

# MEDICAL IMAGING & THERAPEUTIC SCIENCES (MITS)

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## **MITS 305R SPECIAL PROJECTS I 1 Credit Hour**

This is an independent study assignment designed to give the student the opportunity to develop a scientific essay on selected special topics in Radiologic Technology.

Prerequisite: Enrollment in the Radiography Program or instructor approval.

Typically Offered: FALL

## **MITS 306R SPECIAL PROJECTS II 1 Credit Hour**

This is an independent study assignment designed to give the student the opportunity to develop a scientific exhibit and present its findings on selected special topics in Radiologic Technology.

Prerequisite: Enrollment in the Radiography Program or instructor approval.

Typically Offered: SPRING

## **MITS 308R INTRODUCTION TO MEDICAL IMAGING AND THERAPEUTIC SCIENCES 2 Credit Hours**

This course will provide an introduction and overview of Cardiovascular Interventional Technology (CVIT) Diagnostic Medical Sonography (DMS), Nuclear Medicine (NM), Radiation Therapy (RTT), Magnetic Resonance Imaging (MRI), CT practicum.

Prerequisite: Enrollment in the Radiography Program or instructor approval.

Typically Offered: SPRING

## **MITS 312R RADIOGRAPHIC TECHNOLOGY I 4 Credit Hours**

This course includes four units of instruction: I. Analog Imaging; II. Radiographic Positioning; III. Radiographic Laboratory; IV. Orientation to Clinical Setting. The positioning unit will provide the student with the knowledge and skills necessary to perform the following radiographic procedures: introduction, chest, abdomen, upper and lower extremities, spine and pelvis. The exposure and processing unit will provide the student with the knowledge of factors that govern and influence the production of the radiographic image on film. Requirements for the processing of radiographic film will be addressed.

Prerequisite: Enrollment in the Radiography Program.

Typically Offered: FALL

## **MITS 313R RADIOGRAPHIC TECHNOLOGY II 3 Credit Hours**

The purpose of this course is to prepare the student in advanced examinations of diagnostic radiography. This course will provide the student with the knowledge and skills to perform the following radiographic procedures: spines, sternum, ribs, skull, pediatric studies, geriatric studies, gastrointestinal system, genitourinary system, and biliary system.

Prerequisite: Enrollment in the Radiography Program, MITS 312R.

Typically Offered: SPRING

## **MITS 314R RADIOGRAPHIC TECHNOLOGY III 2 Credit Hours**

Prepare the student in advanced and non-routine examinations of Diagnostic Radiography. This course includes didactic instruction of positioning theory, image critique, and demonstration of trauma protocols. Positioning lecture instruction will provide the student with the knowledge and skills to perform the following non-routine and advanced radiographic procedures: upper and lower extremities, spine, pelvis, advanced fluoroscopic procedures, and neuroradiological and musculoskeletal fluoroscopic procedures. Image critique instruction will provide the student with the knowledge and skills to analyze images for diagnostic quality for interpretation. Trauma laboratory demonstration will provide the student with the knowledge and skills to adapt positioning protocols to non-routine and trauma patients.

Prerequisite: MITS 313R

Typically Offered: SUMMER

## **MITS 315R APPLIED RADIOGRAPHIC TECHNOLOGY I 5 Credit Hours**

This clinical course is intended to initiate participation of the Radiography student in patient care and routine radiographic imaging procedures. The clinical education experience is competency-based with professional components included as well. This experience is intended to provide the student with the confidence needed to assist and perform radiographic procedures that parallel progress in his or her didactic education.

Prerequisite: Enrollment in the Radiography Program.

Typically Offered: FALL

Capacity: 26

## **MITS 316R APPLIED RADIOGRAPHIC TECHNOLOGY II 5 Credit Hours**

This clinical course is intended to initiate participation of the Radiography student in patient care and routine radiographic imaging procedures. The clinical education experience is competency-based with professional components included as well. This experience is intended to provide the student with the confidence needed to assist and perform radiographic procedures that parallel progress in his or her didactic education.

Prerequisite: Completion of MITS 315 R Applied Radiographic Technology I or permission of the instructor.

Typically Offered: SPRING

## **MITS 323R APPLIED RADIOGRAPHIC TECHNOLOGY III 7 Credit Hours**

This clinical course is intended to initiate participation of the Radiography student in patient care and routine radiographic imaging procedures. The clinical education experience is competency-based with professional components included as well. This experience is intended to provide the student with the confidence needed to assist and perform radiographic procedures that parallel progress in his or her didactic education. Students will also have the opportunity to complete a rural rotation at a Joint Review Committee on Education in Radiologic Technology (JRCERT) clinically recognized site. During the summer semester, each student will have the opportunity to request an off-site rotation at a JRCERT clinically recognized site. The purpose of this rotation is to expose students to diverse environments, variety of equipment, variety of exams, and hospital protocols and procedures.

Prerequisite: Completion of MITS 316R Applied Radiographic Technology II or permission of the instructor.

Typically Offered: SUMMER

**MITS 333R RADIOGRAPHIC TECHNOLOGY LABORATORY II 1 Credit Hour**

The purpose of this course is to prepare the student in advanced examinations of diagnostic radiography. Laboratory learning experiences will provide the student with the knowledge and skills to perform the following radiographic procedures: spines, sternum, ribs, skull, pediatric studies, geriatric studies, gastrointestinal system, genitourinary system and biliary system.

Prerequisite: MITS 312R

Typically Offered: SPRING

**MITS 340R APPLIED MAMMOGRAPHY PRACT 1 Credit Hour**

APPLIED MAMMOGRAPHY PRACT

Typically Offered: FALL/SP/SU

**MITS 343R RADIOGRAPHIC IMAGE CRITIQUE 1 Credit Hour**

The purpose of this course is to prepare the student in advanced examinations of diagnostic radiography. This course will provide the student with the knowledge and skills to analyze images for diagnostic quality for interpretation.

Prerequisite: MITS 312R

Typically Offered: SPRING

**MITS 350R RADIOGRAPHIC PATHOLOGY 2 Credit Hours**

RADIOGRAPHIC PATHOLOGY

Typically Offered: FALL

**MITS 352R HUMAN PHYSIOLOGY I 2 Credit Hours**

HUMAN PHYSIOLOGY I

Typically Offered: FALL

**MITS 353R HUMAN PHYSIOLOGY II 2 Credit Hours**

HUMAN PHYSIOLOGY II

Typically Offered: SPRING

**MITS 355R RADIOGRAPHIC PATHOLOGY II 2 Credit Hours**

An essential part of the training of a radiologic technologist is an understanding of the basic principles of pathology and cognizance of the radiographic appearances of specific diseases. Not only does this knowledge make the radiologic technologist more competent, but it also aids the technologist in selecting the appropriate imaging modality, evaluate the quality of the images, and become a contributing member of the radiologic diagnostic team. This type of competency is especially needed for those radiologic technologists that will be working in rural areas that do not have a radiologist readily available. With this knowledge, the radiologic technologist should be able to identify some of the medical emergencies that need immediate attention based on the radiographic findings. Common pathologic conditions will be presented along with the radiographic findings. This course will be based on a systematic approach to the disease involving a specific organ system. Prerequisite: Enrollment in the Radiography Program, MITS 350R or instructor permission.

Typically Offered: SPRING

**MITS 390R DIGITAL IMAGING PRINCIPLES 4 Credit Hours**

This course is designed to facilitate a basic understanding of digital radiographic imaging. Concepts covered include: 1) principles of exposure and image production 2) digital image acquisition and display 3) picture archiving and communication systems and 4) quality control. Prerequisite: First Year Radiography Student, or approval of instructor

Typically Offered: FALL

**MITS 401S ULTRASOUND PHYSICS I 1 Credit Hour**

This course is designed to provide the student with fundamental information necessary to understand the principles of ultrasound physics as it applies to diagnostic imaging. Topics to be covered include sound parameters, interaction of sound with media, resolution, transducers, instrumentation, real-time imaging, and image storage and display. Concepts will focus on applicability in the clinical setting and preparation for the registry examination.

Prerequisite: Enrollment in undergraduate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 601S.

Typically Offered: FALL

**MITS 402R INTRODUCTION TO RADIATION PHYSICS 3 Credit Hours**

This course will provide the student with knowledge of basic, radiation and nuclear physics. The course will cover basic radiation physics, radiation production, radiation equipment radiation protection to provide the student with a solid foundation of radiation physics.

Prerequisite: Enrollment in the Radiography Program.

Typically Offered: SPRING

**MITS 402S SONOGRAPHY CLINICAL EDUCATION II 5 Credit Hours**

This clinical course is designed to provide the DMS student with a working knowledge of Diagnostic Medical Sonography. The student will participate in clinical ultrasound exams with emphasis on operating equipment, producing quality images, applying scanning techniques and protocols, identifying normal anatomy, and recognizing pathology. Clinical Competency Evaluations will be used to assess application of technical skills and knowledge. Overall Clinical Evaluations will monitor affective, psychomotor, and cognitive skills.

Prerequisite: Enrollment in the undergraduate Diagnostic Medical Sonography program, MITS 412S or instructor permission.

Cross List: MITS 602S.

Typically Offered: SPRING

**MITS 403S DIAGNOSTIC IMAGE REVIEW II 1 Credit Hour**

This course uses a case study-based approach to provide the student with an in-depth investigation into sonographic anatomy and pathology and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the Diagnostic Medical Sonography (DMS) Program, MITS 441S/641S Diagnostic Image Review I, and/or instructor permission

Cross List: MITS 603S.

Typically Offered: SPRING

**MITS 404R APPLIED RADIOGRAPHIC TECHNOLOGY IV 6 Credit Hours**

This clinical course is intended to initiate participation of the Radiography student in patient care and routine radiographic imaging procedures. The clinical education experience is competency-based with professional components included as well. This experience is intended to provide the student with the confidence needed to assist and perform radiographic procedures that parallel progress in his or her didactic education.

Prerequisite: Completion of MITS 323R Applied Radiographic Technology III or permission of the instructor.

Typically Offered: FALL

**MITS 405S OB/GYN CONFERENCE II 1 Credit Hour**

This course is the second in a series of three courses. This course uses a case study-based approach to allow the student to continue their study of obstetric and gynecologic anatomy, pathology, and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the Diagnostic Medical Sonography Program, MITS 431S/631S, or instructor permission.

Cross List: MITS 605S.

Typically Offered: SPRING

**MITS 405T ORIENTATION TO RADIATION THERAPY 1 Credit Hour**

The content of this course is designed to provide the student with an overview of the foundations in radiation therapy and the practitioners role in the health care delivery system. Principles, practices and policies of the educational program, health care organizations, and principles of radiation and health safety as well as professional responsibilities of the radiation therapist will be discussed and examined.

Prerequisite: Enrollment in the Undergraduate Radiation Therapy Program or instructor permission.

Cross List: MITS 605T.

Typically Offered: FALL

**MITS 407R RADIOGRAPHIC IMAGING SEMINARS 2 Credit Hours**

This course is a comprehensive review of didactic learning material presented in the professional radiography program curriculum completed thus far in the students educational process. It will assist the radiography student in a way to demonstrate an overall understanding of the knowledge and skills needed to be a successful, competent radiographer. Review will encompass radiation protection, equipment operation and quality control, image production and evaluation, radiographic procedures to include anatomy, positioning, procedures and pathology, and patient care and education. The course is designed to assist the student in preparing for a national certification examination provided by the American Registry of Radiologic Technologists Organization (ARRT).

Prerequisite: Enrollment in the Radiography Program.

Typically Offered: SPRING

**MITS 407S ADVANCED OBSTETRICAL ULTRASOUND 2 Credit Hours**

This course is designed to give the student a working knowledge of obstetrics as it relates to sonography. The student is instructed on fetal embryology, normal anatomy, gestational age assessment, anomalies of each organ system, uteroplacental anatomy and physiology, and maternal and fetal complications associated with pregnancy.

Prerequisite: Instructor approval.

Cross List: MITS 607S.

Typically Offered: SPRING

**MITS 408R APPLIED RADIOGRAPHIC TECHNOLOGY V 6 Credit Hours**

This clinical course is intended to initiate participation of the Radiography student in patient care and routine radiographic imaging procedures. The clinical education experience is competency-based with professional components included as well. This experience is intended to provide the student with the confidence needed to assist and perform radiographic procedures that parallel progress in his or her didactic education.

Prerequisite: Enrollment in the Radiography Program.

Typically Offered: SPRING

**MITS 408S GYNECOLOGICAL ULTRASOUND 1 Credit Hour**

This course is designed to give the student a working knowledge of patient care preparation, normal female pelvic anatomy, reproductive physiology, gynecological pathology and scanning techniques. Clinical application of gynecological sonography will be emphasized in this course.

Prerequisite: Instructor approval.

Cross List: MITS 608S.

Typically Offered: SPRING

**MITS 408T RADIATION THERAPY PHYSICS 2 Credit Hours**

This course is the study of the fundamental physics principles and applications utilized in clinical radiation oncology. Wherever possible, clinical correlations will be made. Fundamental nuclear physics, charged particle interaction, measurement of absorbed dose, dosimetric calculations, external beam therapy, brachytherapy and radiation safety will be discussed in detail. New and future therapeutic techniques will also be introduced. Because of the higher level nature of the course and the involvement of medical residents and medical physics residents, the curriculum is the same for both 408T and 608T.

Prerequisite: Enrollment in the Undergraduate Radiation Therapy Program or instructor permission.

