Radiologic Science Program (DMS/RT/RAD)

College of Science and Health
Health Professions Department (https://www.uwlax.edu/academics/department/health-professions/)
Radiation Therapy (https://www.uwlax.edu/academics/department/health-professions/academic-programs/radiation-therapy/)
Radiologic Technology (https://www.uwlax.edu/academics/department/health-professions/academic-programs/radiologic-technology/)
Diagnostic Medical Sonography (https://www.uwlax.edu/academics/department/health-professions/academic-programs/diagnostic-medical-sonography/)
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Radiologic science: radiation therapy emphasis

The mission of the Radiation Therapy Program at the University of Wisconsin-La Crosse is to educate and train radiation therapists who are knowledgeable, clinically competent and dedicated to their profession and patients. Accomplished by meeting the educational and professional needs of a growing and diverse population, the program will emphasize excellence in education by offering a broad-based curriculum in science, liberal studies, professional courses, and clinical internship. This program additionally seeks to promote research through professional writing using evidence-based practice and provides a base for career advancement of its graduates.

Radiation therapists are health care professionals skilled in the art and science of medical radiation treatment delivery. The majority of patients receiving radiation therapy have cancer. Along with surgery and chemotherapy, radiation therapy offers these patients the best chance to succeed in the fight against their disease. The major focus areas of the profession are the care and assessment of patients, simulation, planning and delivery of treatments utilizing linear accelerator produced radiation and radio-isotopes. Aims of care include cure, relief of symptoms, and improvement of patients' quality of life. High technology equipment and innovative treatment methods are utilized to maximize treatment effectiveness. Radiation therapists must have excellent technical skills, but must also be empathetic and effective communicators. Much satisfaction is gained from close patient interaction and the specialty's team approach with radiation oncologists, physicists, nurses and other medical specialists. Radiation therapy is "technology with a human touch."

The **major in radiologic science: radiation therapy emphasis** provides students with an educational foundation in the sciences and humanities as well as clinical experience in a radiation therapy department. The curriculum requires six semesters on campus in pre-professional and professional core courses prior to the senior year clinical internship. The clinical internship begins in July of the senior year, extends for 13 months, and is spent at an affiliated clinical internship site. When students have met all requirements of the major and the university, they are eligible for graduation and to apply to take the national certification exam.

UWL, in cooperation with its clinical internship sites, currently provides the only training and baccalaureate degree program in radiation therapy in the Universities of Wisconsin. The radiologic science: radiation therapy emphasis at UWL is designed to offer a high quality radiation therapy curriculum rich in academic and clinical experiences. During the clinical internship, students will work directly with certified radiation therapists in direct patient care in busy and highly regarded radiation oncology departments. The program also seeks to foster, in its students, the professional development, problem solving and leadership skills needed for current and future health care environments.

Radiologic science: radiologic technology emphasis

Radiologic technology is a health professions specialty employing the use of ionizing radiation for diagnostic purposes. Radiologic technologists work with physicians, nurses, and other healthcare practitioners to assist in diagnosing patients with a variety of health conditions. The **radiologic science major: radiologic technology emphasis** provides students with a substantial educational foundation in the sciences and clinical applications in a hospital setting so that graduates may function as technologists.

The pre-professional program collectively requires four semesters on campus to complete, including certain prescribed courses, followed by a 24-month internship at an affiliated internship site, away from UWL. Upon the successful completion of a clinical internship experience, students earn a Bachelor of Science degree in radiologic science with a radiologic technology emphasis and are eligible to take the national boards to become a radiologic technologist.

Radiologic science: diagnostic medical sonography emphasis

Diagnostic medical sonography uses ultrasound, or high-frequency sound waves, to identify and diagnose diseases in body organs and tissues. The diagnostic medical sonographer is a health care professional who performs diagnostic ultrasound examinations under a physician's supervision. To perform imaging on patients in the clinical setting, sonographers are required to integrate medical knowledge of anatomy and physiology, pathology and ultrasound physics. Among the parts of the body most commonly viewed through ultrasound are the heart and blood vessels, abdominal organs, pelvic organs and pregnant uterus. Qualified diagnostic medical sonographers are needed in hospitals, clinics, physicians' offices, medical laboratories, industry and public health. Teachers, managers and researchers in diagnostic ultrasound are also in demand.

