

IU School of Medicine

Medical Imaging and Radiologic Sciences

IU Fort Wayne offers a Bachelor of Science in Medical Imaging that prepares graduates for a career in Radiography. Radiographers (or Radiologic Technologists) use radiation to produce images of the human body for the purpose of medical diagnosis. Directed by physicians, radiographers are responsible for the appropriate use of complex imaging equipment, as well as caring for the needs and comfort of patients during diagnostic imaging procedures. In addition to completing coursework and clinical rotations focused in Radiography, students in the Medical Imaging program at IUFW have the opportunity to explore advanced imaging modalities and career pathways.

The Medical Imaging Program includes general education and professional education courses. Students are designated as pre-medical imaging majors as they complete required prerequisite courses and prior to admission to the professional program. Admission to the professional portion of the program is competitive and is based on a composite score derived from the prerequisite GPA, submitted recommendation forms, medical imaging preadmission testing, and a personal interview. Completion of course work alone does not ensure admission. Students must apply for admission to the professional program directly to the Office of Medical Imaging and Radiologic Sciences by the first business day of March.

The professional education curriculum is a structured, full-time, 33-month program beginning Fall semester each year. Professional education is a combination of classroom and laboratory instruction and clinical experience. In clinical practice, students utilize the theories and concepts that are presented in the professional curriculum. Under the supervision of radiologists and registered radiographers, students will progress from observing to assisting, and subsequently to completing the radiographic examinations.

Upon program completion, students will be awarded a Bachelor of Science in Medical Imaging. Graduates are eligible to apply to sit for the American Registry of Radiologic Technologists (ARRT) Examination in Radiography. Each graduate must pass the national exam and become certified as a Radiologic Technologist in Radiography before applying for certification examination in another modality.

All students in the process of completing prerequisite course work are strongly encouraged to seek academic advisement from the Pre-Medical Imaging advisor.

Admission Standards and Procedures

Admission Criteria

Admission to the Medical Imaging program from Pre-Medical Imaging is limited and competitive, based on a total composite score of the following:

- Prerequisite curriculum GPA (Must be 2.5 minimum in order to qualify for preadmission testing)

- Applicant Recommendation Forms (COMPLETED BY NON-FAMILY MEMBERS)
- Preadmission testing
- Personal interview *

* If the number of qualified applicants far exceeds the number of positions available, the program's Admission Committee reserves the right to limit the number of applicants to be interviewed to one and a half times the number of positions available in the class.

Completion of the prerequisite coursework and meeting the minimum requirements does not guarantee admission.

Application Requirements

Applicants seeking admission to the Medical Imaging program must meet the following requirements to sit for the preadmission test:

1. Be admitted to IUFW as a degree seeking student (active status is required prior to submitting admission materials).
2. Complete and submit all admission materials, including:
 - Application Forms (available on the program website) <https://www.iufw.edu/medical-imaging/program-admissions/index.html>
 - Official College Transcript from each post-secondary institution attended (unofficial transcript from IUFW Registrar acceptable)
 - For any high school dual credit and/or advanced placement (AP) courses, a high school transcript.
3. Complete at least 13 credit hours of the prerequisite curriculum with a minimum 2.5 prerequisite curriculum grade point average. The prerequisite curriculum grade point average (GPA) is a calculation used only for the Medical Imaging admission process.
4. Earn a grade of C- or better in all prerequisite curriculum coursework.
5. Complete Biol 20300, Biol 20400 and a math course within 5 years of admission to the professional program.
6. Applications and other required application materials may be submitted between the first business day of November and the first business day of March each year. Submit complete admission packet directly to Medical Imaging and Radiologic Sciences, or postmarked by the first business day of March to be considered for admission into the professional program.