Cross List: MITS 608T.

Typically Offered: FALL

**MITS 409S GENITOURINARY ULTRASOUND 1 Credit Hour**

This course is designed to provide the student with an understanding of anatomy, physiology, and pathology of the genitourinary system. Clinical application of genitourinary sonography will be emphasized in this course.

Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS) or American Registry Of Radiologic Technologist (ARRT), or permission of the Diagnostic Medical Sonography program director

Cross List: MITS 609S.

Typically Offered: SPRING

**MITS 410R SECTIONAL ANATOMY & PATHOLOGY I 4 Credit Hours**

This course is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform computed tomography and magnetic resonance imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include neck/spine, bones (osseous system), joints, cranial nerves and head (nervous systems). (Asynchronous Didactic)

Prerequisite: Admission good standing within the MRI, CVIT or DAO Program OR permission from the instructor.

Cross List: MITS 610R.

Typically Offered: FALL

**MITS 411R SECTIONAL ANATOMY & PATHOLOGY II 4 Credit Hours**

This course is a continuation of RSTE 410R/610R and is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform computed tomography and magnetic resonance imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include chest (respiratory system lymphoid system), abdomen (gastrointestinal system) and pelvis (genitourinary reproductive systems). (Asynchronous Didactic)

Prerequisite: Admission good standing within the MRI, CVIT or DAO Program OR permission from the instructor.

Cross List: MITS 611R.

Typically Offered: SPRING

**MITS 412S SONOGRAPHY CLINICAL EDUCATION I 5 Credit Hours**

This clinical course is designed to develop the cognitive, psychomotor and affective skills necessary to practice as a Diagnostic Medical Sonographer. Students will participate in a variety of clinical environments with direct supervision by clinical instructors and staff sonographers.

Prerequisite: Enrollment in the undergraduate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 612S.

Typically Offered: FALL

**MITS 413R RADIOLOGIC CONTRAST AGENTS 2 Credit Hours**

This course provides students with a study of different types of contrast media; how each is used to delineate specific anatomic parts or organs; common radiographic procedures using contrast media; indications/contraindications; patient prep care. This course presents the physical principles of contrast media related to imaging, the physical and chemical properties of contrast media solutions, classification/chemistry/pharmacology of contrast agents, pharmacodynamics, the pharmacokinetics and biopharmaceutics of contrast media, routes of drug administration, infection prevention and control, anxiety/phobia/conscious sedation, pharmacology of emergency medications, contrast-related nephrotoxicity, mechanisms of contrast media reactions, radiographic contrast media terminology, and the economic and legal issues involving contrast media and radiographic procedures.

Prerequisite: Enrollment in a health science program or radiography program.

Typically Offered: SPRING

**MITS 414R RADIATION HEALTH PHYSICS 2 Credit Hours**

This course will focus on the legal, biological, and administrative aspects of radiation protection in radiology. Emphasis will be placed on practical means of minimizing radiation exposure to the patient, radiology staff, and the general public.

Prerequisite: Enrollment in the Radiography Program.

Typically Offered: FALL

**MITS 414S PRACTICAL APPLICATION OF SONOGRAPHY 3 Credit Hours**

This course provides the sonographer with an overview of organ systems and structures imaged by ultrasound and associated pathologies encountered in the patient care setting. Clinical reasoning skills and differential diagnoses are further refined through case study-based application.

Prerequisite: Admission in the UNMC College of Allied Health Professions, and/or current certification in diagnostic medical sonography, or permission of the Diagnostic Medical Sonography program director.

Cross List: MITS 614S.

Typically Offered: FALL/SP/SU

**MITS 414T ONCOLOGY SECTIONAL ANATOMY & PATHOLOGY I 2 Credit Hours**

This online course is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform radiation therapy treatment and imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include chest (respiratory system) and abdomen (gastrointestinal system).

Prerequisite: Admission good standing within the Radiation Therapy Program, DAO Program, OR permission from the instructor.

Cross List: MITS 614T.

Typically Offered: FALL

**MITS 415S ORIENTATION TO DIAGNOSTIC MEDICAL SONOGRAPHY 1 Credit Hour**

This course provides the sonography student with an overview of sonographic exams that will be encountered in the clinical environment. The focus will include exam indications and preps, correlation of clinical history, and sonographic findings.

Prerequisite: Instructor approval.

Cross List: MITS 615S.

Typically Offered: FALL

**MITS 415T ONCOLOGY SECTIONAL ANATOMY & PATHOLOGY II 2 Credit Hours**

This course is a continuation of MITS 414/614T and is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform radiation therapy treatment and imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include pelvis (urinary reproductive systems), spine/ head (nervous system) and neck/neck lymphatics.

Prerequisite: Admission good standing within the Radiation Therapy Program, DAO Program, OR permission from the instructor.

Cross List: MITS 615T.

Typically Offered: SPRING

**MITS 416S SONOGRAPHY LAB I 1 Credit Hour**

This course is designed to provide the student with the opportunity to practice and refine ultrasound scanning skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Enrollment in the Diagnostic Medical Sonography (DMS) program and/or instructor permission.

Cross List: MITS 616S.

Typically Offered: FALL

**MITS 417S SONOGRAPHY LAB II 1 Credit Hour**

This course is the second course in a series of three lab courses. The course is designed to provide the student with the opportunity to further hone acquired scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting. Prerequisite: MITS 416S Sonography Lab I and/or admission to the Diagnostic Medical Sonography program or instructor permission  
Cross List: MITS 617S  
Typically Offered: SPRING

**MITS 418S SONOGRAPHY LAB III 1 Credit Hour**

This course is the third course in a series of three lab courses. The course is designed to provide the student with the opportunity to master acquired scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting. Prerequisite: Enrollment in the Diagnostic Medical Sonography program, successful completion of MITS 416S/616S Sonography Lab I and MITS 417S/617S Sonography Lab II, and/or instructor permission  
Cross List: MITS 618S  
Typically Offered: SUMMER

**MITS 419I INDUSTRIAL STUDIES: MRI PHYSICS & SYSTEMS 4 Credit Hours**

The course will provide the student with an introduction of fundamental MRI concepts which includes MRI basics, physical principles of image formation, sequence parameters and options, and data acquisition, processing, and storage.  
Typically Offered: FALL/SP/SU

**MITS 419R MRI PHYSICS & SYSTEMS I 2 Credit Hours**

This course is designed for use within a magnetic resonance imaging program (MRI) or related health science profession. Course content will include a comprehensive MRI safety overview, an introduction of fundamental MRI concepts including magnetization, image contrast, image weighting, and introduction to pulse sequences, instrumentation, spatial encoding principles and imaging parameters and their trade-offs. Prerequisite: Enrollment in the UNMC Magnetic Resonance Imaging Program, BSMITS DAO Option or by permission of instructor.  
Cross List: MITS 619R.  
Typically Offered: FALL

**MITS 419S PROFESSIONAL PROJECTS I 1 Credit Hour**

This course will help prepare the student for clinical practice through an in-depth investigation into the professions of medical imaging using an interdisciplinary approach to build skills in critical thinking, oral and written communication, and working in teams. Prerequisite: Enrollment in a Medical Imaging and Therapeutic Sciences (MITS) program or instructor permission.  
Cross List: MITS 619S  
Typically Offered: SPRING

**MITS 420R MRI PHYSICS & SYSTEMS II 2 Credit Hours**

This course is a continuation of MITS 419/619R and is for the student who is enrolled in a Magnetic Resonance Imaging (MRI) program or related health science discipline. Content will be built upon principles covered in MITS 419/619R and establishing understanding of spin echo and gradient echo pulse sequences, image artifacts and methods to correct them, and advanced imaging procedures including contrast and contrast procedures, diffusion, perfusion, fMRI and spectroscopy. Prerequisite: MITS 419/619R MRI Physics Systems I required.  
Cross List: MITS 620R.  
Typically Offered: SPRING

**MITS 420T IND STUDY PROJECT 1-3 Credit Hours**

IND STUDY PROJECT  
Typically Offered: FALL/SP/SU

**MITS 421S PROFESSIONAL PROJECTS II 1 Credit Hour**

This course is designed to prepare the student for entry into the profession of Diagnostic Medical Sonography. Professional development and growth will be promoted through activities that enhance skills needed to successfully make the transition from student to professional. Areas to be covered include presentation skills, resume writing, interviewing skills, professional requirements and opportunities. Prerequisite: Enrollment in the undergraduate Diagnostic Medical Sonography program, MITS 419S or instructor permission.  
Cross List: MITS 621S.  
Typically Offered: SUMMER

**MITS 422S VASCULAR ANATOMY AND PHYSIOLOGY 3 Credit Hours**

The course is designed to provide the student with a working knowledge of vascular sonography. Course content will cover hemodynamics, anatomy, and pathology of the cerebral, extremity, abdominal and pelvic vessels. Students will also be introduced to exam preps and scanning techniques. Prerequisite: Admission to the Vascular Sonography Program and/or permission from the instructor.  
Cross List: MITS 622S.  
Typically Offered: FALL/SP/SU

**MITS 423S PATHOLOGY FOR THE HEALTH CARE PROFESSIONAL 2 Credit Hours**

This course allows an in-depth investigation into pathology that may be encountered by the health care professional in clinical practice. The relationship of clinical symptoms, labs values, and imaging findings will be covered for each disease process. Prerequisite: Current American Registry of Diagnostic Medical Sonography (ARDMS), American Registry of Radiologic Technologist (ARRT) credentials, OR permission of the instructor.  
Typically Offered: FALL/SP/SU

**MITS 424S BREAST SONOGRAPHY 2 Credit Hours**

This course is designed to prepare the registered sonographer or radiographer for the Breast Sonography Certification Exam offered by the ARDMS or ARRT. The course will offer a comprehensive review of sonographic principles and instrumentation, sonographic anatomy and pathology of the breast, and interventional procedures/treatment. This course does not offer a clinical component. Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS) or American Registry Of Radiologic Technologist (ARRT), or permission of the Diagnostic Medical Sonography program director.  
Cross List: MITS 624S.  
Typically Offered: FALL/SP/SU

**MITS 424T CLINICAL ONCOLOGY I 2 Credit Hours**

Content is designed to examine and evaluate the management of neoplastic disease using knowledge in arts and sciences, while promoting critical thinking and the basis of ethical clinical decision making. The epidemiology, etiology, detection, diagnosis, patient condition, treatment and prognosis of neoplastic disease will be presented, discussed and evaluated in relation to histology, anatomical site and patterns of spread. The radiation therapist's responsibility in the management of neoplastic disease will be examined and linked to the skills required to analyze complex issues and make informed decisions while appreciating the scope of the profession. Site specific neoplasms covered in this course will include: Breast, Gastrointestinal, Genitourinary, Head and Neck, Reproductive and Respiratory. Because of the higher level nature of the course and the involvement of medical residents and medical physics residents, the curriculum is the same for both MITS 424T and MITS 624T.

Prerequisite: Enrollment in the undergraduate Radiation Therapy program or instructor permission.

Cross List: MITS 624T.

Typically Offered: FALL

**MITS 425I INDUSTRIAL STUDIES: MRI POSITIONING & PROTOCOLS 4 Credit Hours**

This course will provide the student with imaging techniques through individual topics of the following: central nervous system, neck, thorax, musculoskeletal system, and abdominopelvic regions. The course includes materials related to patient care and assessment, cross-sectional anatomy, patient preparation, positioning, and technical parameters associated with MR imaging.

Typically Offered: FALL/SP/SU

**MITS 425R MRI POSITION & PROTOCOL I 2 Credit Hours**

This course is directed to the student who is enrolled in a Magnetic Resonance Imaging (MRI) program or related health science discipline. Content will include materials related to MRI safety and patient care, cross sectional anatomy, patient positioning, MRI instrumentation, and technical parameters associated with MR imaging of the brain, spine, abdomen, and musculoskeletal exams. Students enrolled in this course must have access to an MRI scanner in order to complete various protocol assignments.

Cross List: MITS 625R.

Typically Offered: FALL

**MITS 425T CLINICAL ONCOLOGY II 2 Credit Hours**

Content is designed to examine and evaluate the management of neoplastic disease using knowledge in arts and sciences, while promoting critical thinking and the basis of ethical clinical decision making. The epidemiology, etiology, detection, diagnosis, patient condition, treatment and prognosis of neoplastic disease will be presented, discussed and evaluated in relation to histology, anatomical site and patterns of spread. The radiation therapists responsibility in the management of neoplastic disease will be examined and linked to the skills required to analyze complex issues and make informed decisions while appreciating the scope of the profession. Site specific neoplasms covered in this course will include: Central Nervous System, Endocrine, Hematopoietic, Integumentary, Lymphoreticular, Musculoskeletal, Pediatric, Metastatic and Emergent disease. Because of the higher level nature of the course and the involvement of medical residents and medical physics residents, the curriculum is the same for both 425T and 625T.

Prerequisite: Enrollment in the undergraduate Radiation Therapy Program or instructor permission.

Cross List: MITS 625T.

Typically Offered: SPRING

**MITS 427R PATIENT EDUCATION AND ASSESSMENT IN MAMMOGRAPHY 1 Credit Hour**

PATIENT EDUCATION AND ASSESSMENT IN MAMMOGRAPHY

Typically Offered: FALL/SP/SU

**MITS 428T PRINCIPLES AND PRACTICE OF RADIATION THERAPY 2 Credit Hours**

This course is designed to provide an overview of cancer and the specialty of radiation therapy. Historic and current aspects of cancer treatment will be covered. The roles and responsibilities of the radiation therapist will be discussed. Aspects of law and ethics pertaining to a radiation therapist are included. Basic principles of radiation safety are reinforced. In addition, treatment prescription, techniques, and treatment delivery will be covered. Oral and written communication skills are developed with the writing and presentation of an article abstract pertaining to radiation oncology.