The **radiologic science major: diagnostic medical sonography emphasis** has two tracks: the **echocardiography/vascular** track and the **general/vascular** track. The pre-professional program collectively requires four semesters on campus to complete, including certain prescribed courses, followed by a 22-month internship at an affiliated internship site, away from UWL. Upon the successful completion of a clinical internship experience, students earn a Bachelor of Science degree in radiologic science with a diagnostic medical sonography emphasis and the pertinent track. Students will also complete national certification exams in order to work in the field.

Majors

- Radiologic science major: diagnostic medical sonography with echocardiography/vascular emphasis - BS (https://catalog.uwlax.edu/undergraduate/radiologicscience/diagnosticmedicalsonography-echocardiographyvascularbs/)
- Radiologic science major: diagnostic medical sonography with general/vascular emphasis - BS (https://catalog.uwlax.edu/

undergraduate/radiologicscience/diagnosticmedicalsonography-generalvascularbs/)

- Radiologic science major: radiation therapy emphasis - BS (https://catalog.uwlax.edu/undergraduate/radiologicscience/radiationtherapybs/)
- Radiologic science major: radiologic technology emphasis - BS (https://catalog.uwlax.edu/undergraduate/radiologicscience/radiologictechnologybs/)

Diagnostic Medical Sonography Courses

DMS 301 Cr.3
Introduction to Diagnostic Medical Ultrasound
In this course students prepare for the new and challenging demands of sonography training in a hospital. Clinical policies and procedures are emphasized. Course content includes materials emphasizing personal adaptation skills and staff development issues, nursing procedures, ethics, and skills to become a better student. An overview of basic sonographic terminology, technique, and equipment form the framework for future study. Students have the opportunity to demonstrate their knowledge of sterile technique. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 302 Cr.3
Vascular Sonography I
Hemodynamics of the arterial and venous vasculature are discussed. Lower extremity venous normal and abnormal are discussed. Extracranial and intracranial cerebrovascular anatomy, normal and abnormal are discussed. Students become familiar with the clinical symptoms and specific ultrasound protocols for normal and abnormal cases associated with lower extremity venous and cerebrovascular disease. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 303 Cr.3
Vascular Sonography II
Peripheral vascular direct and indirect, lower extremity arterial, upper extremity arterial, and upper extremity venous examinations, normal and abnormal will be discussed. Students will become familiar with the clinical symptoms and specific ultrasound protocols for normal and abnormal cases associated with peripheral vascular disease. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 304 Cr.3
Sonographic Principles and Instrumentation
This course enables students to become familiar with the physical principles governing the use of medical ultrasound equipment. Emphasis will be on diagnostic imaging systems, but students will also become acquainted with therapeutic devices including shock wave and thermal delivery systems. Basic principles of acoustic transmission and reflection in tissues are covered at an elementary level. Design and performance of transducers, pulse-echo imaging equipment, Doppler and color flow equipment, and physical therapy systems are emphasized. The physics leading to image artifacts is described, as are methods for evaluating performance of ultrasound devices. Finally, acoustical exposure measurements and levels from diagnostic equipment are discussed, as well as biological effects and risk. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 310 Cr.3
General/Vascular Clinical Education I
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for this Practicum I include abdominal imaging, OB/GYN imaging, and vascular technology. During this practicum, students will be assigned competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 311 Cr.3
General/Vascular Clinical Education II
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum II include abdominal imaging, OB/GYN imaging and vascular technology. During this practicum, students will be assigned competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 312 Cr.3
General/Vascular Clinical Education III
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum III include abdominal imaging, OB/GYN imaging and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 313 Cr.3
Echocardiography/Vascular Clinical Education I
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum I includes adult echocardiography and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 314 Cr.3
Echocardiography/Vascular Clinical Education II
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum II includes adult echocardiography and vascular technology. During this practicum, students will be assigned competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 315 Cr.3
Echocardiography/Vascular Clinical Education III
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum III includes adult echocardiography, pediatric echocardiography, and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 316 Cr.3
Cardiovascular Physiology in Sonography
This course will discuss cardiac physiology, mechanical events, timing of mitral and aortic flow, auscultation, phonocardiography, hemodynamics and Doppler applications to echocardiography, Doppler methods and formulas, concepts of dP/dt, index of myocardial performance, and evaluation of LV systolic and diastolic filling. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 317 Cr.3
Cardiovascular Principles in Sonographic Imaging
This course discusses cardiovascular anatomy, ultrasound image orientation, scan planes, routine views, sonographic anatomy, the normal ultrasound exam protocol for the echocardiogram, left ventricle function indicators, hemodynamics and Doppler applications to echocardiography, spectral Doppler measurements, indirect measurements, Doppler methods, right heart pressures, and introductory echocardiography findings in the following disease states: aortic stenosis, aortic regurgitation, mitral stenosis, and mitral regurgitation assessment. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 318 Cr.3