Special Considerations:

1. Applicants may complete the equivalents of these courses at other colleges and universities. A student may make multiple attempts at a prerequisite course, with the most recent grade calculated in the Prerequisite curriculum GPA.
2. Students may petition to fulfill some requirements with courses taken at a higher level than the specified course provided that the prerequisite course requirement has been fulfilled. This petition must be indicated by using the SUBSTITUTE COURSE COMPLETION portion of the Prerequisite Checklist Form. Students must earn a C- or better in

the substitute course. If approved, the substitution grade will be calculated into the prerequisite curriculum GPA provided it is higher than the grade for the course being replaced. Prerequisite curriculum coursework and grades from all post-secondary institutions attended will be reviewed and evaluated. Equivalents to pre-admission testing requirements will be evaluated on an individual basis.

Admittance to the Program

In order to be admitted to the Medical Imaging program, applicants must complete all Prerequisite curriculum course work by the end of spring semester with a grade of C- or better in each course and maintain a minimum 2.5 Prerequisite curriculum grade point average.

Upon acceptance to the program, final admission is contingent upon an applicant meeting the following requirements:

- Possess skills and abilities required under the MIRS Technical Standards and Physical Demands and Environmental Conditions or request accommodation through Services for Students with Disabilities
- Complete a background check that meets the requirement for clinical site placement
- Pass a drug screening test
- Complete a physical examination and submit a health record with documentation of required immunizations
- Obtain an Indiana State Board of Health Radiology Permit
- Have personal health insurance

Upon acceptance into the Medical Imaging Program, students will be provided with the forms and information necessary to complete the above listed additional requirements. Expenses incurred in meeting these requirements are the responsibility of the applicant.

Prerequisite Requirement

The Prerequisite curriculum is:

- **BIOL 20300** - Human Anatomy & Physiology I
- **BIOL 20400** - Human Anatomy & Physiology II
- **CHM 10400** - Living Chemistry
- **COM 11400** - Fundamentals of Speech Communication
- **ENGL 13100** - Elementary Composition
- Choose **two** of the following courses:
 - **COM 21200** - Approaches to the Study of Interpersonal Communication (recommended) **OR**
 - **PSY 12000** - Elementary Psychology **OR**
 - **SOC 16101** - Principles of Sociology
- **CS 11200** - Survey of Computer Science
- **STAT 30100** - Elementary Statistical Methods I
- **MA 15300** - Algebra and Trigonometry I **OR** MA 21300 - Finite Math

Course descriptions may be found in the 2019-20 Bulletin. Note: All Prerequisite courses must be completed by the end of spring semester of the application year. Two

additional general education courses must be completed prior to the final academic year of the professional program; however, students are encouraged to complete these courses prior to program entry if possible.

Accreditation

The Medical Imaging Program is accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT):

20 N. Wacker Drive, Suite 2850
Chicago, IL 60606-3182
Phone: (312) 704-5300
Fax: (312) 704-5304
www.jrcert.org

Student Learning Outcomes

Mission Statement

IUFW Medical Imaging and Radiologic Sciences is committed to preparing highly qualified medical imaging technologists by integrating an outstanding baccalaureate academic education with a comprehensive clinical experience.

Program Goals for Student Learning

1. Students will communicate effectively in the health care setting.
2. Students will utilize critical thinking and problem solving skills.
3. Students will model professionalism.
4. Students will demonstrate clinical competence.

Student Outcomes

A graduate of the program will be able to:

- Exercise effective interpersonal communication skills with patients.
- Apply effective interdisciplinary communication skills.
- Execute logical procedural variations for non-routine situations.
- Evaluate radiographic image quality.
- Exhibit the professional responsibilities of medical imaging technologists.
- Engage in self-development related to professional practice.
- Demonstrate clinical procedural proficiency.