Prerequisite: Enrollment in the Radiation Therapy Program.

Cross List: MITS 628T.

Typically Offered: FALL

**MITS 429R INSTRUMENTATION & QUALITY ASSURANCE IN MAMMOGRAPHY 1 Credit Hour**

INTRUMENTATION QUALITY ASSURANCE IN MAMMOGRAPHY

Typically Offered: FALL/SP/SU

**MITS 430T PATIENT CARE 1 Credit Hour**

This course builds upon the students previous academic knowledge and clinical experience. Assessment and evaluation of the cancer patient for service delivery will be addressed. Content will include examination of patients psychological and physical needs affecting radiation treatment outcome. The role of chemotherapy will be discussed; to include common agents, routes of administration, and side effects. Routine and emergency care procedures will be reviewed or presented.

Prerequisite: Enrollment in the undergraduate Radiation Therapy Program or instructor permission.

Cross List: MITS 630T.

Typically Offered: FALL

**MITS 431S OB/GYN CONFERENCE I 1 Credit Hour**

This course is the first in a series of three courses. This course uses a case study-based approach to provide the student with an introduction to obstetric and gynecologic sonographic anatomy, basic pathology, and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the undergraduate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 631S.  
Typically Offered: FALL

**MITS 432S ABDOMINAL ULTRASOUND 3 Credit Hours**

This course provides the student with an in-depth investigation into abdominal sonography including normal and abnormal sonographic findings, scanning techniques, physiology, pathophysiology of the upper abdominal organs.

Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS), the American Registry Of Radiologic Technologist (ARRT), or permission of the Diagnostic Medical Sonography program director.

Cross List: MITS 632S.  
Typically Offered: FALL

**MITS 434S VASCULAR SONOGRAPHY EXTERNSHIP 3 Credit Hours**

This clinical course is designed to provide the sonography student with a working knowledge of clinical vascular sonography. The student will apply concepts learned in didactic courses to the performance of noninvasive vascular procedures. Emphasis will be placed on delivering quality patient care, applying scanning techniques and protocols, producing quality images, identifying normal anatomy, and recognizing pathology.

Prerequisite: MITS 424S or MITS 624S, satisfactory completion of a DMS program, ARDMS or ARRT certification and DMS Program Director permission.

Corequisite: MITS 424S or MITS 624S, satisfactory completion of a DMS program, ARDMS or ARRT certification and DMS Program Director permission.

Cross List: MITS 634S.  
Typically Offered: FALL/SPR

**MITS 435S ORIENTATION TO CARDIOVASCULAR SONOGRAPHY 2 Credit Hours**

This course provides the sonography student with an overview of cardiovascular sonographic exams that will be encountered in the clinical environment. Focus will include exam indications and preparation, correlation of clinical history, and sonographic findings.

Prerequisite: Enrollment in the Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 635S.  
Typically Offered: FALL

**MITS 435T TREATMENT PLANNING & DELIVERY 3 Credit Hours**

This course covers concepts of clinical dosimetry, brachytherapy, and treatment planning. Emerging technologist and delivering precise doses of radiation are emphasized. Included are isodose summation, construction and calculations. The importance of lifelong learning is addressed with the construction and presentation of an educational exhibit incorporating radiation therapy's role in cancer care as well as completion of the ASRT IGRT educational modules. Activities emphasizing inter-professionalism and leadership are also included. Written and oral communication skills will continue to be strengthened through the writing and presentation of an article abstract assignment. MITS 635T students will complete a scientific essay and present it to their peers.

Prerequisite: Enrollment in the undergraduate Radiation Therapy Program or instructor permission.

Cross List: MITS 635T.  
Typically Offered: SPRING

**MITS 436S ADULT CARDIAC SONOGRAPHY EXTERNSHIP 3 Credit Hours**

This clinical course is designed to provide the sonography student with a working knowledge of clinical cardiac sonography. The student will apply concepts learned in their didactic courses to the performance of adult echocardiography procedures. Emphasis will be placed on delivering quality patient care, applying scanning techniques and protocols, producing quality images, identifying normal anatomy, and recognizing pathology.

Prerequisite: MITS 437S or 637S, MITS 438S or 638S, satisfactory completion of a DMS Program, ARDMS or ARRT certification and DMS Program Director permission.

Corequisite: MITS 437S or MITS 637S, MITS 438S or MITS 638S, satisfactory completion of a DMS program, ARDMS or ARRT certification and DMS Program Director permission.

Cross List: MITS 636S.  
Typically Offered: FALL/SP/SU

**MITS 436T RADIATION THERAPY CLINICAL EDUCATION I 3 Credit Hours**

This course provides the student with the necessary skills used in treatment delivery, record keeping, simulation, and development of patient-therapist rapport. Content is designed to provide sequential development, application and integration of concepts and theories in radiation therapy. Clinical experiences will include operation of linear accelerators, instruction in dosimetry, beam modification, simulation procedures, and patient-centered clinical practices. Concepts of team practice, Critical thinking, and professional development will also be presented and evaluated.

Cross List: MITS 636T.  
Typically Offered: FALL

**MITS 437S CARDIAC ANATOMY AND PHYSIOLOGY 3 Credit Hours**

This course is designed to provide the student with a working knowledge of cardiac sonography. The student is provided with instruction in anatomy, scanning techniques, physiology, and pathophysiology of the heart.

Prerequisite: Satisfactory completion of an accredited sonography program and ARDMS or ARRT(S) certification. Permission of the program director required.

Cross List: MITS 637S.  
Typically Offered: FALL

**MITS 438N ADVANCED RADIATION BIOLOGY 3 Credit Hours**

This course is directed to the senior level students enrolled in the Radiation Therapy and BSMITS degree completion programs. Content will include review and continuation of basic radiobiology involved with radiation oncology and radiation therapy. It will address the radiobiological/biophysical events at the cellular and subcellular levels. Analysis of factors influencing radiation response of cells and tissues will be covered. Construction and evaluation of radiobiological data on graphs, charts, and survival curves will be included. Relationships of time, dose, fractionation, volume and site as they apply to both normal and tumor biology will be evaluated. The principles of radiation response modifiers, hyperthermia, chemotherapy and their influence on biologic effects in combination with radiation will be examined.

Prerequisite: Enrollment good standing within a Medical Imaging Therapeutic Sciences or BSMITS DAO Program OR permission from the instructor. College Biology is recommended.

Cross List: MITS 638N.

Typically Offered: SPRING

**MITS 438S CARDIAC PATHOLOGY AND HEMODYNAMICS 4 Credit Hours**

This course will offer a comprehensive review of cardiac pathology and the related EKG and sonographic findings.

Prerequisite: Satisfactory completion of an accredited sonography program and ARDMS or ARRT(S) certification. Permission of the program director required.

Cross List: MITS 638S.

Typically Offered: SPRING

**MITS 439S CASES IN CARDIOVASCULAR SONOGRAPHY I 1 Credit Hour**

This course is designed to give the student an understanding of normal and pathologic cardiac and vascular conditions and how they are viewed by ultrasound.

Prerequisite: Admission to the Cardiac Sonography Program and/or permission of the instructor.

Cross List: MITS 639S

Typically Offered: FALL

**MITS 439T RADIATION THERAPY CLINICAL EDUCATION II 3 Credit Hours**

As a continuum of Applied Radiation Therapy I, this course provides the student with the necessary skills used in treatment delivery, record keeping, simulation, and development of patient-therapist rapport.

Content is designed to provide sequential development, application and integration of concepts and theories in radiation therapy. Clinical experiences will include operation of linear accelerators, instruction in dosimetry, beam modification, simulation procedures, and patient-centered clinical practices. Concepts of team practice, critical thinking, and professional development will also be presented and evaluated. For 639T, students will participate in a cytology lab assignment to identify various histologic types of cancers treated in the clinic.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 428T, MITS 436T or instructor permission.

Cross List: MITS 639T.

Typically Offered: SPRING

**MITS 440R CASE STUDIES & JOURNAL REVIEW 2 Credit Hours**

Case Studies Journal Review is an independent upper-level course designed for radiation science students in a baccalaureate degree program to facilitate analytical and critical thinking skills, apply their written and oral communication skills, and foster professional development and growth. Students will research, identify, and form a differential diagnosis for clinical cases imaged by various diagnostic modalities. Students will also study and critique medical cases and professional peer-reviewed journal articles. This course will allow students to broaden their educational experience in radiation science and their specific modality of study by investigating cases from a wider perspective. Students will review clinical cases to gain a better understanding of their scope of practice/role as a radiation science professional in an integrated health care system. They will witness, reflect upon, and discuss the interdisciplinary medical process; patient clinical presentation, historical interview, diagnostic findings, differential diagnosis, initial diagnosis, actual pathology, definition of terms, therapy, follow up, home care and support, and the healthcare provider/patient relationship. They will also consider any medical legal issues, communication issues, age related and cultural competency issues, risk management issues, and/or ethical issues associated with each case.

Prerequisite: Enrollment in the BSMITS DAO Program or instructor permission.

Typically Offered: SUMMER

**MITS 440S CARDIOVASCULAR SONOGRAPHY CLINICAL EDUCATION I 5 Credit Hours**

This clinical course is designed to provide the sonography student with the fundamental knowledge and critical thinking skills necessary to participate in the clinical setting. The student will participate in a clinical setting to develop skills in equipment operation, scanning technique, scanning protocol, normal anatomy identification, and pathology recognition.

Prerequisite: Admission to the Cardiac Sonography Program and/or permission from the instructor.

Cross List: MITS 640S.

Typically Offered: FALL

**MITS 441R MRI POSITIONING & PROTOCOLS II 2 Credit Hours**

This course is a continuation of MITS 425/625R and is for the student who is enrolled in a Magnetic Resonance Imaging (MRI) program or related health science discipline. Content will include materials related to MRI safety and patient care, cross sectional anatomy, patient preparation, patient positioning, MRI instrumentation, and technical parameters associated with MR imaging of the upper and lower extremities, soft tissue and bony pelvis, cardiac, chest, and breast MRI. Content will also include material related to MRI quality control procedures. Students enrolled in this course must have access to an MRI scanner in order to complete various protocol assignments.

Prerequisite: MITS 425R MRI Positioning Protocols I

Cross List: MITS 641R

Typically Offered: SPRING

**MITS 441S DIAGNOSTIC IMAGE REVIEW I 1 Credit Hour**

This course uses a case study-based approach to provide the student with an introduction to sonographic anatomy and pathology and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the undergraduate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 641S.

Typically Offered: FALL



**MITS 441T INTRODUCTION TO RADIATION THERAPY 2 Credit Hours**

This course is designed to give the allied health profession's student an introduction to the field of radiation therapy. The course is structured from the American Society of Registered Technologist- Radiation Therapy Curricula. Students will learn basic knowledge in the areas Principles practice of radiation therapy, Operational issues, Clinical concepts in radiation oncology, Patient care and Professionalism.

Prerequisite: Enrollment in the BSMITS DAO, ARRT certification or instructor permission.

Typically Offered: FALL/SP/SU

**MITS 442S CARDIOVASCULAR SONOGRAPHY LAB I 1 Credit Hour**

This course is designed to provide the student with the opportunity to practice and refine basic cardiovascular ultrasound scanning skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Enrollment in the Diagnostic Medical Sonography(DMS) program or instructor permission.

Cross List: MITS 642S

Typically Offered: FALL

**MITS 442T PROFESSIONAL PROJECTS 3 Credit Hours**

This online course will emphasize the dosimetry and treatment planning aspects of the radiation therapy profession. Completion of the dosimetry workbook documents experiences and learning in dosimetry and physics. The second component of this course requires the student to investigate a clinical case demonstrated during their clinical experience and expand on the information to develop a well written case study which will then be presented to their peers. This will allow the radiation therapy student to facilitate analytical and critical thinking skills, apply their written and oral communication skills and foster professional development and growth. Professional development will also be addressed by attending a tumor board conference and the completion of two Bioterrorism Public Health Emergency modules sponsored by the University of Nebraska Medical Center. Due to the advanced dosimetry content, requirements for 442T and 642T are the same.

Prerequisite: Enrollment in the Radiation Therapy Program or instructor permission.

Cross List: MITS 642T.

Typically Offered: SUMMER

**MITS 443S FETAL ECHOCARDIOGRAPHY 2 Credit Hours**

This course is designed for registered sonographers who are preparing to take their Fetal Echocardiography credentialing examination. The course will cover anatomy, physiology and pathology of the fetal heart. Students will also learn exam views and image evaluation. This course will provide only didactic instruction and will not include clinical experience.

Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS), the American Registry Of Radiologic Technologist (ARRT), Cardiovascular Credentialing International (CCI) or permission of the Diagnostic Medical Sonography Program Director.

Cross List: MITS 643S

Typically Offered: FALL/SP/SU

**MITS 443T RADIATION THERAPY CLINICAL EDUCATION III 5 Credit Hours**

This clinical course is designed to provide the Radiation Therapy student with a working knowledge of Radiation Therapy. It will provide the student the opportunity to apply academic clinical skills previously learned with minimal instruction, while maintaining direct supervision and assistance.