Embryology of the Heart in Echocardiography
This course is a study of the development of the cardiovascular system and the pediatric heart to include normal anatomy and congenital heart disease. This course will cover embryology of the heart, the pediatric echocardiography exam and protocols, and congenital heart disease. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 319 Cr.3
Adult Echocardiography I
This course will discuss cardiac anatomy and physiology, prosthetic valves, diastology, and cardiac valvular pathology seen on echocardiograms in the adult population. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 320 Cr.3
Pediatric Echocardiography I
This course will introduce the student echocardiographer to various types of congenital heart disease. The types of congenital heart disease to be discussed in this course include, but are not limited to, patent ductus arteriosus (PDA), atrial septal defect (ASD), ventricular septal defect (VSD), pulmonic stenosis (PS), coarctation of the aorta, transposition of the great arteries (TGA), double outlet right ventricle (DORV), and double outlet left ventricle (DOLV). Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 321 Cr.3
Adult Echocardiography II
This course will discuss cardiac pathology seen on echocardiograms in the adult population including cardiomyopathies (hypertrophic, dilated, restrictive), pericardial disease, endocarditis, and cardiac masses. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 326 Cr.3
Abdominal Sonography I
Anatomy, physiology, pathology, and pathophysiology seen on normal and abnormal sonograms of the chest cavity, peritoneal and retroperitoneal spaces, aorta and mesenteric vessels, and the liver will be discussed. Students will become familiar with the clinical symptoms, lab values, and specific ultrasound protocols for normal and abnormal cases. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 327 Cr.3
Abdominal Sonography II
Anatomy, physiology, pathology, and pathophysiology seen on normal and abnormal sonograms of the kidneys, biliary system, pancreas, spleen, and interventional procedures will be discussed. Students will become familiar with the clinical symptoms, lab values, and specific ultrasound protocols for normal and abnormal cases. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 330 Cr.3
OB/GYN Sonography I
This course focuses on the normal gross, relational, and sonographic anatomy of the female pelvis. Gynecologic pathologies and infertility are discussed. Physiology and related laboratory and clinical findings for disease processes are emphasized as related to the female pelvis. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 331 Cr.3
OB/GYN Sonography II
The student gains an understanding of embryology, sonographic evaluation, and complications during the first trimester. Labor, fetal presentation, and fetal anomalies as visualized on ultrasound during the second and third trimester are also discussed. Students become familiar with central nervous system anomalies, GI anomalies, GU anomalies, musculoskeletal anomalies, anomalies associated with multiple gestations, and placental pathology as they appear on ultrasound exams. Students have the opportunity to practice biometric measurements on an obstetrical phantom during this course. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 332 Cr.3
OB/GYN Sonography III
This course will discuss the role of ultrasound in evaluating maternal complications in pregnancy, needle guidance procedures (CVS sampling, Amniocentesis, PUBS, therapy), and in monitoring high risk patients. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 401 Cr.3
Vascular Sonography III
A review of hemodynamics, abdominal, penile, organ transplant Doppler, and vascular statistics will be discussed. Students will become familiar with the clinical symptoms and specific ultrasound protocols for normal and abnormal cases associated with vascular disease involving the above areas of interest. Lect. 2, Lab 2. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 402 Cr.3
Seminar in Professional Development
This course will familiarize the diagnostic medical sonography student with the history of the profession and professional societies associated with the field of diagnostic medical sonography. Students will learn how to be a professional and how to positively influence the field of diagnostic medical sonography. Students will also become familiar with resume creation and interviewing techniques. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 403 Cr.3
Seminar in Management, Research, and Education
This course will familiarize the diagnostic medical sonography student with educational and management issues in the profession. Students will problem solve management issues as they relate to diagnostic medical sonography and will explore educational strategies employed in ultrasound education. Students will participate in department quality assurance projects and educational course development projects. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 404 Cr.3
Seminar in Advanced Medical Imaging: Vascular
The student will be exposed to normal anatomy and pathology cases combining diagnostic medical sonography, computed sonography, and magnetic resonance imaging. The student will gain an understanding of how a diagnosis is made and patients are managed based on findings from multiple imaging modalities. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 410 Cr.3
General/Vascular Clinical Education IV
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum IV include abdominal imaging, OB/GYN imaging, and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 411 Cr.3
General/Vascular Clinical Education V
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum V include abdominal imaging, OB/GYN imaging, and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 412 Cr.3
General/Vascular Clinical Education VI
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum VI include abdominal imaging, OB/GYN imaging, and vascular technology. During this practicum, students are assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Consent of instructor. Offered Summer.