Academic Regulations

Students enrolled in the IU School of Medicine professional Medical Imaging Program are governed by the following academic standards:

- Grading System
- Program Cumulative GPA
- Good Academic Standing

Grading System

Final achievement in a particular RADX course is indicated by a letter grade that is translated into the 4.0 grading system below

	Grade	Scale	Grade Points
Exceptional Achievement	A+	99-100	4.0
	A	96-98	4.0
	A-	94-95	3.7
Above Average	B+	92-93	3.3
	B	89-91	3.0
	B-	87-88	2.7
Average	C+	85-86	2.3
	C	82-84	2.0
	C-	80-81	1.7
Below Average	D+	78-79.9	1.3
	D	75-77	1.0
	D-	73-74	0.7
Failure	F	72 & below	0.0

- Polio (series of 3) - e.g. OPV, IPV

Positive titer documentation (showing immunity) may be accepted in place of immunization documentation.

Tuberculosis (TB) Test and Influenza Vaccine

An annual TB test and influenza vaccine will be required for all students enrolled in the professional medical imaging program. More information regarding this requirement will be provided to students enrolled in the program.

Health Insurance

Students enrolled in a program in the health sciences may be exposed to possible injuries and communicable diseases. All students are required to carry their own health insurance. Costs associated with any incident on campus or at clinical sites shall remain the responsibility of the student.

Medical Imaging BS Degree Requirements

1. General Education/Prerequisites (35 Credits)
2. Professional Curriculum - Required Courses (85 credits)

Program Cumulative GPA

Program Cumulative GPA is the average for all RADX courses taken by the student and will be verified at the end of each grading period to establish academic standing.

Good Academic Standing

To be in good standing in MIRS, the following two requirements must be maintained throughout the three years in the Program:

- Students must achieve a grade of C- or better in all RADX courses.
- Students are also required to maintain a Program Cumulative GPA of 3.00.

Students who fail to meet the requirements for Good Academic Standing are subject to dismissal from MIRS

Immunizations and Insurance

Required Immunizations

The following immunizations are required for students admitted to Medical Imaging and Radiologic Sciences. It is recommended that students begin the immunization process prior to admission to the program, as some immunizations require six (6) months to complete the series.

- Measles, Mumps, and Rubella (series of 2) - e.g. MMR
- Tetanus and Diphtheria (within last 10 years - must not lapse during program) - e.g. Td, Tdap
- Varicella (Chicken Pox, series of 2) - e.g. VAR **OR** documented History of Disease
- Hepatitis B (series of 3) - e.g. HepB, HepA-HepB

General Education and Prerequisites

GENERAL EDUCATION/PREREQUISITES 35 Credits - PFW Course numbers

1. CORE COMMUNICATION - TWO CONTENT AREAS (2 courses, 6.0 Cr Hrs)

Dept	Course	Title	Cr Hrs
*ENGL	13100	Writing	3
*COM	11400	Speaking & Listening	3

2. ARTS/HUMANITIES & SOCIAL SCIENCES - TWO CONTENT AREAS (3 courses, 9.0 Cr Hrs)

Dept	Course	Title	Cr Hrs
	Choose two of the following courses:		
*COM	21200	Approaches to the Study of Interpersonal Communication (recommended) OR	3
*PSY	12000	Elementary Psychology OR	
*SOC	16101	Principles of Sociology	
ARTS/ HUMANITIES			

CHOOSE 1 ELECTIVE	ENGL 20201, 3 MUSC 10101, AD 10101, PHIL 11100
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3. CULTURAL UNDERSTANDING - 1 course (3.0 Cr Hrs)

Option	Courses	Cr Hrs
CHOOSE 1 ELECTIVE	ANTH 10501, 3 MUSC 10500, SPAN 11101, NUR 30900, REL 11200	

4. ANALYTICAL REASONING - TWO CONTENT AREAS - 1 course from each list (6.0 Cr Hrs). At least one course must be from List A. Second course can be from List A or B

Options	Course	Title	Cr Hrs
+LIST A – choose 1			
	*MA 15300	Algebra and Trigonometry I (Preferred) OR	3
	*MA 21300	Finite Math	
+Enrollment in List A math courses requires placement or completion of prerequisite course			
++LIST B – choose 1			
	*CS 11200	Survey of Computer Science OR	3
			3
			3
*PSY 20100	Introduction to Statistics in Psychology OR		
*STAT 30100	Elementary Statistical Methods		
++Enrollment in PSY 20100 or STAT 30100 requires MA 15300 as a prerequisite			

