C and RAD 411 Minimum Grade of C and RAD 415 Minimum Grade of C and RAD 468 Minimum Grade of C.
- RAD 470 Magnetic Resonance lmg III-W** 4 cr  
An in-depth study of the principles and clinical applications of MRI.  
Pre-requisite: RAD 468 Minimum Grade of C and RAD 469 Minimum Grade of C.
- RAD 472 Mammography I** 4 cr  
Advanced practice and in-depth study of breast imaging techniques.  
Pre-requisite: RAD 300 Minimum Grade of C and RAD 304 Minimum Grade of C and RAD 307 Minimum Grade of C and RAD 310 Minimum Grade of C and RAD 312 Minimum Grade of C.
- RAD 473 Mammography II** 4 cr  
Advanced practice and in-depth study of breast imaging techniques.  
Pre-requisite: RAD 403 Minimum Grade of C and RAD 411 Minimum Grade of C and RAD 415 Minimum Grade of C and RAD 472 Minimum Grade of C.
- RAD 474 Mammography III-W** 4 cr  
Advanced practice and in-depth study, of breast imaging techniques.  
Pre-requisite: RAD 472 Minimum Grade of C and RAD 473 Minimum Grade of C.
- RAD 475 Advanced Modality Clinical A** 2 cr  
Advance practice in hospital based laboratory/clinical settings. Clinical rotations will serve as the foundation for acquiring the appropriate clinical skills. The completion of assigned clinical rotations and clinical competencies are essential to filling objectives.
- RAD 476 Advanced Modality Clinical B** 2 cr  
Advance practice in an additional hospital based laboratory clinical setting. Clinical rotations will serve as the foundation for acquiring the appropriate clinical skills. The completion of assigned clinical rotations and clinical competencies are essentials to filling objectives.
- RAD 477 Computed Tomography I** 2 cr  
Advance practice in, and in-depth study of, computerized tomography
- RAD 478 Computed Tomography II-W** 2 cr  
Continuation of RAD 477, with increased emphasis on 3-D imaging, biopsies and advanced CT techniques.  
Co-requisite: RAD 475  
Pre-requisite: RAD 477 Minimum Grade of C and EH 102 Minimum Grade of C.
- RAD 479 Computed Tomography III** 2 cr  
Advance practice in, and in-depth study of, computerized tomography
- RAD 480 Mammography I - W** 2 cr  
Lecture and discussion of breast imaging and includes the history, scope of practice, introduction to MQSA, breast cancer and early detection, epidemiology, patient care, patient education and assessment.  
Co-requisite: RAD 475  
Pre-requisite: EH 102 Minimum Grade of C.
- RAD 481 Mammography II** 2 cr  
This course is continuation of RAD 480 with increased emphasis on quality assurance, mammographic digital imaging, diagnostic procedures, and 3D breast tomosynthesis.
- RAD 482 Mammography III** 2 cr  
This course will include web enhanced lectures, demonstrations and review of RAD 480 and RAD 481 with increased emphasis on quality assurance and advanced mammographic digital imaging.

**RAD 483 Magnetic Resonance Imaging I 2 cr**  
An in-depth study of the principles and clinical applications of MRI.

**RAD 484 Magnetic Resonance Imaging II - W 2 cr**  
This course introduces the basic principles of MR safety and covers the basic concepts of patient management. Educating patients and ancillary staff on magnet safety also is presented. Patient and magnet-related emergencies represent a unique situation to an MR tech.  
Co-requisite: RAD 475  
Pre-requisite: EH 102 Minimum Grade of C.

**RAD 485 Magnetic Resonance Imaging III 2 cr**  
A continuation of RAD 484 with additional emphasis on instrumentation, abdominal, extremity and joint procedures.

**RAD 486 Vascular Radiography - W 2 cr**  
Advanced practice and in-depth study of the principles of vascular radiography with writing component.  
Co-requisite: RAD 475

**RAD 487 Vascular Radiography II 2 cr**  
Advanced practice and in-depth study of the principles of vascular radiography, with increased emphasis on digital radiography as applied to vascular procedures.

**RAD 488 Vascular Radiography III 2 cr**  
Advanced practice and in-depth study of the principles of vascular radiography, with increased emphasis on vascular procedures.

**RAD 490 Special Topics 1 TO 3 cr**  
Selected topics in Radiological Sciences. Students can increase knowledge in specific areas of radiological sciences, and also use this course to gain extra credit hours to complete their baccalaureate degree.

**RAD 491 Prof. Radiological Practice 6 cr**  
A bridge course for certified radiographers to transition from Radiographer to BS program.

**RAD 494 Directed Independent Study 2 cr**  
A comprehensive registry review to include written assignments and a presentation.

**RAD 496 Radiologic Sci Research I-W 1 cr**  
Writing intensive course that prepares students to perform a research project in one of the imaging modalities.  
Pre-requisite: EH 102 Minimum Grade of C.

**RAD 497 Rad Science Research II 1 cr**  
Continuation of RAD 496. Students will design and perform a research project.  
Pre-requisite: RAD 496 Minimum Grade of C.

**RAD 499 Senior Honors Project - H - W 3 TO 6 cr**  
Under the advice and guidance of a faculty mentor, honors students will identify and carry out a research project relevant to the field of Radiologic Sciences study that will lead to a formal presentation at the annual Honors Student Colloquium. The senior project will be judged and graded by three faculty members chaired by the honors mentor. This course is required for Honors recognition and may be repeated for up to 6 credit hours. Prerequisite: Permission of the department chair and completion of an approved project prospectus.  
Pre-requisite: RAD 403 Minimum Grade of C or RAD 423 Minimum Grade of C or RAD 441 Minimum Grade of C or RAD 460 Minimum Grade of C or RAD 464 Minimum Grade of C or RAD 468 Minimum Grade of C or RAD 472 Minimum Grade of C.