DMS 413 Cr.3
Echocardiography/Vascular Clinical Education IV
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum IV includes adult echocardiography, pediatric echocardiography, and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 414 Cr.3
Echocardiography/Vascular Clinical Education V
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum V includes adult echocardiography, pediatric echocardiography, and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 415 Cr.3
Echocardiography/Vascular Clinical Education VI
Students are scheduled for clinical practicum at participating clinical education centers. Clinical experience rotations for Practicum VI includes adult echocardiography, pediatric echocardiography, and vascular technology. During this practicum, students will be assigned clinical competencies and objectives to complete. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 420 Cr.3
Specialized Sonography
In this course the student studies the embryology, structure, physiology, and pathology of the breast, thyroid, and scrotum. Normal, abnormal gross, cross-sectional, and relational sonographic anatomy will be explored. Invasive and intraoperative sonographic techniques will be discussed as they relate to breast, thyroid, and scrotal sonography exams. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 421 Cr.3
Seminar in OB/GYN: Introduction to Fetal Echocardiography
This course will discuss the role of ultrasound in evaluating the fetus for various genetic syndromes and understanding inheritance patterns. Advanced study of the fetal heart, to include normal anatomy and congenital heart disease, will be discussed including embryology of the heart, the fetal echocardiography exam and protocols, and congenital heart disease. This course also gives students a board review to assist in preparing to take the ARDMS OB/GYN specialty examination. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 422 Cr.3
Introduction to Neurosonography
This course will cover the anatomy, physiology, pathology, pathophysiology, and the sonographic appearance of the normal and abnormal neonatal brain and spine. Students will become familiar with the normal ultrasound exam protocol and how to modify the exam for pathological conditions. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 423 Cr.3
Introduction to Musculoskeletal Sonography
This course will introduce students to an array of musculoskeletal sonographic evaluations including anatomy, physiology, and sonography protocols and procedures. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Spring.

DMS 428 Cr.3
Abdominal Sonography III
Anatomy, physiology, pathology, and pathophysiology seen on normal and abnormal sonograms of the adrenals, male pelvis, and pediatric specialty exams will be discussed. Students will become familiar with the clinical symptoms, lab values, and specific ultrasound protocols for normal and abnormal cases. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

DMS 430 Cr.3
Stress Echocardiography
In this course the student will prepare for the new and challenging demands of sonography training in a hospital with emphasis on stress echocardiography. Clinical policies and procedures are emphasized. Course content includes materials emphasizing personal adaptation skills and staff development issues, nursing procedures, ethics, and skills to become a better student. An emphasis is put on coronary anatomy and wall segment distribution. An overview of basic sonographic terminology, technique, and equipment form the framework for future study. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 431 Cr.3
Pediatric Echocardiography II
This course will introduce the student echocardiographer to various types of congenital heart disease. The types of congenital heart disease to be discussed in this course include, but are not limited to, univentricular heart, right ventricular hypoplasia, left ventricular hypoplasia, inflow anomalies, outflow anomalies, total anomalous pulmonary venous return and coronary artery anomalies, conotruncal anomalies, abnormalities within the cardiac chambers, proximal vessels and thorax, cardiomyopathies, postoperative evaluations, and complex combinations of previously discussed congenital heart defects. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 432 Cr.3
Adult Echocardiography III
This course will discuss cardiac anatomy and pathology as it is seen on echocardiography. This course will focus on intraoperative cardiac ultrasound, congenital heart disease in the adult, and guidance for invasive procedures and contrast echocardiography. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Fall.

DMS 433 Cr.3
Special Procedures in Echocardiography
This course will cover topics for senior students moving from being a student to an entry level sonographer. The course will include the fundamental concepts for intravenous catheter insertion, aseptic technique, and IV contrast administration. A demonstration and lecture on strain imaging and the use of 3D/4D will be presented. There will be a research component for the Intersocietal Accreditation Commission in Echocardiography. Prerequisite: admission to Diagnostic Medical Sonography Program. Offered Summer.

Radiation Therapy Courses

RT 310 Cr.4
Pathophysiology
This course focuses on the pathophysiologic disorders that affect healthy systems across the life span. Theories of disease causation are introduced. Areas of emphasis include cellular and systemic responses, clinical manifestations and the response of tissue to radiation damage. Acquired, immune, infectious, carcinogenic and genetic alterations in body systems are included. Prerequisite: BIO 312, BIO 313; admission to RT. Consent of instructor. Offered Fall.