The student will participate clinically with the theory and operation of linear accelerators, simulators and treatment planning equipment with increased levels of responsibility. Assessment and care of the cancer patient is also emphasized. Assignments and clinical rotations for this course will be a continuation from Applied Radiation Therapy II. MITS 643T students will be required to complete a QA procedure on a VMAT treatment and submit documentation from physics/dosimetry.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 439T, MITS 435T or instructor permission.

Cross List: MITS 643T.

Typically Offered: SUMMER

**MITS 444S CONGENITAL HEART DISEASE 1 Credit Hour**

This course covers fundamental and advanced concepts of echocardiography in patients with congenital heart disease.

Prerequisite: Admission to the Cardiac Sonography Program and/or instructor permission.

Cross List: MITS 644S

Typically Offered: SUMMER

**MITS 444T OPERATIONAL ISSUES IN ONCOLOGY 2 Credit Hours**

This course is designed to focus on components of quality improvement programs and various operational issues in radiation therapy. Quality control and assessment for treatment delivery, planning and patient care are included as well as image acquisition. The role of the radiation therapist in billing, reimbursement and continuous quality improvement will be presented along with issues of regulation, accreditation and budgeting.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 435T, MITS 438N or instructor permission.

Cross List: MITS 644T.

Typically Offered: SUMMER

**MITS 445S ADVANCED TOPICS IN CARDIOVASCULAR SONOGRAPHY 1 Credit Hour**

This course is designed to explore new advancements and research in the field of cardiac sonography.

Prerequisite: Admission to the Cardiac Sonography Program and/or instructor permission.

Cross List: MITS 645S

Typically Offered: SUMMER

**MITS 445T COMPREHENSIVE SEMINAR AND BOARD REVIEW 2 Credit Hours**

This course is a comprehensive review of didactic learning material presented in the professional radiation therapy curriculum completed thus far in the student's educational process. It will assist the therapy student in a way to demonstrate an overall understanding of the knowledge and skills needed to be a successful, competent radiation therapist. One component of this course will review content categories including: Radiation protection and quality assurance, Clinical concepts in radiation oncology, Treatment planning, Treatment delivery; and Patient care and education. Due to the intensive nature of this course, requirements for 445T and 645T are the same.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 438N, MITS 439T or instructor permission.

Cross List: MITS 645T.

Typically Offered: SUMMER

**MITS 449S CASES IN CARDIOVASCULAR SONOGRAPHY II 1 Credit Hour**

This course is designed to give the student an understanding of normal and pathologic cardiac and vascular conditions and how they are viewed by ultrasound.

Prerequisite: Admission to the Cardiac Sonography Program and /or permission of the instructor. Completion of MITS 439S/639S Cases in Cardiovascular Sonography I

Cross List: MITS 649S

Typically Offered: SPRING

**MITS 450I INDUSTRIAL STUDIES: MRI REGISTRY REVIEW 1 Credit Hour**

The MRI Registry Review course prepares students for the ARRT MRI Board Examination by providing a comprehensive review of magnetic resonance imaging. The topics to be covered include patient care and safety, imaging procedures, pulse sequences, data manipulation, special procedures, sequence parameters and options, instrumentation, fundamentals of image formation, artifacts, and quality control.

Typically Offered: FALL/SP/SU

**MITS 450R MRI CAPSTONE 2 Credit Hours**

The MRI Capstone course prepares students for the ARRT MRI Board Examination by providing a comprehensive review of magnetic resonance imaging. The topics to be covered include patient care and safety, imaging procedures, pulse sequences, data manipulation, special procedures, sequence parameters and options, instrumentation, fundamentals of image formation, artifacts, and quality control.

Prerequisite: Enrollment in the undergraduate MRI Program or instructor permission.

Cross List: MITS 650R.

Typically Offered: SPRING

**MITS 450S CARDIOVASCULAR SONOGRAPHY CLINICAL EDUCATION II 5 Credit Hours**

This clinical course is designed to provide the cardiac sonography student with the knowledge and critical thinking skills necessary to participate in the clinical setting.

Prerequisite: Completion of MITS 440S/640S Cardiovascular Sonography Clinical Education I and /or permission of the instructor.

Cross List: MITS 650S

Typically Offered: SPRING

**MITS 451I INDUSTRIAL STUDIES: MRI SAFETY 1 Credit Hour**

This course is designed to facilitate an understanding of magnetic resonance imaging (MRI) safety considerations and practices. Concepts covered include: 1) MRI contrast administration, 2) static magnetic field, 3) radiofrequency magnetic field, 4) gradient magnetic field, 5) patient and personnel screening, 6) equipment safety, and 7) emergencies in MRI.

Typically Offered: FALL/SP/SU

**MITS 451R MRI SAFETY 1 Credit Hour**

This course is designed to facilitate an understanding of magnetic resonance imaging (MRI) safety considerations and practices. Concepts covered include: 1) MRI contrast administration 2) static magnetic field 3) radiofrequency magnetic field 4) gradient magnetic field 5) patient and personnel screening 6) equipment safety and 7) emergencies in MRI.

Prerequisite: Enrollment in the UNMC Magnetic Resonance Imaging Program or by permission of Instructor.

Cross List: MITS 651R

Typically Offered: FALL/SP/SU

**MITS 451S ULTRASOUND PHYSICS II 2 Credit Hours**

This course is designed to provide the student with an understanding of the fundamental principles of ultrasound physics instrumentation. Topics to be covered include hemodynamics, Doppler, color Doppler, quality assurance, bioeffects and new advances in technology. Concepts will focus on applicability in the clinical setting and preparation for the registry examination.

Prerequisite: Enrollment in the Undergraduate Diagnostic Medical Sonography Program, MITS 401S or instructor permission.

Cross List: MITS 651S.

Typically Offered: SPRING

**MITS 452S SONOGRAPHY CLINICAL EDUCATION III 5 Credit Hours**

This clinical course is designed to provide the DMS student with a working knowledge of Diagnostic Medical Sonography. The student will participate in clinical ultrasound exams with increased emphasis placed on operating equipment, producing quality images, applying scanning techniques and protocols, recognizing sonographic features and findings associated with various pathologies, and providing differential diagnosis. Clinical Competency Evaluations will be used to assess application of technical skills and knowledge. Overall Clinical Evaluations will monitor affective, psychomotor, and cognitive skills.

Prerequisite: Enrollment in the undergraduate Diagnostic Medical Sonography Program, MITS 402S and 412S or instructor permission.

Cross List: MITS 652S.

Typically Offered: SUMMER

**MITS 453S OB/GYN CONFERENCE III 1 Credit Hour**

This course is the third in a series of three courses. This course uses a case study-based approach to allow the student to continue their study of obstetric and gynecologic with an emphasis on advanced pathology, and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the Diagnostic Medical Sonography Program, MITS 431S/631S OB/GYN Conference I, MITS 405S/605S OB/GYN Conference II or instructor permission.

Cross List: MITS 653S

Typically Offered: SUMMER

**MITS 454S DIAGNOSTIC IMAGE REVIEW III 1 Credit Hour**

This course uses a case study-based approach to provide students with the opportunity to refine the critical thinking skills needed to evaluate complex sonographic pathology and to generate a comprehensive differential diagnosis.

Prerequisite: Enrollment in the Diagnostic Medical Sonography (DMS) Program, successful completion of MITS 441S/641S Diagnostic Image Review I and MITS 403S/603S Diagnostic Image Review II, or by instructor permission.

Cross List: MITS 654S.

Typically Offered: SUMMER

**MITS 455S HIGH RESOLUTION SONOGRAPHY 1 Credit Hour**

This course is designed to provide the student with a working knowledge of anatomy, physiology, and pathology related to the scrotum, retroperitoneum, RE system, musculoskeletal system, thyroid, parathyroid, GI tract, breast, abdominal wall, diaphragm, and peritoneum. Scanning techniques will also be covered for each topic.

Prerequisite: Instructor approval.

Cross List: MITS 655S.

Typically Offered: SUMMER

**MITS 456S NEUROSONOGRAPHY 2 Credit Hours**

This course is designed to provide the student a working knowledge of the embryologic development, anatomy, and physiology of the CNS, CSF formation and circulation, blood supply to the brain, scanning techniques, pathology of the neonatal brain and spine, and medical care of the neonate during scanning.

Prerequisite: Instructor approval.

Cross List: MITS 656S.

Typically Offered: SUMMER

**MITS 457R CARDIOVASCULAR INTERVENTIONAL TECHNOLOGY I 3 Credit Hours**

This didactic course includes instruction over the history of Angiography, medical and legal implications of angiographic procedures, pharmaceuticals and contrast agents used in interventional radiology, patient care procedures, quality control, angiographic equipment, and image enhancement techniques. (Asynchronous Didactic)

Prerequisite: Successful admission to CVIT program or by approval of the CVIT director. Student must have a certification in Radiography from the American Registry of Radiologic Technologists.

Cross List: MITS 657R.

Typically Offered: FALL

**MITS 457S PEDIATRIC SONOGRAPHY 2 Credit Hours**

This course focuses on the use of ultrasound in the pediatric patient. It is designed to provide the student a working knowledge of patient care practices and scanning techniques related to pediatric imaging. Anatomy, pathology, and sonographic correlation will be covered for organs/structures related to the central nervous system, neck, thorax, abdomen, pelvis, and musculoskeletal system.

Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS) or American Registry of Radiologic Technologist (ARRT), or permission of the Diagnostic Medical Sonography program director.

Cross List: MITS 657S.

Typically Offered: FALL/SP/SU

**MITS 458R CARDIOVASCULAR INTERVENTIONAL TECHNOLOGY II 3 Credit Hours**

This didactic course includes instruction over: interventional procedures of arterial and vascular systems, central venous access procedures, cardiac-interventional, vascular-interventional, neurologic-interventional and nonvascular interventional procedures This course also includes discussion of supplies and materials used in intervention procedures. (Asynchronous Didactic)

Prerequisite: Successful admission to CVIT program or by approval of the CVIT director. Student must have a certification in Radiography from the American Registry of Radiologic Technologists. Successful completion of MITS 457R, Vascular-Interventional Technology I, or permission of the program instructor; proctor required.

Cross List: MITS 658R.

Typically Offered: SPRING

**MITS 458S MUSCULOSKELETAL SONOGRAPHY 2 Credit Hours**

This course focuses on the use of ultrasound for imaging the musculoskeletal system. It is designed to provide the student with a basic working knowledge and the skills required to image and diagnose musculoskeletal-related conditions. Key concepts to be covered include scanning techniques, anatomy and pathology with sonographic correlation, and invasive procedures.

Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS) or American Registry Of Radiologic Technologist (ARRT), or permission of the Diagnostic Medical Sonography program director.

Cross List: MITS 658S.

Typically Offered: FALL/SP/SU

**MITS 459S CASES IN CARDIOVASCULAR SONOGRAPHY III 1 Credit Hour**

This course is designed to give the student an in-depth investigation of cardiac and vascular pathologies and how they are viewed by ultrasound. Prerequisite: MITS 439S/639S Cases in Cardiovascular Sonography I, MITS 449S/649S Cases in Cardiovascular Sonography II, and/or instructor permission.

Cross List: MITS 659S

Typically Offered: SUMMER

**MITS 460R CT PROTOCOLS AND CROSS-SECTIONAL ANATOMY 2 Credit Hours**

Content provides detailed coverage of procedures for CT imaging of adults and pediatric patients. Procedures include, but are not limited to, indications for the procedure, patient education, preparation, orientation and positioning, patient history and assessment, contrast media usage, scout image, selectable scan parameters and archiving of the images. CT procedures will be taught for differentiation of specific structures, patient symptomology and pathology. CT images studied will be reviewed for quality, anatomy and pathology. CT procedures vary from facility to facility and normally are dependent on the preferences of the radiologists.

Prerequisite: Instructor approval.

Cross List: MITS 660R.

Typically Offered: FALL/SP/SU

**MITS 460S CARDIOVASCULAR SONOGRAPHY CLINICAL EDUCATION III 5 Credit Hours**

This clinical course is designed to provide the sonography student with the knowledge and critical thinking skills necessary to participate in the clinical setting as an entry-level cardiac sonographer.

Prerequisite: MITS 440S/640S Cardiac Sonography Clinical Education I, MITS 450S/650S Cardiac Sonography Clinical Education II and/or instructor permission.

Cross List: MITS 660S

Typically Offered: SUMMER

**MITS 461R CT PHYSICS 1 Credit Hour**

This course will cover the fundamental physics principles, quality control, and instrumentation needed for a CT technologist.

Prerequisite: Instructor approval.

Cross List: MITS 661R.

Typically Offered: FALL/SP/SU

**MITS 461S CARDIOVASCULAR SONOGRAPHY LAB II 1 Credit Hour**

This course is the second course in a series of three lab courses. The course is designed to provide the student with the opportunity to further hone acquired cardiovascular scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Admission to the Cardiac Sonography Program and /or permission of the instructor.

Cross List: MITS 661S

Typically Offered: SPRING

**MITS 462R CT CLINICAL EDUCATION 3-6 Credit Hours**

This clinical course will cover patient set-up (positioning) and scan set-up (protocols), for Computed Tomography examinations. The clinical rotations will include hands-on experience. Students will have the opportunity to seek out exam competencies that may be applied toward ARRT CT certifying examination eligibility.

Prerequisite: Enrollment in the CT Practicum, MITS 460R, MITS 461R, or instructor permission.