5. LIFE AND PHYSICAL SCIENCES - 3 Courses (11.0 Cr Hrs minimum)

Dept	Course	Title	Cr Hrs
*BIOL	20300	Human Anatomy and Physiology	4
*BIOL	20400	Human Anatomy and Physiology	4
*CHM	10400	Living Chemistry	3

- Courses marked with an asterisks (*) must be completed by spring semester prior to the planned

start date of the professional program, and will be used to calculate the cumulative prerequisite coursework GPA.

- Additional general education courses must be completed prior to the final academic year of the professional program; however, students are encouraged to complete these courses prior to program entry if possible.
- Biology courses and a college math course must be completed within 5 years of anticipated program start date.

Professional Curriculum

Second Year - 29 Cr Hrs

Fall

Dept	Course	Title	Cr Hrs
RADX	R105	Orientation to Radiography and Medical Imaging	3
RADX	R106	Fundamentals of Patient Care for Medical Imaging	3
RADX	R111	Radiography I	3
RADX	R270	Radiologic Physics	3

Spring

Dept	Course	Title	Cr Hrs
RADX	R190	Introduction to Clinical Education	3
RADX	R211	Radiography II	3
RADX	R215	Medical Imaging Modalities	3
RADX	R271	Foundations of Image Acquisition	3

Summer

Dept	Course	Title	Cr Hrs
RADX	R191	Medical Imaging Clinical Education I	2
RADX	R185	Medical Terminology	3

Third Year - 29 Cr Hrs**Fall**

Dept	Course	Title	Cr Hrs
RADX	R192	Medical Imaging Clinical Education II	3
RADX	R255	Radiation Biology and Protection in Radiography	3
RADX	R304	Medical Imaging Anatomy	3
RADX	R371	Advanced Image Acquisition	3

Spring

Dept	Course	Title	Cr Hrs
RADX	R291	Medical Imaging Clinical Education III	3
RADX	R206	Advanced Patient Care for Medical Imaging	3
RADX	R305	Radiographic Image Critique	3
RADX	R307	Pharmacology for Medical Imaging	3

Summer

Dept	Course	Title	Cr Hrs
RADX	R292	Medical Imaging Clinical Education IV	2
RADX	R315	Exploring Modalities	3

Fourth Year - 27 Cr Hrs**Fall**

Dept	Course	Title	Cr Hrs
RADX	R293	Medical Imaging	3

RADX	R306	Clinical Education V	
RADX	R400	Radiographic Pathology	3
RADX	R401	Leadership	3
		Legal and Ethical Issues in Medical Imaging	3
RADX	R410	Imaging Informatics and Acquisition Technology	3

Spring

Dept	Course	Title	Cr Hrs
RADX	R391	Clinical Education VI	3
RADX	R310	Seminar in Radiography	3
RADX	R450	Quality Management	3
RADX	R481	Medical Imaging Internship Capstone	3

Courses

RADX-R 105 Orientation to Radiography and Medical Imaging (3 cr.) Introduction to the field of radiology and its history. Ethical and professional Practice Standards are introduced. Professional organizations, accrediting and credentialing agencies will be explored. Basic radiation protection practices for the patient, personnel and general public will be addressed.

RADX-R 106 Fundamentals of Patient Care for Medical Imaging (3 cr.) Concepts in patient care including the physical and psychological needs of the patient and the radiographer's role in patient assessment and education.

Infection control, sterile techniques, body mechanics, immobilization and vital signs will be incorporated through lecture and practice exercises.

RADX-R 111 Radiography I (3 cr.) The knowledge, skills and application of aligning body parts, image receptors and radiographic tube in routine radiographic examinations. Emphasis given to skeletal, chest and abdominal procedures. Correlation will be made between anatomy, physiology, principles of radiography and radiographic image critique.