RT 325 Cr.3
Radiation Therapy Readings, Writing, and Research
This course introduces radiation therapy students to the language of radiation therapy and professional issues in the field by the use of selected readings. The Radiation Therapy Writing in the Major program will be introduced along with the types of writing practiced in the field. Students will learn basic research techniques and begin to apply them to their professional education. This course is designed to be taken concurrently with RT 310. Prerequisite: ENG 110 or ENG 112; STAT 145; concurrent enrollment in RT 310; admission to Radiation Therapy Program. Offered Fall.

RT 330 Cr.2
Professional Issues in Radiation Therapy
This course will provide students with knowledge related to the professional issues pertinent to the field of radiation therapy. Course topics will include: professional development, career advancement/options, radiation therapist scope of practice and practice standards, certification and licensure, radiation therapy professional organizations, legislative issues in radiation therapy, as well as ethics and introductory law in radiation therapy. Prerequisite: admission to Radiation Therapy Program. Offered Fall.

RT 350 Cr.3
Patient Care Issues
This course will prepare students to work directly with patients in a health care setting. It will cover such topics as: communication and patient education, assessment, examination and monitoring of patients, body mechanics and patient handling skills, infection control, management of medical emergencies and CPR, nutritional counseling. Prerequisite: admission to Radiation Therapy Program. Offered Spring.

RT 380 Cr.2
Clinical Concepts in Oncology
Through lecture and hands-on activities, this course provides radiation therapy students advanced patient care skills related to cancer diagnostic and treatment processes. The course also provides instruction on key components of cancer care, health care systems, radiation protection, and treatment processes. Prerequisite: RT 310, RT 325, and RT 330; admission to Radiation Therapy Program. Offered Spring.

RT 385 Cr.1
Applied Concepts in Oncology and Medical Imaging
In this course students gain hands on experiences related to several aspects of treatment delivery and imaging using the Radiation Therapy Virtual Reality System (VERT). Such concepts include, but are not limited to, image guided radiation therapy, anatomy, treatment machine components, treatment planning in radiation therapy, simulation, and treatment delivery and patient safety. Prerequisite: RT 310, RT 325; concurrent enrollment in RT 380 and RT 390; admission to Radiation Therapy Program. Offered Spring.

RT 390 Cr.3
Medical Imaging
This course will provide radiation therapy students with theory and information regarding medical imaging procedures. Radiation therapists play a crucial role in imaging for treatment planning and treatment field verification. The course will provide instruction on analog and digital imaging, as well as various imaging modalities. Prerequisite: PHY 386; admission to Radiation Therapy Program. Offered Spring.

RT 400 Cr.1
Clinical Internship Seminar
This course will prepare students for the clinical internship portion of the program. Course topics will include: professional development, team building skills, radiation therapy terminology, basic clinical concepts, immobilization device construction, CPR, and radiation therapy equipment basics. Prerequisite: admission to Radiation Therapy Program. Offered Spring.

RT 401 Cr.3
Introduction to Radiation Therapy
This course, the first in the clinical internship, will provide the student with an overview of the profession of radiation therapy and its role in health care delivery and cancer management. Students will be oriented to the academic and administrative format of the internship site as well as safety practices of the hospital and radiation therapy department. The radiation therapy process will be identified and discussed along with critical steps in treatment procedures. Students will be prepared for working with patients by learning about charting and documentation as well as appropriate patient/therapist interactions. Prerequisite: RT 310, RT 350; admission to Radiation Therapy Program; assignment to a clinical internship site. Offered Summer.

RT 411 Cr.4
Principles and Practice of Radiation Therapy I
This course, taught during the clinical internship year, addresses the concepts of cancer treatment, focusing primarily on radiation therapy. Methods of improving therapeutic advantage are investigated. Students learn safe and effective use of equipment and accessories along with the rationale for their clinical application. Technical aspects of treatment simulation and delivery are developed. Treatment related side effects and their management and special patient situations are addressed. Prerequisite: RT 310, RT 350, RT 401, RT 471; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Fall.

RT 412 Cr.4
Principles and Practice of Radiation Therapy II
This course, taught during the clinical internship, advances the student's knowledge of neoplastic disease management. Cancers and some benign conditions of various body sites are discussed in relation to natural history, treatment and prognosis. Technical aspects related to radiation planning and delivery are closely investigated as well as pertinent anatomical considerations, combination therapy, treatment results and the therapist's role in disease management. Lect. 3, Lab 2. Prerequisite: RT 411, RT 421, RT 472; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Spring.