Cross List: MITS 662R.

Typically Offered: SUM/FALL

**MITS 462S VASCULAR PATHOLOGY AND HEMODYNAMICS 2 Credit Hours**

This course will cover pathology and pathophysiology of complex diseases of the cerebral, peripheral and abdominal vascular systems along with the associated clinical, hemodynamic and sonographic findings.

Prerequisite: Admission to the Cardiac Sonography Program and /or permission of the instructor.

Cross List: MITS 662S

Typically Offered: FALL/SP/SU

**MITS 463R CT CAPSTONE 2 Credit Hours**

The Computed Tomography Capstone prepares students for board examinations by providing a comprehensive review of computed tomography imaging. The topics to be covered include patient care and safety, imaging procedures, protocols, data manipulation, instrumentation, fundamentals of image formation, artifacts, and quality control.

Prerequisite: Enrollment in the CT Program or instructor permission.

Cross List: MITS 663R.

Typically Offered: SUM/FALL

**MITS 464N MITS INDEPENDENT STUDIES 1-2 Credit Hours**

MITS INDEPENDENT STUDIES

Typically Offered: FALL/SP/SU

**MITS 464R SPECIAL TOPICS IN IMAGING SCIENCES 1-3 Credit Hours**

This is an applied clinical course which will cover the patient care, positioning, and equipment operation skills required for the Imaging Sciences discipline. The clinical rotations will include hands-on experience. Students will have the opportunity to seek out exam competencies.

Prerequisite: Enrollment in an MITS Program or Practicum or instructor permission.

Cross List: MITS 664R.

Typically Offered: FALL/SP/SU

**MITS 465R MRI CLINICAL EDUCATION I 6 Credit Hours**

The course will cover patient set-up (positioning) and scan set up (protocols), for MRI examinations. The clinical rotations will include hands-on experience through a variety of clinical settings. Additionally, students will gain exam competencies, which will be applied toward ARRT certifying examination eligibility.

Prerequisite: Admission in the UNMC Magnetic Resonance Imaging Program.

Cross List: MITS 665R.

Typically Offered: FALL

**MITS 466R MRI CLINICAL EDUCATION II 6 Credit Hours**

The course will cover patient set-up (positioning) and scan set up (protocols), for MRI examinations. The clinical rotations will include hands-on experience through a variety of clinical settings. Additionally, students will gain exam competencies, which will be applied toward ARRT certifying examination eligibility.

Prerequisite: MITS 465R and/or Program Director approval.

Cross List: MITS 666R.

Typically Offered: SPRING

**MITS 467R SPECIAL PROJECTS I 1 Credit Hour**

This is an independent study assignment designed to give the student the opportunity to develop a scientific essay on selected special topics in the medical imaging and therapeutic sciences field.

Prerequisite: Enrollment in the undergraduate MRI Program or instructor permission.

Cross List: MITS 667R.

Typically Offered: FALL/SP/SU

**MITS 467S VASCULAR SONOGRAPHY CLINICAL EDUCATION I 5 Credit Hours**

This clinical course is designed to provide the vascular sonography student with the fundamental knowledge and critical thinking skills necessary to participate in the clinical setting. The student will participate in a clinical setting to develop skills in patient care, equipment operation, scanning technique and protocol, normal anatomy identification, and pathology recognition. Clinical objectives will assess the application of technical skills and knowledge. Overall Clinical Evaluations (OCE) will monitor affective, psychomotor and cognitive skills.

Prerequisite: Admission to the Vascular Sonography Program and/or permission from the instructor

Cross List: MITS 667S

Typically Offered: FALL

**MITS 468R SPECIAL PROJECTS II 1 Credit Hour**

This is an independent study assignment designed to give the student the opportunity to develop a scientific exhibit and present its findings on selected special topics in Radiologic Technology. (Asynchronous Didactic)

Prerequisite: Enrollment in the undergraduate MRI Program, MITS 467R or instructor permission.

Cross List: MITS 668R.

Typically Offered: FALL/SP/SU

**MITS 469S CASES IN VASCULAR SONOGRAPHY I 1 Credit Hour**

This course is designed to give the student an understanding of normal and pathologic vascular conditions and how they are viewed by ultrasound. Course materials will consist of vascular case studies from the Vascular Lab. Each week a student will present a "case of the week" from the cases they have observed or scanned during their clinical rotations. This brief presentation (10-15 minutes) will include pertinent facts on patient history, lab values, previous imaging studies, and sonographic findings. The remainder of the class will be presented by the faculty and will consist of the students reviewing vascular ultrasound cases with faculty guidance to make the correct differential diagnosis. Prerequisite: Admission to the Vascular Sonography Program and /or permission of the instructor. Typically Offered: FALL

**MITS 470M MAMMOGRAPHY CLINICAL EDUCATION 1-3 Credit Hours**

This is an applied clinical course which will cover the patient care, positioning, and equipment operation skills required for certification eligibility with the American Registry of Radiologic Technologists (ARRT) - Mammography exam. The clinical rotations will include hands-on experience. Students will have the opportunity to complete exam competencies. Pre-reqs: Admission to the Mammography Practicum or by permission of the Radiography Program Director. Typically Offered: FALL/SP/SU

**MITS 471S CARDIOVASCULAR SONOGRAPHY LAB III 1 Credit Hour**

This course is the third course in a series of three lab courses. The course is designed to provide the student with the opportunity to master acquired cardiovascular scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Enrollment in the Diagnostic Medical Sonography program, successful completion of MITS 442S/642S Cardiovascular Sonography Lab I, MITS 461S/661S Cardiovascular Sonography Lab II, and/or instructor permission.

Cross List: MITS 671S

Typically Offered: SUMMER

**MITS 473R CVIT CLINICAL EDUCATION I 10 Credit Hours**

This clinical course is intended to initiate participation of the CVIT student inpatient care (prior, during, and following procedure), radiation safety measures (accompanying high dose procedures), and routine and emergency procedures and protocols performed in Interventional Radiography Suites and Cardiac Catheterization Laboratories. This experience is intended to provide the student with the confidence needed to assist and perform procedures that parallel progress in his or her didactic education. (Clinical)

Prerequisite: Admission to the Cardiovascular Interventional Technology program or permission of program director.

Cross List: MITS 673R.

Typically Offered: FALL

Capacity: 26

**MITS 474R CVIT CLINICAL EDUCATION II 4-10 Credit Hours**

This clinical course is intended to initiate participation of the CVIT student inpatient care (prior, during, and following procedure), radiation safety measures (accompanying high dose procedures), and routine and emergency procedures and protocols performed in Interventional Radiography Suites, Cardiac Catheterization Laboratories, or Hybrid Suites. This experience is intended to provide the student with the opportunities to assist and perform procedures that parallel progress in his or her didactic education. (Clinical)

Prerequisite: Admission to the Cardiovascular Interventional Technology program or permission of program director.

Cross List: MITS 674R.

Typically Offered: SPRING

**MITS 475R CVIT CLINICAL EDUCATION III 6-10 Credit Hours**

This clinical course is intended to initiate participation of the CVIT student in patient care (prior, during and following procedure), radiation safety measures (accompanying high dose procedures), and routine and emergency procedures and protocols performed in Interventional Radiography Suites and Cardiac Catheterization Laboratories. This experience is intended to provide the student with the confidence needed to assist and perform procedures that parallel progress in his or her didactic education.

Prerequisite: Enrollment in the undergraduate CVIT Program, MITS 473R, MITS 474R.

Cross List: MITS 675R.

Typically Offered: FALL/SP/SU

**MITS 481S OBSTETRICAL SONOGRAPHY EXTERNSHIP 3 Credit Hours**

This clinical course is designed to provide the sonography student with a working knowledge of advanced obstetrical sonography. The student will apply concepts learned in didactic courses to the performance of obstetrical sonograms. Emphasis will be placed on delivering quality patient care, applying scanning techniques and protocols, producing quality images, identifying normal anatomy, and recognizing pathology. Prerequisite: Satisfactory completion of an accredited sonography program and ARDMS or ARRT(S) certification. Permission of the program director required.

Cross List: MITS 681S

Typically Offered: FALL/SP/SU

**MITS 601S ULTRASOUND PHYSICS I 1 Credit Hour**

This course is designed to provide the student with fundamental information necessary to understand the principles of ultrasound physics as it applies to diagnostic imaging. Topics to be covered include sound parameters, interaction of sound with media, resolution, transducers, instrumentation, real-time imaging, and image storage and display. Concepts will focus on applicability in the clinical setting and preparation for the registry examination.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 401S.

Typically Offered: FALL

**MITS 602S SONOGRAPHY CLINICAL EDUCATION II 5 Credit Hours**

This clinical course is designed to provide the DMS student with a working knowledge of Diagnostic Medical Sonography. The student will participate in clinical ultrasound exams with emphasis on operating equipment, producing quality images, applying scanning techniques and protocols, identifying normal anatomy, and recognizing pathology. Clinical Competency Evaluations will be used to assess application of technical skills and knowledge. Overall Clinical Evaluations will monitor affective, psychomotor, and cognitive skills.

Prerequisite: Enrollment in the Post Baccalaureate Diagnostic Medical Sonography program, MITS 612S or instructor permission.

Cross List: MITS 402S.

Typically Offered: SPRING

**MITS 603S DIAGNOSTIC IMAGE REVIEW II 1 Credit Hour**

This course uses a case study-based approach to provide the student with an in-depth investigation into sonographic anatomy and pathology and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the Post Baccalaureate Diagnostic Medical Sonography Program, MITS 614S or instructor permission.

Cross List: MITS 403S.

Typically Offered: SPRING

**MITS 605S OB/GYN CONFERENCE II 1 Credit Hour**

This course is the second in a series of three courses. This course uses a case study-based approach to allow the student to continue their study of obstetric and gynecologic anatomy, pathology, and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the Post Baccalaureate Diagnostic Medical Sonography program, MITS 631S, or instructor permission.

Cross List: MITS 405S.

Typically Offered: SPRING

**MITS 605T ORIENTATION TO RADIATION THERAPY 1 Credit Hour**

The content of this course is designed to provide the student with an overview of the foundations in radiation therapy and the practitioners role in the health care delivery system. Principles, practices and policies of the educational program, health care organizations, and principles of radiation and health safety as well as professional responsibilities of the radiation therapist will be discussed and examined.

Prerequisite: Enrollment in the Post Baccalaureate Radiation Therapy Program or instructor permission.

Cross List: MITS 405T.

Typically Offered: FALL

**MITS 607S ADVANCED OBSTETRICAL ULTRASOUND 2 Credit Hours**

This course is designed to give the student a working knowledge of obstetrics as it relates to sonography. The student is instructed on fetal embryology, normal anatomy, gestational age assessment, anomalies of each organ system, uteroplacental anatomy and physiology, and maternal and fetal complications associated with pregnancy.

Prerequisite: Enrollment in the Post Baccalaureate Diagnostic Medical Sonography Program or instructor permission.

Cross List: MITS 407S.

Typically Offered: SPRING

**MITS 608S GYNECOLOGICAL ULTRASOUND 1 Credit Hour**

This course is designed to give the student a working knowledge of patient care preparation, normal female pelvic anatomy, reproductive physiology, gynecological pathology and scanning techniques. Clinical application of gynecological sonography will be emphasized in this course.

Prerequisite: Enrollment in the Post Baccalaureate Diagnostic Medical Sonography Program or instructor permission.

Cross List: MITS 408S.

Typically Offered: SPRING

**MITS 608T RADIATION THERAPY PHYSICS 2 Credit Hours**

This course is the study of the fundamental physics principles and applications utilized in clinical radiation oncology. Wherever possible, clinical correlations will be made. Fundamental nuclear physics, charged particle interaction, measurement of absorbed dose, dosimetric calculations, external beam therapy, brachytherapy and radiation safety will be discussed in detail. New and future therapeutic techniques will also be introduced. Because of the higher level nature of the course and the involvement of medical residents and medical physics residents, the curriculum is the same for both 408T and 608T.

Prerequisite: Enrollment in the Post Baccalaureate Radiation Therapy Program or instructor permission.

Cross List: MITS 408T.

Typically Offered: FALL

**MITS 609S GENITOURINARY ULTRASOUND 1 Credit Hour**

This course is designed to provide the student with an understanding of anatomy, physiology, and pathology of the genitourinary system. Clinical application of genitourinary sonography will be emphasized in this course.

Prerequisite: Enrollment in the Post Baccalaureate Diagnostic Medical Sonography Program or instructor permission.

Cross List: MITS 409S.

Typically Offered: SPRING

**MITS 610R SECTIONAL ANATOMY & PATHOLOGY I 4 Credit Hours**

This course is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform computed tomography and magnetic resonance imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include neck/spine, bones (osseous system), joints, cranial nerves and head (nervous systems). (Asynchronous Didactic)

Prerequisite: Enrollment in an MITS Program or instructor permission.

Cross List: MITS 410R.

Typically Offered: FALL

**MITS 611R SECTIONAL ANATOMY & PATHOLOGY II 4 Credit Hours**

This course is a continuation of RSTE 410R/610R and is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform computed tomography and magnetic resonance imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include chest (respiratory system lymphoid system), abdomen (gastrointestinal system) and pelvis (genitourinary reproductive systems). (Asynchronous Didactic)

Prerequisite: Enrollment in an MITS program, MITS 610R or instructor permission.

Cross List: MITS 411R.