RADX-R 185 Understanding Med Terminology (1-3 cr.) Introduction to the origin and derivation of medical language with focus on building terms, spelling, abbreviations and pronunciation. Students will become acquainted with combination of the various terms, abbreviations and symbols as they relate to the specific structure and function of the human body. Orientation is

made to the interpretation of radiology reports, clinical diagnosis and imaging orders.

RADX-R 190 Introduction to Clinical Education

(2-4 cr.) An introduction to clinical education as applied to medical imaging. Issues such as patient confidentiality including but not limited to HIPAA, teamwork, self-assessment, communication and interaction with healthcare providers, patients and caregivers will be addressed. Observational rotations in the clinical setting.

RADX-R 191 Medical Imaging Clinical Education I

(2-4 cr.) Clinical application of medical imaging techniques including patient assessment, positioning, technical exposure selection, patient education and documentation. Procedures observed or performed under applicable level of supervision. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-R 192 Medical Imaging Clinical Education II

(2-4 cr.) Clinical application of medical imaging techniques including patient assessment, positioning, technical exposure selection, patient education and documentation. Procedures observed or performed under applicable level of supervision. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-R 206 Advanced Patient Care (3 cr.) Advanced concepts in patient care including the identification of physical and psychological needs of the patients through assessment, patient education, and emergency care procedures and pharmacology. Contrast media, indication, contraindications and adverse reactions will be explored. Response to medical emergency will be simulated in lab setting.

RADX-R 211 Radiography II (3 cr.) This course is a continuation of Radiography I. Additional anatomy, physiology, and positioning will be covered for required routine radiography exams, as well as, surgical and trauma considerations. Correlation will be made between anatomy, physiology, principles of radiography and radiographic critique.

RADX-R 215 Medical Imaging Modalities (3 cr.)

Introduction to current and emerging advanced imaging and therapeutic modalities in the radiologic sciences. Diagnostic and therapeutic modalities utilizing contrast media will be explored. Analysis of indications and contraindications for specific procedures based on pathology and patient condition.

RADX-R 255 Radiation Biology and Protection in

Radiography (3 cr.) Radiation safety issues critical to medical imaging practice will be analyzed. A study of the effects of ionizing radiation on cells, organs and the whole body. Organizations and regulations which influence radiation exposure will be discussed.

RADX-R 270 Radiologic Physics (3 cr.)

Radiologic Physics includes the fundamental principles of radiation physics, x-ray generating equipment and equipment quality control.

RADX-R 271 Foundations of Image Acquisition (3 cr.)

Foundation of image acquisition introduces the principles of radiographic image production, image capturing devices and image characteristics and quality.

RADX-R 291 Medical Imaging Clinical Education III

(2-4 cr.) Clinical application of medical imaging techniques including patient assessment, positioning, technical exposure selection, patient education and documentation. Procedures observed or performed under applicable level of supervision. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-R 292 Medical Imaging Clinical Education IV

(2-4 cr.) Clinical application of medical imaging techniques including patient assessment, positioning, technical exposure selection, patient education and documentation. Procedures observed or performed under applicable level of supervision. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-R 293 Medical Imaging Clinical Education V

(2-4 cr.) Clinical application of medical imaging techniques including patient assessment, positioning, technical exposure selection, patient education and documentation. Procedures observed or performed under applicable level of supervision. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-R 304 Medical Imaging Anatomy (3 cr.)

An analysis of human anatomy and physiology relating to multiplanar and standard radiographic imaging. Relationships between adjacent anatomical structures will be analyzed in multiple dimensions including axial, coronal, and sagittal planes. Computed Tomography (CT) Magnetic Resonance (MR) and radiographic images will be incorporated in lecture and case study.

RADX-R 305 Radiographic Image Critique (3 cr.)