RT 421 Cr.3
Cross Sectional, Topographic and Radiographic Anatomy
This course, taught during the clinical internship, revisits anatomy specifically from an imaging perspective. Students will learn to identify structures and pathology on x-rays, CT and MRI scans and locate topographic landmarks on diagnostic and simulation films. Prerequisite: BIO 313, RT 390, RT 401; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Fall.

RT 431 Cr.3
Radiation Therapy Physics
This course, taught during the clinical internship, expands the student's understanding of physics related to radiation therapy. Topics include the components and operation of linear accelerators and other treatment machines, brachytherapy, specification and modification of beam quality and characteristics, measurement of absorbed dose, treatment machine calibration, beam geometry and treatment with particles. Prerequisite: PHY 386, RT 401; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Fall.

RT 435 Cr.3
Dosimetry and Treatment Planning
This course, taught during the clinical internship, focuses on the characteristics, measurement and manipulation of radiation dose delivery in treatment. This involves advanced concepts of methods of altering dose to optimize the effectiveness of the radiation treatment. Treatment planning for a variety of tumor sites and situations is discussed. Prerequisite: RT 411, RT 421, RT 431; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Spring.

RT 437 Cr.2
Quality Management in Radiation Therapy
This course, taught during the clinical internship, focuses on the purpose and techniques of quality management in a radiation oncology program. The importance of documentation, consistent application of specified protocols and assessment of outcomes are addressed. The responsibilities of the radiation therapist within the radiation oncology team for quality functions are highlighted. Prerequisite: RT 411, RT 431; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Spring.

RT 471 Cr.3
Clinical Practicum I
This course, offered the first summer session of the clinical internship, will orient students to the clinical operation of the internship site. Students will observe staff operations in the radiation therapy clinic, simulation, treatment planning, and treatment delivery areas. Prerequisite: RT 310, RT 350, RT 390; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Summer.

RT 472 Cr.6
Clinical Practicum II
This course, offered fall semester of the clinical internship, will progress students' clinical skills from observation in simulation, treatment planning and treatment delivery to the point of participation and development of basic competencies. Prerequisite: RT 401, RT 471; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Fall.

RT 473 Cr.6
Clinical Practicum III
This course, offered spring semester of the clinical internship, will offer students the opportunity to continue the process of developing competence and confidence in the areas of simulation, treatment planning and treatment delivery. They will demonstrate competence in intermediate and some advanced procedures. Students will also be given opportunity to work in dosimetry. Prerequisite: RT 411, RT 421, RT 431, RT 472; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Spring.

RT 474 Cr.4
Clinical Practicum IV
This course, offered during the final summer session of the clinical internship, will complete the students' clinical education experience. By the end of this course, students will have developed proficiency and confidence in areas of simulation, treatment planning and treatment delivery. They will complete all required competencies. Opportunities to broaden the experience and work with different equipment, techniques and advanced procedures will be offered. Prerequisite: RT 412, RT 435, RT 437, RT 473; admission to Radiation Therapy Program; assignment to clinical internship site. Offered Summer.

RT 481 Cr.3
Seminar in Radiation Therapy
The course, offered during the clinical internship, is a capstone course in which students present patient case information, discuss application of radiation science theory, review and critique journal articles and prepare for the national certification exam. Prerequisite: RT 412, RT 435, RT 437; admission to Radiation Therapy Program ; assignment to clinical internship site. Offered Summer.

Radiologic Technology Courses

RAD 306 Cr.3-5
Imaging Procedures I
This course is a study of human anatomy and physiology geared toward students majoring in the radiologic sciences. The course explores the structure and function of the human body, its components, the integration of systems into one functional unit and the concept of homeostasis. This course covers the theoretical and practical principles of radiographic positioning and procedures of the chest, abdomen and upper extremity. Special attention is paid to assessing radiographs for diagnostic quality and to instill critical thinking skills. Laboratory practice sessions are included. Prerequisite: admission to Radiologic Technology Program. Offered Fall.

RAD 307 Cr.2-5
Seminar in Radiology I - Ethics, Law, and Medical Records
This course provides the student with an introduction to radiography practice. Topics include the ARRT code of ethics, HIPAA laws, ethical and legal issues, and licensure and professional organizations. Emphasis is placed on the student's role in medical imaging. This seminar course will include writing and class presentations about ethical and legal issues in the medical field. Prerequisite: admission to Radiologic Technology Program. Offered Spring.