Typically Offered: SPRING

**MITS 612S SONOGRAPHY CLINICAL EDUCATION I 5 Credit Hours**

This clinical course is designed to develop the cognitive, psychomotor and affective skills necessary to practice as a Diagnostic Medical Sonographer. Students will participate in a variety of clinical environments with direct supervision by clinical instructors and staff sonographers.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 412S.

Typically Offered: FALL

**MITS 614S PRACTICAL APPLICATION OF SONOGRAPHY 3 Credit Hours**

This course provides the sonographer with an overview of organ systems and structures imaged by ultrasound and associated pathologies encountered in the patient care setting. Clinical reasoning skills and differential diagnoses are further refined through case study-based application.

Prerequisite: Enrollment in a CAHP program or instructor permission.

Cross List: MITS 414S.

Typically Offered: FALL/SP/SU

**MITS 614T ONCOLOGY SECTIONAL ANATOMY & PATHOLOGY I 2 Credit Hours**

This online course is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform radiation therapy treatment and imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include chest (respiratory system) and abdomen (gastrointestinal system).

Prerequisite: Enrollment in post baccalaureate Radiation Therapy program or instructor permission.

Cross List: MITS 414T.

Typically Offered: FALL

**MITS 615S ORIENTATION TO DIAGNOSTIC MEDICAL SONOGRAPHY 1 Credit Hour**

This course provides the sonography student with an overview of sonographic exams that will be encountered in the clinical environment. The focus will include exam indications and preps, correlation of clinical history, and sonographic findings.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 415S.

Typically Offered: FALL

**MITS 615T ONCOLOGY SECTIONAL ANATOMY & PATHOLOGY II 2 Credit Hours**

This course is a continuation of MITS 414/614T and is designed to give students a basic understanding of sectional anatomy and pathology requisite to competently perform radiation therapy treatment and imaging procedures. To enable the students to create optimal diagnostic images, this course provides the students with the ability to identify normal human anatomical structures in sectional images, and the ability to distinguish common pathological processes and variant anatomy. The sectional anatomy and pathology covered in this course will include pelvis (urinary reproductive systems), spine/ head (nervous system) and neck/neck lymphatics.

Prerequisite: Enrollment in the post baccalaureate Radiation Therapy program or instructor permission.

Cross List: MITS 415T.

Typically Offered: SPRING

**MITS 616S SONOGRAPHY LAB I 1 Credit Hour**

This course is designed to provide the student with the opportunity to practice and refine ultrasound scanning skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Enrollment in the Diagnostic Medical Sonography (DMS) program and/or instructor permission.

Cross List: MITS 416S.

Typically Offered: FALL

**MITS 617S SONOGRAPHY LAB II 1 Credit Hour**

This course is the second course in a series of three lab courses. The course is designed to provide the student with the opportunity to further hone acquired scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: MITS 416S Sonography Lab I and/or admission to the Diagnostic Medical Sonography program or instructor permission

Cross List: MITS 417S

Typically Offered: SPRING

**MITS 618S SONOGRAPHY LAB III 1 Credit Hour**

This course is the third course in a series of three lab courses. The course is designed to provide the student with the opportunity to master acquired scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Enrollment in the Diagnostic Medical Sonography program, successful completion of MITS 416S/616S Sonography Lab I and MITS 417S/617S Sonography Lab II, and/or instructor permission

Cross List: MITS 418S

Typically Offered: SUMMER

**MITS 619R MRI PHYSICS & SYSTEMS I 2 Credit Hours**

This course is designed for use within a magnetic resonance imaging program (MRI) or related health science profession. Course content will include a comprehensive MRI safety overview, an introduction of fundamental MRI concepts including magnetization, image contrast, image weighting, and introduction to pulse sequences, instrumentation, spatial encoding principles and imaging parameters and their trade-offs.

Prerequisite: Enrollment in the UNMC Magnetic Resonance Imaging Program or by permission of instructor.

Cross List: MITS 419R.

Typically Offered: FALL

**MITS 619S PROFESSIONAL PROJECTS I 1 Credit Hour**

This course will help prepare the student for clinical practice through an in-depth investigation into the professions of medical imaging using an interdisciplinary approach to build skills in critical thinking, oral and written communication, and working in teams.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 419S

Typically Offered: SPRING

**MITS 620R MRI PHYSICS & SYSTEMS II 2 Credit Hours**

This course is a continuation of MITS 419/619R and is for the student who is enrolled in a Magnetic Resonance Imaging (MRI) program or related health science discipline. Content will be built upon principles covered in MITS 419/619R and establishing understanding of spin echo and gradient echo pulse sequences, image artifacts and methods to correct them, and advanced imaging procedures including contrast and contrast procedures, diffusion, perfusion, fMRI and spectroscopy.

Prerequisite: MITS 619R, enrollment in the UNMC Magnetic Resonance Imaging Program or by permission of instructor.

Cross List: MITS 420R.

Typically Offered: SPRING

**MITS 621S PROFESSIONAL PROJECTS II 1 Credit Hour**

This course is designed to prepare the student for entry into the profession of Diagnostic Medical Sonography. Professional development and growth will be promoted through activities that enhance skills needed to successfully make the transition from student to professional. Areas to be covered include presentation skills, resume writing, interviewing skills, professional requirements and opportunities.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program, MITS 619S or instructor permission.

Cross List: MITS 421S.

Typically Offered: SUMMER

**MITS 622S VASCULAR ANATOMY AND PHYSIOLOGY 3 Credit Hours**

The course is designed to provide the student with a working knowledge of vascular sonography. Course content will cover hemodynamics, anatomy, and pathology of the cerebral, extremity, abdominal and pelvic vessels. Students will also be introduced to exam preps and scanning techniques.

Prerequisite: Current ARDMS, ARRT credentials or instructor permission.

Cross List: MITS 422S.

Typically Offered: FALL/SP/SU

**MITS 623S PATHOLOGY FOR THE HEALTH CARE PROFESSIONAL 2 Credit Hours**

This course allows an in-depth investigation into pathology that may be encountered by the health care professional in clinical practice. The relationship of clinical symptoms, lab values, and imaging findings will be covered for each disease process.

Prerequisite: Current American Registry of Diagnostic Medical Sonography (ARDMS) or American Registry of Radiologic Technologist (ARRT) credentials and/or permission of the instructor.

Typically Offered: FALL/SP/SU

**MITS 624S BREAST SONOGRAPHY 2 Credit Hours**

This course is designed to prepare the registered sonographer or radiographer for the Breast Sonography Certification Exam offered by the ARDMS or ARRT. The course will offer a comprehensive review of sonographic principles and instrumentation, sonographic anatomy and pathology of the breast, and interventional procedures/treatment. This course does not offer a clinical component.

Prerequisite: Current ARDMS or ARRT credentials or instructor permission.

Cross List: MITS 424S.

Typically Offered: FALL/SP/SU

**MITS 624T CLINICAL ONCOLOGY I 2 Credit Hours**

Content is designed to examine and evaluate the management of neoplastic disease using knowledge in arts and sciences, while promoting critical thinking and the basis of ethical clinical decision making. The epidemiology, etiology, detection, diagnosis, patient condition, treatment and prognosis of neoplastic disease will be presented, discussed and evaluated in relation to histology, anatomical site and patterns of spread. The radiation therapist's responsibility in the management of neoplastic disease will be examined and linked to the skills required to analyze complex issues and make informed decisions while appreciating the scope of the profession. Site specific neoplasms covered in this course will include: Breast, Gastrointestinal, Genitourinary, Head and Neck, Reproductive and Respiratory. Because of the higher level nature of the course and the involvement of medical residents and medical physics residents, the curriculum is the same for both MITS 424T and MITS 624T.

Prerequisite: Enrollment in the post baccalaureate Radiation Therapy program or instructor permission.

Cross List: MITS 424T.

Typically Offered: FALL

**MITS 625R MRI POSITION & PROTOCOL I 2 Credit Hours**

This course is directed to the student who is enrolled in a Magnetic Resonance Imaging (MRI) program or related health science discipline. Content will include materials related to MRI safety and patient care, cross sectional anatomy, patient positioning, MRI instrumentation, and technical parameters associated with MR imaging of the brain, spine, abdomen, and musculoskeletal exams. Students enrolled in this course must have access to an MRI scanner in order to complete various protocol assignments.

Prerequisite: Enrollment in the UNMC Magnetic Resonance Imaging Program or by permission of instructor.

Cross List: MITS 425R.

Typically Offered: FALL



**MITS 625T CLINICAL ONCOLOGY II 2 Credit Hours**

Content is designed to examine and evaluate the management of neoplastic disease using knowledge in arts and sciences, while promoting critical thinking and the basis of ethical clinical decision making. The epidemiology, etiology, detection, diagnosis, patient condition, treatment and prognosis of neoplastic disease will be presented, discussed and evaluated in relation to histology, anatomical site and patterns of spread. The radiation therapists responsibility in the management of neoplastic disease will be examined and linked to the skills required to analyze complex issues and make informed decisions while appreciating the scope of the profession. Site specific neoplasms covered in this course will include: Central Nervous System, Endocrine, Hematopoietic, Integumentary, Lymphoreticular, Musculoskeletal, Pediatric, Metastatic and Emergent disease. Because of the higher level nature of the course and the involvement of medical residents and medical physics residents, the curriculum is the same for both 425T and 625T.

Prerequisite: Enrollment in the post baccalaureate Radiation Therapy Program or instructor permission.

Cross List: MITS 425T.

Typically Offered: SPRING

**MITS 628T PRINCIPLES AND PRACTICE OF RADIATION THERAPY 2 Credit Hours**

This course is designed to provide an overview of cancer and the specialty of radiation therapy. Historic and current aspects of cancer treatment will be covered. The roles and responsibilities of the radiation therapist will be discussed. Aspects of law and ethics pertaining to a radiation therapist are included. Basic principles of radiation safety are reinforced. In addition, treatment prescription, techniques, and treatment delivery will be covered. Oral and written communication skills are developed with the writing and presentation of an article abstract pertaining to radiation oncology.

Prerequisite: Enrollment in the Radiation Therapy Program.

Cross List: MITS 428T.

Typically Offered: FALL

**MITS 630T PATIENT CARE 1 Credit Hour**

This course builds upon the students previous academic knowledge and clinical experience. Assessment and evaluation of the cancer patient for service delivery will be addressed. Content will include examination of patients psychological and physical needs affecting radiation treatment outcome. The role of chemotherapy will be discussed; to include common agents, routes of administration, and side effects. Routine and emergency care procedures will be reviewed or presented.

Prerequisite: Enrollment in the post baccalaureate Radiation Therapy Program or instructor permission.

Cross List: MITS 430T.

Typically Offered: FALL

**MITS 631S OB/GYN CONFERENCE I 1 Credit Hour**

This course is the first in a series of three courses. This course uses a case study-based approach to provide the student with an introduction to obstetric and gynecologic sonographic anatomy, basic pathology, and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 431S.

Typically Offered: FALL

**MITS 632S ABDOMINAL ULTRASOUND 3 Credit Hours**

This course provides the student with an in-depth investigation into abdominal sonography including normal and abnormal sonographic findings, scanning techniques, physiology, pathophysiology of the upper abdominal organs.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 432S.

Typically Offered: FALL

**MITS 634S VASCULAR SONOGRAPHY EXTERNSHIP 3 Credit Hours**

This clinical course is designed to provide the sonography student with a working knowledge of clinical vascular sonography. The student will apply concepts learned in didactic courses to the performance of noninvasive vascular procedures. Emphasis will be placed on delivering quality patient care, applying scanning techniques and protocols, producing quality images, identifying normal anatomy, and recognizing pathology.

Prerequisite: MITS 424S or MITS 624S, satisfactory completion of a DMS program, ARDMS or ARRT certification and DMS Program Director permission.

Corequisite: MITS 424S or MITS 624S, satisfactory completion of a DMS program, ARDMS or ARRT certification and DMS Program Director permission.

Cross List: MITS 434S.

Typically Offered: FALL/SPR

**MITS 635S ORIENTATION TO CARDIOVASCULAR SONOGRAPHY 2 Credit Hours**

This course provides the sonography student with an overview of cardiovascular sonographic exams that will be encountered in the clinical environment. Focus will include exam indications and preparation, correlation of clinical history, and sonographic findings.

Prerequisite: Admission to the Cardiac Sonography Program and/or permission of the instructor.

Cross List: MITS 435S.

Typically Offered: FALL

**MITS 635T TREATMENT PLANNING & DELIVERY 3 Credit Hours**

This course covers concepts of clinical dosimetry, brachytherapy, and treatment planning. Emerging technologist and delivering precise doses of radiation are emphasized. Included are isodose summation, construction and calculations. The importance of lifelong learning is addressed with the construction and presentation of an educational exhibit incorporating radiation therapy's role in cancer care as well as completion of the ASRT IGRT educational modules. Activities emphasizing inter-professionalism and leadership are also included. Written and oral communication skills will continue to be strengthened through the writing and presentation of an article abstract assignment. MITS 635T students will complete a scientific essay and present it to their peers.

Prerequisite: Enrollment in the Radiation Therapy Program or instructor permission.

Cross List: MITS 435T.

Typically Offered: SPRING

**MITS 636S ADULT CARDIAC SONOGRAPHY EXTERNSHIP 3 Credit Hours**

This clinical course is designed to provide the sonography student with a working knowledge of clinical cardiac sonography. The student will apply concepts learned in their didactic courses to the performance of adult echocardiography procedures. Emphasis will be placed on delivering quality patient care, applying scanning techniques and protocols, producing quality images, identifying normal anatomy, and recognizing pathology.