Overview of assessment factors utilized to determine diagnostic quality of radiographic images. Analysis of images using clinical assessment techniques to identify anatomy for all body systems and to ascertain proper and improper positioning, image quality and acceptability based on established professional protocol.

RADX-R 306 Radiographic Pathology (3 cr.)

A study of diseases including causes, symptoms, and methods of diagnosis and treatment. Emphasis is given to the various diagnostic modes in Radiology and the identification of pathologic variances on radiographs.

RADX-R 307 Pharmacology for Medical Imaging

(3 cr.) An exploration of pharmacology discussing the impact of drugs and the utilization in medical imaging. Classification and types of drugs, administration routes and possible adverse effects will be analyzed. Discussions will integrate the selection of drugs with their appropriate use and possible effects. Pharmaceutical regulation will be reviewed.

RADX-R 310 Seminar in Radiography (3 cr.)

Analysis of current trends in medical imaging and comprehensive overview of Radiography including ethical and professional performance standards assessed through a series of projects, examinations and clinical competency performance activities.

RADX-R 315 Exploration of Imaging Modalities (3 cr.)

Designed to give medical imaging students the opportunity to study an advanced imaging modality. Lecture and guided independent study in a selected modality support the potential pursuit of advanced certification in areas such as bone densitometry, computed tomography,

magnetic resonance imaging, mammography, and vascular interventional.

RADX-R 320 PROFESSIONAL DEVELOPMENT IN MEDICAL IMAGING (3 cr.) Personal and Professional development methods and career pathways for medical imaging professionals will be analyzed. discussion of opportunities for professional development including professional organizations, community service and personal growth. Professional networking opportunities.

RADX-R 371 Advanced Image Acquisition (3 cr.) Advanced Image Acquisition is the continuation of RADX-R271. Foundations of Image Acquisition, with emphasis on the application of radiologic principles applied to image formation, imaging equipment and image quality.

RADX-R 391 Clinical Education VI (2-5 cr.) Clinical application of medical imaging techniques including patient assessment, positioning, technical exposure selection, patient education and documentation. Procedures observed or performed under applicable level of supervision. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-R 400 Leadership in Medical Imaging (3 cr.) This course provides an opportunity to explore and analyze leadership in medical imaging. Leadership theory, team-building, and change management will be discussed. The leader-follower relationship and leader behaviors and attributes will be investigated.

RADX-R 401 Legal and Ethical Issues in Medical Imaging (3 cr.) An overview of legal and ethical issues affecting the medical imaging environment. Sources and types of law including constitutional, statutory, regulatory, administrative, contract, criminal and common law and associated legal theories will be discussed. Ethical issues related to professional ethical standards will be discussed as applied to actual clinical scenarios.

RADX-R 410 Imaging Informatics and Acquisition Technology (3 cr.) This course will provide students with a course of study of medical imaging acquisition equipment and technology. The role medical imaging data plays and its use in healthcare will be analyzed.

RADX-R 450 Quality Management in Medical Imaging (3 cr.) Principles of quality management as related to medical imaging will be analyzed. Data collection and analysis will be discussed. Students will develop a quality management project for application in imaging facility.

RADX-R 481 Medical Imaging Internship Capstone (3 cr.) Opportunity for students to develop a project in either clinical or leadership concentration focused on an appropriate area of study in conjunction with a mentor in the field. Aspects of the professional coursework and bachelor's degree framework will be included in project assessment.

RADX-S 111 ABDOMINAL SONOGRAPHY I WITH LAB (3 cr.) This course provides a study of the structure, function, pathology, and relational anatomy of the abdominal organs. The material focuses on sonographic visualization of normal and abnormal abdominal organs to include the pancreas, liver, biliary system, spleen, and urinary system, as well as the adrenal glands and vascular structures.

RADX-S 112 ABDOMINAL SONOGRAPHY II (3 cr.) This course is a continuation of Abdominal Sonography I, with continued focus on the structure, function, pathology, and relational anatomy of the abdomen and superficial organs. Includes normal and abnormal conditions and correlation of ultrasound diagnosis with the patient history and lab findings.