RAD 308 Cr.2-5
Imaging Procedures II
This course is a study of human anatomy and physiology geared toward students majoring in the radiologic sciences. The course explores the structure and function of the human body, its components, the integration of systems into one functional unit, the concept of homeostasis and the basic mechanism of disease processes. This course also covers the theoretical and practical principles of radiographic procedures of the shoulder, lower extremity, pelvis, and vertebral column. Special attention is paid to patient positioning, assessing radiographs for diagnostic quality, and the development critical thinking skills. Laboratory practice sessions are included. Prerequisite: admission to Radiologic Technology Program. Offered Spring, Summer.

RAD 309 Cr.2-5
Imaging Procedures III
This course is a study of human anatomy and physiology geared toward students majoring in the radiologic sciences. The course explores the structure and function of the human body, its components, the integration of systems into one functional unit, the concept of homeostasis and the basic mechanism of disease processes. This course covers the theoretical and practical principles of patient positioning and procedures in radiography of the bony thorax, skull, paranasal sinuses, and facial bones. Special attention is paid to assessing radiographs for diagnostic quality for the development of critical thinking skills. Laboratory practice sessions are included to aid in the application of procedural methods. Lect. 1, Lab 2. Prerequisite: admission to Radiologic Technology Program. Offered Summer.

RAD 350 Cr.2-4
Introduction to Radiologic Sciences and Health Care
This course provides the student with an introduction to radiography practice. Topics include patient care, patient care equipment, patient assessment, aseptic & non-aseptic techniques, pharmacology. Emphasis is placed on the student's role in medical imaging. Laboratory simulation and skills testing is provided to enhance patient care skills. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 351 Cr.1-5
Radiation Protection
This course studies the principles of radiation protection as they apply to exposure from ionizing radiation during medical procedures. It includes radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, and healthcare organizations. It focuses on the responsibilities of the radiographer in assuring correct radiation protection practices are followed for patients, personnel, and the public. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 353 Cr.2-5
Principles of Imaging I
This course introduces the technical aspects of radiographic image production. Topics covered include production of the x-ray beam, image formation, image quality, scatter control exposure factor selection, automatic exposure control, and technique charts. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 355 Cr.2-5
Radiography Clinical Education I
Students will participate in radiographic procedures at various clinical education centers and work toward achieving competency in radiographic practice. The first seven weeks is spent in providing the student with orientation to the clinical environment. Students will begin by observing in the clinical areas with participation increasing as the comfort level and procedural skill levels develop. Performance objectives and cognitive goals apply during the remaining weeks of the semester focusing on basic skill levels in radiography. A minimum of five successful competency tests must be completed by the end of this course. Prerequisite: admission to Radiologic Technology Program. Offered Fall.

RAD 360 Cr.1-5
Radiation Biology
This course teaches the principles of radiation biology. Topics covered include the various ways ionizing radiation interacts with matter from the atomic to the systemic levels of biologic organization including biologic effects of radiation exposure, early effects, late effects, somatic effects, and genetic effects. The concepts of stochastic and deterministic effects, risk models, and dose-response curves are also covered. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 362 Cr.2-5
Principles of Imaging II
This course covers the technical aspects of radiographic image production. Topics covered include image acquisition, image receptors, processing, sensitometry, digital imaging, and fluoroscopy. Prerequisite: admission to Radiologic Technology Program. Offered Spring.

RAD 364 Cr.1-5
Radiography Clinical Education II
Students will participate in radiographic procedures at various clinical education centers and work toward achieving competency in radiographic practice. Students will rotate through various clinical areas with participation increasing as the comfort level and procedural skill levels develop. Performance objectives and cognitive goals apply during the remaining weeks of the semester focusing on basic skill levels in radiography. A minimum of 15 successful competency tests must be completed by the end of this course. Prerequisite: admission to Radiologic Technology Program. Offered Spring.

RAD 372 Cr.1-5
Radiography Clinical Education III
Students will participate in radiographic procedures at various clinical education centers and work toward achieving competency in radiographic practice. Students will rotate through various clinical areas with participation increasing as the comfort level and procedural skill levels develop. Performance objectives and cognitive goals apply during the remaining weeks of the semester focusing on basic skill levels in radiography. A minimum of 25 successful competency tests must be completed by the end of this course. Of the 25 successful competency tests, 10 must be completed with a clinical instructor. Prerequisite: admission to Radiologic Technology Program. Offered Summer.