Prerequisite: MITS 437S or 637S, MITS 438S or 638S, satisfactory completion of a DMS Program, ARDMS or ARRT certification and DMS Program Director permission.

Corequisite: MITS 437S or MITS 637S, MITS 438S or MITS 638S, satisfactory completion of a DMS program, ARDMS or ARRT certification and DMS Program Director permission.

Cross List: MITS 436S.

Typically Offered: FALL

**MITS 636T RADIATION THERAPY CLINICAL EDUCATION I 3 Credit Hours**

This course provides the student with the necessary skills used in treatment delivery, record keeping, simulation, and development of patient-therapist rapport. Content is designed to provide sequential development, application and integration of concepts and theories in radiation therapy. Clinical experiences will include operation of linear accelerators, instruction in dosimetry, beam modification, simulation procedures, and patient-centered clinical practices. Concepts of team practice, Critical thinking, and professional development will also be presented and evaluated.

Cross List: MITS 436T.

Typically Offered: FALL

**MITS 637S CARDIAC ANATOMY AND PHYSIOLOGY 3 Credit Hours**

This course is designed to provide the student with a working knowledge of cardiac sonography. The student is provided with instruction in anatomy, scanning techniques, physiology, and pathophysiology of the heart.

Prerequisite: Satisfactory completion of a DMS Program, ARDMS or ARRT certification and DMS Program Director permission.

Cross List: MITS 437S.

Typically Offered: FALL

**MITS 638N ADVANCED RADIATION BIOLOGY 3 Credit Hours**

This course is directed to the senior level students enrolled in the Radiation Therapy and BSMITS degree completion programs. Content will include review and continuation of basic radiobiology involved with radiation oncology and radiation therapy. It will address the radiobiological/biophysical events at the cellular and subcellular levels. Analysis of factors influencing radiation response of cells and tissues will be covered. Construction and evaluation of radiobiological data on graphs, charts, and survival curves will be included. Relationships of time, dose, fractionation, volume and site as they apply to both normal and tumor biology will be evaluated. The principles of radiation response modifiers, hyperthermia, chemotherapy and their influence on biologic effects in combination with radiation will be examined.

Prerequisite: Enrollment in a Medical Imaging and Therapeutic Sciences Program or instructor permission.

Cross List: MITS 438N.

Typically Offered: SPRING

**MITS 638S CARDIAC PATHOLOGY AND HEMODYNAMICS 4 Credit Hours**

This course will offer a comprehensive review of cardiac pathology and the related EKG and sonographic findings.

Prerequisite: Satisfactory completion of a DMS Program, ARDMS or ARRT Certification and DMS Program Director permission.

Cross List: MITS 438S

Typically Offered: SPRING

**MITS 639S CASES IN CARDIOVASCULAR SONOGRAPHY I 1 Credit Hour**

This course is designed to give the student an understanding of normal and pathologic cardiac and vascular conditions and how they are viewed by ultrasound.

Prerequisite: Admission to the Cardiac Sonography Program and/or permission of the instructor.

Cross List: MITS 439S

Typically Offered: FALL

**MITS 639T RADIATION THERAPY CLINICAL EDUCATION II 3 Credit Hours**

As a continuum of Applied Radiation Therapy I, this course provides the student with the necessary skills used in treatment delivery, record keeping, simulation, and development of patient-therapist rapport. Content is designed to provide sequential development, application and integration of concepts and theories in radiation therapy. Clinical experiences will include operation of linear accelerators, instruction in dosimetry, beam modification, simulation procedures, and patient-centered clinical practices. Concepts of team practice, critical thinking, and professional development will also be presented and evaluated. For 639T, students will participate in a cytology lab assignment to identify various histologic types of cancers treated in the clinic.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 628T, MITS 636T or instructor permission.

Cross List: MITS 439T.

Typically Offered: SPRING

**MITS 640S CARDIOVASCULAR SONOGRAPHY CLINICAL EDUCATION I 5 Credit Hours**

This clinical course is designed to provide the sonography student with the fundamental knowledge and critical thinking skills necessary to participate in the clinical setting. The student will participate in a clinical setting to develop skills in equipment operation, scanning technique, scanning protocol, normal anatomy identification, and pathology recognition.

Prerequisite: Admission to the Cardiac Sonography Program and/or permission from the instructor.

Cross List: MITS 440S.

Typically Offered: FALL

**MITS 641R MRI POSITIONING & PROTOCOLS II 2 Credit Hours**

This course is a continuation of MITS 425/625R and is for the student who is enrolled in a Magnetic Resonance Imaging (MRI) program or related health science discipline. Content will include materials related to MRI safety and patient care, cross sectional anatomy, patient preparation, patient positioning, MRI instrumentation, and technical parameters associated with MR imaging of the upper and lower extremities, soft tissue and bony pelvis, cardiac, chest, and breast MRI. Content will also include material related to MRI quality control procedures. Students enrolled in this course must have access to an MRI scanner in order to complete various protocol assignments.

Prerequisite: MITS: 625R MRI Positioning Protocols I, enrollment in the undergraduate MRI Program or by permission of instructor.

Cross List: MITS 441R

Typically Offered: SPRING

**MITS 641S DIAGNOSTIC IMAGE REVIEW I 1 Credit Hour**

This course uses a case study-based approach to provide the student with an introduction to sonographic anatomy and pathology and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 441S.

Typically Offered: FALL

**MITS 642S CARDIOVASCULAR SONOGRAPHY LAB I 1 Credit Hour**

This course is designed to provide the student with the opportunity to practice and refine basic cardiovascular ultrasound scanning skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Admission to the Vascular Sonography Program and /or permission of the instructor.

Cross List: MITS 442S

Typically Offered: FALL

**MITS 642T PROFESSIONAL PROJECTS 3 Credit Hours**

This online course will emphasize the dosimetry and treatment planning aspects of the radiation therapy profession. Completion of the dosimetry workbook documents experiences and learning in dosimetry and physics. The second component of this course requires the student to investigate a clinical case demonstrated during their clinical experience and expand on the information to develop a well written case study which will then be presented to their peers. This will allow the radiation therapy student to facilitate analytical and critical thinking skills, apply their written and oral communication skills and foster professional development and growth. Professional development will also be addressed by attending a tumor board conference and the completion of two Bioterrorism Public Health Emergency modules sponsored by the University of Nebraska Medical Center. Due to the advanced dosimetry content, requirements for 442T and 642T are the same.

Prerequisite: Enrollment in the Radiation Therapy Program or instructor permission.

Cross List: MITS 442T.

Typically Offered: SUMMER

**MITS 643S FETAL ECHOCARDIOGRAPHY 2 Credit Hours**

This course is designed for registered sonographers who are preparing to take their Fetal Echocardiography credentialing examination. The course will cover anatomy, physiology and pathology of the fetal heart. Students will also learn exam views and image evaluation. This course will provide only didactic instruction and will not include clinical experience.

Prerequisite: Current credentialing by the American Registry of Diagnostic Medical Sonography (ARDMS), the American Registry Of Radiologic Technologist (ARRT), Cardiovascular Credentialing International (CCI) or permission of the Diagnostic Medical Sonography Program Director.

Cross List: MITS 443S

Typically Offered: FALL/SP/SU

**MITS 643T RADIATION THERAPY CLINICAL EDUCATION III 5 Credit Hours**

This clinical course is designed to provide the Radiation Therapy student with a working knowledge of Radiation Therapy. It will provide the student the opportunity to apply academic clinical skills previously learned with minimal instruction, while maintaining direct supervision and assistance. The student will participate clinically with the theory and operation of linear accelerators, simulators and treatment planning equipment with increased levels of responsibility. Assessment and care of the cancer patient is also emphasized. Assignments and clinical rotations for this course will be a continuation from Applied Radiation Therapy II. MITS 643T students will be required to complete a QA procedure on a VMAT treatment and submit documentation from physics/dosimetry. Prerequisite: Enrollment in the Radiation Therapy Program, MITS 639T, MITS 635T or instructor permission.

Cross List: MITS 443T.

Typically Offered: SUMMER

**MITS 644S CONGENITAL HEART DISEASE 1 Credit Hour**

This course covers fundamental and advanced concepts of echocardiography in patients with congenital heart disease.

Prerequisite: Admission to the Cardiac Sonography Program and/or instructor permission.

Cross List: MITS 444S

Typically Offered: SUMMER

**MITS 644T OPERATIONAL ISSUES IN ONCOLOGY 2 Credit Hours**

This course is designed to focus on components of quality improvement programs and various operational issues in radiation therapy. Quality control and assessment for treatment delivery, planning and patient care are included as well as image acquisition. The role of the radiation therapist in billing, reimbursement and continuous quality improvement will be presented along with issues of regulation, accreditation and budgeting.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 635T, MITS 638N or instructor permission.

Cross List: MITS 444T.

Typically Offered: SUMMER

**MITS 645S ADVANCED TOPICS IN CARDIOVASCULAR SONOGRAPHY 1 Credit Hour**

This course is designed to explore new advancements and research in the field of cardiac sonography.

Prerequisite: Admission to the Cardiac Sonography Program and/or instructor permission.

Cross List: MITS 445S

Typically Offered: SUMMER

**MITS 645T COMPREHENSIVE SEMINAR AND BOARD REVIEW 2 Credit Hours**

This course is a comprehensive review of didactic learning material presented in the professional radiation therapy curriculum completed thus far in the student's educational process. It will assist the therapy student in a way to demonstrate an overall understanding of the knowledge and skills needed to be a successful, competent radiation therapist. One component of this course will review content categories including: Radiation protection and quality assurance, Clinical concepts in radiation oncology, Treatment planning, Treatment delivery; and Patient care and education. Due to the intensive nature of this course, requirements for 445T and 645T are the same.

Prerequisite: Enrollment in the Radiation Therapy Program, MITS 638N, MITS 639T or instructor permission.

Cross List: MITS 445T.

Typically Offered: SUMMER

**MITS 649S CASES IN CARDIOVASCULAR SONOGRAPHY II 1 Credit Hour**

This course is designed to give the student an understanding of normal and pathologic cardiac and vascular conditions and how they are viewed by ultrasound.

Prerequisite: Admission to the Cardiac Sonography Program and /or permission of the instructor. Completion of MITS 439S/639S Cases in Cardiac Sonography I

Cross List: MITS 449S

Typically Offered: SPRING

**MITS 650R MRI CAPSTONE 2 Credit Hours**

The MRI Capstone course prepares students for the ARRT MRI Board Examination by providing a comprehensive review of magnetic resonance imaging. The topics to be covered include patient care and safety, imaging procedures, pulse sequences, data manipulation, special procedures, sequence parameters and options, instrumentation, fundamentals of image formation, artifacts, and quality control.

Prerequisite: Enrollment in the post baccalaureate MRI Program or instructor permission.

Cross List: MITS 450R.

Typically Offered: SPRING

**MITS 650S CARDIOVASCULAR SONOGRAPHY CLINICAL EDUCATION II 5 Credit Hours**

This clinical course is designed to provide the cardiac sonography student with the knowledge and critical thinking skills necessary to participate in the clinical setting.

Prerequisite: Completion of MITS 440S/640S Cardiac Sonography Clinical Education I and /or permission of the instructor.

Cross List: MITS 450S

Typically Offered: SPRING

**MITS 651R MRI SAFETY 1 Credit Hour**

This course is designed to facilitate an understanding of magnetic resonance imaging (MRI) safety considerations and practices. Concepts covered include: 1) MRI contrast administration 2) static magnetic field 3) radiofrequency magnetic field 4) gradient magnetic field 5) patient and personnel screening 6) equipment safety and 7) emergencies in MRI.

Prerequisite: Enrollment in the UNMC Magnetic Resonance Imaging Program or by permission of Instructor.

Cross List: MITS 451R

Typically Offered: FALL/SP/SU

**MITS 651S ULTRASOUND PHYSICS II 2 Credit Hours**

This course is designed to provide the student with an understanding of the fundamental principles of ultrasound physics instrumentation. Topics to be covered include hemodynamics, Doppler, color Doppler, quality assurance, bioeffects and new advances in technology. Concepts will focus on applicability in the clinical setting and preparation for the registry examination.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program, MITS 601S or instructor permission.

Cross List: MITS 451S.

Typically Offered: SPRING

**MITS 652S SONOGRAPHY CLINICAL EDUCATION III 5 Credit Hours**

This clinical course is designed to provide the DMS student with a working knowledge of Diagnostic Medical Sonography. The student will participate in clinical ultrasound exams with increased emphasis placed on operating equipment, producing quality images, applying scanning techniques and protocols, recognizing sonographic features and findings associated with various pathologies, and providing differential diagnosis. Clinical Competency Evaluations will be used to assess application of technical skills and knowledge. Overall Clinical Evaluations will monitor affective, psychomotor, and cognitive skills.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program, MITS 602S and MITS 612S or instructor permission.

Cross List: MITS 452S.

Typically Offered: SUMMER

**MITS 653S OB/GYN CONFERENCE III 1 Credit Hour**

This course is the third in a series of three courses. This course uses a case study-based approach to allow the student to continue their study of obstetric and gynecologic with an emphasis on advanced pathology, and how these structures are interpreted by ultrasound.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program, MITS 631S and MITS 605S or instructor permission.