RADX-S 190 INTRODUCTION TO CLINICAL EDUCATION (2-5 cr.) Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Demonstrate mastery of clinical objectives appropriate to the student's didactic and clinical experience.

RADX-S 191 SONOGRAPHY CLINICAL EDUCATION I (2-5 cr.) Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-S 192 SONOGRAPHY CLINICAL EDUCATION II (2-5 cr.) Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-S 211 OBSTETRIC AND GYNECOLOGIC SONOGRAPHY I (3 cr.) This course provides a study of gynecologic and obstetric/fetal anatomy, physiology, patient care, and imaging/interventional techniques. Emphasis will be placed on normal and abnormal gynecologic anatomy, fetal embryology, normal anatomy, gestational age assessment, uteroplacental anatomy, and maternal and fetal complications associated with pregnancy.

RADX-S 212 OBSTETRICS & GYNECOLOGIC SONOGRAPHY II (3 cr.) This course is a continuation of Obstetrical and Gynecologic Sonography I, with continued focus on gynecologic and obstetric/fetal sonography techniques. Emphasis will be placed on normal and abnormal fetal anatomy, physiology, sonographic patterns, clinical history, and correlation of laboratory values.

RADX-S 215 VASCULAR SONOGRAPHY I (3 cr.) This course provides a study of vascular anatomy, physiology, hemodynamics, wave form analysis, and treatment of vascular disease. Emphasis will be placed on carotid duplex/color flow imaging, upper and lower extremity arterial and venous duplex/color flow imaging, and ankle brachial indices. including the clinical history, physical assessment, and appropriate scanning protocol.

RADX-S 216 VASCULAR SONOGRAPHY II (3 cr.)

This course is a continuation of Vascular Sonography I, with continued focus on vascular anatomy, physiology, hemodynamics, wave form analysis, and treatment of vascular disease. Emphasis will be placed on renal doppler, intracranial doppler, vein mapping, hemodialysis grafts, and venous insufficiency duplex/color flow testing, including the clinical history, physical assessment, and appropriate scanning protocol.

RADX-S 271 SONOGRAPHY PHYSICS AND INSTRUMENTATION I (3 cr.)

This course provides the student with the knowledge of ultrasound physics and instrumentation with an emphasis on sound and its interaction with matter. Topics covered in this course include basic physical principles of ultrasound, Doppler principles and ultrasound equipment controls.

RADX-S 291 SONOGRAPHY CLINICAL EDUCATION III (2-5 cr.)

Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-S 292 SONOGRAPHY CLINICAL EDUCATION IV (2-5 cr.)

Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-S 293 SONOGRAPHY CLINICAL EDUCATION V (2-5 cr.)

Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.

RADX-S 310 SEMINAR IN SONOGRAPHY (3 cr.)

This course provides a comprehensive overview of sonography including ethical and professional standards, physics concepts, instrumentation, abdominal, obstetric/gynecological, and vascular. Analysis of topics and current trends in medical sonography is completed via case studies, review exercises, projects and examinations.

RADX-S 371 SONOGRAPHY PHYSICS AND INSTRUMENTATION II (3 cr.)

This course is a continuation of Physics and Instrumentation I, with a focus on providing the ultrasound student with the knowledge of ultrasound physics and instrumentation with an emphasis on instrumentation. Topics include detailed ultrasound instrumentation, applied doppler effect with interpretation, imaging recording devices and quality control.

RADX-S 391 SONOGRAPHY CLINICAL EDUCATION VI (2-5 cr.)

Clinical Application of sonographic imaging techniques, procedures and protocols, including patient assessment, patient education and documentation. The student is assigned to a clinical education center(s) to practice sonography skills. The students will be supervised by qualified sonographers and directed in specific experiences designed to meet the course objectives. Students demonstrate mastery of clinical objectives appropriate to didactic and clinical experience.