RAD 401 Cr.2-5
Seminar in Radiography II - Research in the Radiologic Sciences
Topics will be geared toward research in the radiologic sciences. Students will gain experience working in groups and independently. Students will have the opportunity to read and critique professional journal articles and prepare an independent study project. The project can be completed as a scientific paper, scientific exhibit, or video exhibit. Topics must be pertinent to medical imaging and students must follow the essay and exhibit guidelines as published by the Wisconsin Association of Educators in Radiologic Technology (WAERT). Qualified projects will be submitted to the WAERT Student Symposium Essay and Exhibit Competition. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 470 Cr.2-4
Radiologic Physics I
This course studies the principles of physics as they apply to radiologic science. It encompasses comprehensive coverage of the design and function of the x-ray imaging system components, x-ray production, the x-ray emission spectrum, and x-ray interactions with matter. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 473 Cr.2-5
Imaging Procedures IV
This course covers advanced imaging procedures of the skeletal, CNS, and circulatory systems. The course includes guidelines for trauma and surgical radiography, pediatrics, bone densitometry, and the use of contrast agents in advanced radiologic procedures. It also covers advanced modalities including mammography, radiation therapy, nuclear medicine, and ultrasound. Prerequisite: admission to Radiologic Technology Program. Offered Fall.

RAD 474 Cr.2-5
Radiography Clinical Education IV
Students will participate in radiographic procedures at various clinical education centers and demonstrate competency in radiographic practice. Performance objectives and cognitive goals reinforce basic skills and focus on the achievement of advanced skills required of the practicing radiographer. Seventy mandatory competencies are required prior to program completion. A minimum of 40 successful competency tests must be completed by the end of this course. In addition, two of these successful competency tests must be completed with a clinical instructor, and two must be completed as impromptu competency tests to demonstrate continued proficiency. Prerequisite: admission to Radiologic Technology Program. Offered Fall.

RAD 475 Cr.2-5
Seminar in Radiography III - Physics II
This course studies the principles and equipment associated with advanced x-ray imaging and quality control. Topics cover mammography, fluoroscopy, interventional radiography, quality assurance programs, quality control testing, computed tomography, and magnetic resonance imaging. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 477 Cr.1-5
Cross-Sectional Anatomy
This course is a study of human anatomy from a cross-sectional perspective. Special consideration is given to its application in the imaging modalities of CT and MRI. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 478 Cr.2-4
Radiographic Pathology
This course is a study of disease processes and their radiographic appearance. Emphasis is on the detection of disorders and injuries relative to each body system and the diagnosis of pathological processes as aided by medical imaging. Prerequisite: admission to Radiologic Technology Program. Offered Fall, Spring.

RAD 479 Cr.2-5
Radiography Clinical Education V
Students will participate in radiographic procedures at various clinical education centers and demonstrate competency in radiographic practice. Performance objectives and cognitive goals reinforce basic skills and focus on the achievement of advanced skills required of the practicing radiographer. Seventy mandatory competencies are required prior to program completion. A minimum of 55 successful competency tests must be completed by the end of this course. In addition, two of these successful competency tests must be completed with a clinical instructor, and two must be completed as impromptu competency tests to demonstrate continued proficiency. Prerequisite: admission to Radiologic Technology Program. Offered Spring, Summer.

RAD 480 Cr.1-5
Seminar in Radiography IV - Image Analysis
This course covers the principles and practices associated with quality analysis and critique of the radiographic image. Emphasis is on the practical and empirical application of image analysis methods and techniques. Prerequisite: admission to Radiologic Technology Program. Offered Spring, Summer.

RAD 485 Cr.1-5
Professional Development in Radiography
This course is a comprehensive review of subjects deemed critical for the ARRT certification examination in radiography. Topics are in accordance with the content specifications of the ARRT certification examination for radiography. Activities include simulated certification examinations, discussions, and professional development seminars. Prerequisite: admission to Radiologic Technology Program. Offered Spring, Summer.

RAD 486 Cr.2-5
Radiography Clinical Education VI
Students will participate in radiographic procedures at various clinical education centers and demonstrate competency in radiographic practice. Performance objectives and cognitive goals reinforce basic skills and focus on the achievement of advanced skills required of the practicing radiographer. A minimum of 70 successful competency tests must be completed by the end of this course. In addition, one of these successful competency tests must be completed with a clinical instructor, and one must be completed as impromptu competency tests to demonstrate continued proficiency. Seventy mandatory competencies are required prior to program completion. Prerequisite: admission to Radiologic Technology Program. Offered Spring, Summer.