Cross List: MITS 453S

Typically Offered: SUMMER

**MITS 654S DIAGNOSTIC IMAGE REVIEW III 1 Credit Hour**

This course uses a case study-based approach to provide students with the opportunity to refine the critical thinking skills needed to evaluate complex sonographic pathology and to generate a comprehensive differential diagnosis.

Prerequisite: Enrollment in the Diagnostic Medical Sonography (DMS) Program, successful completion of MITS 441S/641S Diagnostic Image Review I and MITS 403S/603S Diagnostic Image Review II, or by instructor permission.

Cross List: MITS 454S.

Typically Offered: SUMMER

**MITS 655S HIGH RESOLUTION SONOGRAPHY 1 Credit Hour**

This course is designed to provide the student with a working knowledge of anatomy, physiology, and pathology related to the scrotum, retroperitoneum, RE system, musculoskeletal system, thyroid, parathyroid, GI tract, breast, abdominal wall, diaphragm, and peritoneum. Scanning techniques will also be covered for each topic.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 455S.

Typically Offered: SUMMER

**MITS 656S NEUROSONOGRAPHY 2 Credit Hours**

This course is designed to provide the student a working knowledge of the embryologic development, anatomy, and physiology of the CNS, CSF formation and circulation, blood supply to the brain, scanning techniques, pathology of the neonatal brain and spine, and medical care of the neonate during scanning.

Prerequisite: Enrollment in the DMS Program or instructor permission.

Cross List: MITS 456S.

Typically Offered: SUMMER

**MITS 657R CARDIOVASCULAR INTERVENTIONAL TECHNOLOGY I 3 Credit Hours**

This didactic course includes instruction over the history of Angiography, medical and legal implications of angiographic procedures, pharmaceuticals and contrast agents used in interventional radiology, patient care procedures, quality control, angiographic equipment, and image enhancement techniques. (Asynchronous Didactic)

Prerequisite: Enrollment in the CVIT post baccalaureate program or instructor approval.

Cross List: MITS 457R.

Typically Offered: FALL

**MITS 657S PEDIATRIC SONOGRAPHY 2 Credit Hours**

This course focuses on the use of ultrasound in the pediatric patient. It is designed to provide the student a working knowledge of patient care practices and scanning techniques related to pediatric imaging. Anatomy, pathology, and sonographic correlation will be covered for organs/structures related to the central nervous system, neck, thorax, abdomen, pelvis, and musculoskeletal system.

Prerequisite: Enrollment in the post baccalaureate Diagnostic Medical Sonography program or instructor permission.

Cross List: MITS 457S.

Typically Offered: FALL/SP/SU

**MITS 658R CARDIOVASCULAR INTERVENTIONAL TECHNOLOGY II 3 Credit Hours**

This didactic course includes instruction over: interventional procedures of arterial and vascular systems, central venous access procedures, cardiac-interventional, vascular-interventional, neurologic-interventional and nonvascular interventional procedures. This course also includes discussion of supplies and materials used in intervention procedures. (Asynchronous Didactic)

Prerequisite: Enrollment in the CVIT post baccalaureate program, MITS 657R or instructor permission.

Cross List: MITS 458R.

Typically Offered: SPRING

**MITS 658S MUSCULOSKELETAL SONOGRAPHY 2 Credit Hours**

This course focuses on the use of ultrasound for imaging the musculoskeletal system. It is designed to provide the student with a basic working knowledge and the skills required to image and diagnose musculoskeletal-related conditions. Key concepts to be covered include scanning techniques, anatomy and pathology with sonographic correlation, and invasive procedures.

Prerequisite: Current ARDMS or ARRT certification or DMS director permission.

Cross List: MITS 458S.

Typically Offered: FALL/SP/SU

**MITS 659S CASES IN CARDIOVASCULAR SONOGRAPHY III 1 Credit Hour**

This course is designed to give the student an in-depth investigation of cardiac and vascular pathologies and how they are viewed by ultrasound.

Prerequisite: MITS 439S/639S Cases in Cardiovascular Sonography I, MITS 449S/649S Cases in Cardiovascular Sonography II, and/or instructor permission.

Cross List: MITS 459S

Typically Offered: SUMMER

**MITS 660R CT PROTOCOLS AND CROSS-SECTIONAL ANATOMY 2 Credit Hours**

Content provides detailed coverage of procedures for CT imaging of adults and pediatric patients. Procedures include, but are not limited to, indications for the procedure, patient education, preparation, orientation and positioning, patient history and assessment, contrast media usage, scout image, selectable scan parameters and archiving of the images. CT procedures will be taught for differentiation of specific structures, patient symptomology and pathology. CT images studied will be reviewed for quality, anatomy and pathology. CT procedures vary from facility to facility and normally are dependent on the preferences of the radiologists.

Prerequisite: Enrollment in the CT Practicum, Radiography Program or instructor approval.

Cross List: MITS 460R.

Typically Offered: FALL/SP/SU

**MITS 660S CARDIOVASCULAR SONOGRAPHY CLINICAL EDUCATION III 5 Credit Hours**

This clinical course is designed to provide the sonography student with the knowledge and critical thinking skills necessary to participate in the clinical setting as an entry-level cardiac sonographer.

Prerequisite: MITS 440S/640S Cardiac Sonography Clinical Education I, MITS 450S/650S Cardiac Sonography Clinical Education II and/or instructor permission.

Cross List: MITS 460S

Typically Offered: SUMMER

**MITS 661R CT PHYSICS 1 Credit Hour**

This course will cover the fundamental physics principles, quality control, and instrumentation needed for a CT technologist.

Prerequisite: Enrollment in the CT Practicum, Radiography Program or instructor permission.

Cross List: MITS 461R.

Typically Offered: FALL/SP/SU

**MITS 661S CARDIOVASCULAR SONOGRAPHY LAB II 1 Credit Hour**

This course is the second course in a series of three lab courses. The course is designed to provide the student with the opportunity to further hone acquired cardiovascular scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: Admission to the Cardiac Sonography Program /or permission of the instructor.

Cross List: MITS 461S

Typically Offered: SPRING

**MITS 662R CT CLINICAL EDUCATION 3-6 Credit Hours**

This clinical course will cover patient set-up (positioning) and scan set-up (protocols), for Computed Tomography examinations. The clinical rotations will include hands-on experience. Students will have the opportunity to seek out exam competencies that may be applied toward ARRT CT certifying examination eligibility.

Prerequisite: Enrollment in the CT Practicum, MITS 660R, MITS 661R, or instructor permission.

Cross List: MITS 462R.

Typically Offered: SUM/FALL

**MITS 662S VASCULAR PATHOLOGY AND HEMODYNAMICS 2 Credit Hours**

This course will cover pathology and pathophysiology of complex diseases of the cerebral, peripheral and abdominal vascular systems along with the associated clinical, hemodynamic and sonographic findings.

Prerequisite: Admission to the Cardiac Sonography Program and /or permission of the instructor.

Cross List: MITS 462S

Typically Offered: FALL/SP/SU

**MITS 663R CT CAPSTONE 2 Credit Hours**

The Computed Tomography Capstone prepares students for board examinations by providing a comprehensive review of computed tomography imaging. The topics to be covered include patient care and safety, imaging procedures, protocols, data manipulation, instrumentation, fundamentals of image formation, artifacts, and quality control.

Prerequisite: Enrollment in the CT Program or instructor permission.

Cross List: MITS 463R.

Typically Offered: SUM/FALL

**MITS 664R SPECIAL TOPICS IN IMAGING SCIENCES 1-3 Credit Hours**

This is an applied clinical course which will cover the patient care, positioning, and equipment operation skills required for the Imaging Sciences discipline. The clinical rotations will include hands-on experience. Students will have the opportunity to seek out exam competencies.

Prerequisite: Enrollment in an MITS Program or Practicum or instructor permission.

Cross List: MITS 464R.

Typically Offered: FALL/SP/SU

**MITS 665R MRI CLINICAL EDUCATION I 6 Credit Hours**

The course will cover patient set-up (positioning) and scan set up (protocols), for MRI examinations. The clinical rotations will include hands-on experience through a variety of clinical settings. Additionally, students will gain exam competencies, which will be applied toward ARRT certifying examination eligibility.

Prerequisite: Admission in the UNMC Magnetic Resonance Imaging Program.

Cross List: MITS 465R.

Typically Offered: FALL

**MITS 666R MRI CLINICAL EDUCATION II 6 Credit Hours**

The course will cover patient set-up (positioning) and scan set up (protocols), for MRI examinations. The clinical rotations will include hands-on experience through a variety of clinical settings. Additionally, students will gain exam competencies, which will be applied toward ARRT certifying examination eligibility.

Prerequisite: MITS 665R and/or Program Director approval.

Cross List: MITS 466R.

Typically Offered: SPRING

**MITS 667R SPECIAL PROJECTS I 1 Credit Hour**

This is an independent study assignment designed to give the student the opportunity to develop a scientific essay on selected special topics in the medical imaging and therapeutic sciences field.

Prerequisite: Enrollment in the post baccalaureate MRI Program or instructor permission.

Cross List: MITS 467R.

Typically Offered: FALL/SP/SU

**MITS 667S VASCULAR SONOGRAPHY CLINICAL EDUCATION I 5 Credit Hours**

This clinical course is designed to provide the vascular sonography student with the fundamental knowledge and critical thinking skills necessary to participate in the clinical setting. The student will participate in a clinical setting to develop skills in patient care, equipment operation, scanning technique and protocol, normal anatomy identification, and pathology recognition. Clinical objectives will assess the application of technical skills and knowledge. Overall Clinical Evaluations (OCE) will monitor affective, psychomotor and cognitive skills.

Prerequisite: Admission to the Vascular Sonography Program and/or permission from the instructor.

Cross List: MITS 467S

Typically Offered: FALL

**MITS 668R SPECIAL PROJECTS II 1 Credit Hour**

This is an independent study assignment designed to give the student the opportunity to develop a scientific exhibit and present its findings on selected special topics in Radiologic Technology. (Asynchronous Didactic)

Prerequisite: Enrollment in the post baccalaureate MRI Program, MITS 667R or instructor permission.

Cross List: MITS 468R.

Typically Offered: FALL/SP/SU

**MITS 670M MAMMOGRAPHY CLINICAL EDUCATION 1-3 Credit Hours**

This is an applied clinical course which will cover the patient care, positioning, and equipment operation skills required for certification eligibility with the American Registry of Radiologic Technologists (ARRT) - Mammography exam. The clinical rotations will include hands-on experience. Students will have the opportunity to complete exam competencies. Pre-reqs: Admission to the Mammography Practicum or by permission of the Radiography Program Director.

Typically Offered: FALL/SP/SU

**MITS 671S CARDIOVASCULAR SONOGRAPHY LAB III 1 Credit Hour**

This course is the third course in a series of three lab courses. The course is designed to provide the student with the opportunity to master acquired cardiovascular scanning skills while learning more advanced skills under the supervision of a credentialed sonographer in the laboratory setting.

Prerequisite: MITS 461S/661S Cardiovascular Sonography Lab and/or instructor permission.

Cross List: MITS 471S

Typically Offered: SUMMER

**MITS 673R CVIT CLINICAL EDUCATION I 10 Credit Hours**

This clinical course is intended to initiate participation of the CVIT student inpatient care (prior, during, and following procedure), radiation safety measures (accompanying high dose procedures), and routine and emergency procedures and protocols performed in Interventional Radiography Suites and Cardiac Catheterization Laboratories. This experience is intended to provide the student with the confidence needed to assist and perform procedures that parallel progress in his or her didactic education. (Clinical)

Prerequisite: Enrollment in the CVIT post baccalaureate program or instructor approval.

Cross List: MITS 473R.

Typically Offered: FALL

Capacity: 26

**MITS 674R CVIT CLINICAL EDUCATION II 4-10 Credit Hours**

This clinical course is intended to initiate participation of the CVIT student inpatient care (prior, during, and following procedure), radiation safety measures (accompanying high dose procedures), and routine and emergency procedures and protocols performed in Interventional Radiography Suites, Cardiac Catheterization Laboratories, or Hybrid Suites. This experience is intended to provide the student with the opportunities to assist and perform procedures that parallel progress in his or her didactic education. (Clinical)

Prerequisite: Admission to the Cardiovascular Interventional Technology program or permission of program director.

Cross List: MITS 474R

Typically Offered: SPRING

**MITS 675R CVIT CLINICAL EDUCATION III 6-10 Credit Hours**

This clinical course is intended to initiate participation of the CVIT student in patient care (prior, during and following procedure), radiation safety measures (accompanying high dose procedures), and routine and emergency procedures and protocols performed in Interventional Radiography Suites and Cardiac Catheterization Laboratories. This experience is intended to provide the student with the confidence needed to assist and perform procedures that parallel progress in his or her didactic education.

Prerequisite: Enrollment in the CVIT post baccalaureate Program, MITS 673R, MITS 674R.

Cross List: MITS 475R.

Typically Offered: FALL/SP/SU

**MITS 681S OBSTETRICAL SONOGRAPHY EXTERNSHIP 3 Credit Hours**

This clinical course is designed to provide the sonography student with a working knowledge of advanced obstetrical sonography. The student will apply concepts learned in didactic courses to the performance of obstetrical sonograms. Emphasis will be placed on delivering quality patient care, applying scanning techniques and protocols, producing quality images, identifying normal anatomy, and recognizing pathology

Prerequisite: Satisfactory completion of an accredited sonography program and ARDMS or ARRT(S) certification. Permission of the program director required.

Cross List: MITS 481S

Typically Offered: FALL/SP/SU