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Radiologic Sciences

These professionals function as first assistants to the physician in medical practice, utilizing radiant energy, ionizing radiation (X-Ray), other forms of electro-magnetic energy, and sound waves for the imaging, diagnosis, and treatment of disease. Each distinct specialization has its own educational criteria, accreditation and clinical training requirements. Students may be required to purchase and develop an account within a clinical management system for clinical placement.

The program prepares technologists for entry-level positions and also prepares the technologist who wishes to gain additional expertise. The radiologic technology curriculum and all program specializations are designed to meet the guidelines for accreditation and/or recognition by the American Registry of Radiologic Technologists, the Joint Review Committee on Education in Radiologic Technology and the American Registry of Diagnostic Medical Sonography.

The Radiologic Sciences program offers a Bachelor of Science Degree with specializations in: diagnostic medical sonography, magnetic resonance imaging/computed tomography, radiation therapy technology, cardiac interventional and radiology management/education.

To be considered for enrollment into the Radiologic Sciences program, prospective students must first obtain admission to the University. To be approved for entry into the major and professional sequences, applicants must submit additional application materials. This program admits a limited number of students based on specific selection criteria. Students may be selected for admission to the Radiologic Sciences program either as freshmen or sophomores. Freshmen will be evaluated on the basis of ACT/SAT scores and high school grade point average. Sophomores will be evaluated on the number of hours of college credit, college grade point average as calculated by SIU Carbondale, college mathematics and science grades and the grade in anatomy. Anatomy, math and science courses must be completed prior to the following fall semester.

Accreditation guidelines place limits on the enrollment in this program. Students begin the professional sequence each fall only. This degree program requires the successful completion of clinical internships. In accordance with Federal and State guidelines, the clinical sites will require proof of the following: vaccination for measles, mumps, rubella, tetanus, TB, varicella (chicken pox), Hepatitis B, Covid 19, and influenza; current CPR card; and proof of completion of HIPAA and blood-borne pathogens training. Affiliation sites will also require students to undergo a criminal background check and drug screening.

Associate in Applied Science (A.A.S.) in Radiologic Sciences

The A.A.S. degree in the Radiologic Sciences curriculum is designed to prepare students to become registered radiologic technologists (medical radiographers). Completion of the program provides graduates with the educational requirements necessary to take the national certification examination administered by the American Registry of Radiologic Technologists. Students in the radiation therapy technology, and magnetic resonance imaging/computed tomography, and cardiac-interventional specialization will receive the A.A.S. degree upon successful completion of their junior year.

All students graduating from the Radiography program must pass their ARRT exam and be certified by the ARRT by the start date of their specialization or the student will not be allowed to enter their specialization in Radiation Therapy, Cardiac-Interventional, or MRI/CT. All Radiography students must pass each of their Radiologic Science courses: RAD 122, RAD 102, RAD 112, RAD 112L, RAD 202, RAD 212, RAD 222, RAD 232, RAD 232L, RAD 312, RAD 322, RAD 332, RAD 342, RAD 352 with a grade of "C" or better (the minimum requirement) in order to satisfy Program requirements and stay in the Program. Any Radiography student that does not meet the minimum course requirement (a course

grade of "C" or better) will not be allowed to continue in the Program. The student is allowed to re-apply for admission to the Program the following year through the Program's online application process.

The following general education and radiologic sciences courses totaling 70 credit hours are required to receive the A.A.S. degree in Radiologic Sciences.

A.A.S. Radiologic Sciences Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirement	15
General Education Courses: ENGL 101; MATH 108 or 101; CMST 101; University Core Science, University Core Social Science.	
A.A.S. Radiologic Sciences Requirements	48
Radiologic Sciences Courses: RAD 122, RAD 102, RAD 112, RAD 112L, RAD 202, RAD 212, RAD 222, RAD 232, RAD 232L, RAD 312, RAD 322, RAD 332, RAD 342, RAD 352	
Additional Required Course: AH 241 or Anatomy Equivalent	4
Total	67

Bachelor of Science (B.S.) in Radiologic Sciences

The Bachelor of Science degree in Radiologic Sciences is a 120 credit-hour program consisting of thirty-nine credit hours of University Core Curriculum requirements, and 79 credit hours of combined radiography and professional specialization courses. All coursework required for the A.A.S. degree in Radiologic Sciences counts toward this degree. Within the Radiologic Sciences curriculum, certain courses must be passed by a minimum requirement in order to progress through the program (please see course descriptions for minimum requirements listed for each course). Any student unable to achieve the minimum requirements, will not be allowed to progress through the program and must re-apply for admission into the program and specialization through the program's online application process.

Cardiac-Interventional (CI) Radiography Specialization

The cardiac-interventional specialization is designed to prepare technologists to practice in a clinical setting during interventional cardiac and vascular procedures. The classroom components will emphasize physics, technology, instrumentation, sectional anatomy and pathology relevant to the practice and certification board exam. Technologists employed in these capacities will be supervised by a certified technologist and a board-certified cardiologist/radiologist.

Within the cardiac-interventional specialization, each student must complete RAD 407, RAD 417, RAD 427, and RAD 437 with a "C" or higher and RAD 447, RAD 457, RAD 467 and RAD 477 with a "B" or higher. Any student not completing the above-mentioned requirements, will not be allowed to graduate with the cardiac-interventional specialization and must re-apply for admission into the specialization. The student will not be cleared to take the ARRT cardiac-interventional examination if they do not meet the minimum criteria through the program's online application process.

Competitive Admission Process - Radiologic Sciences - Cardiac Interventional

1. The RADS program is a fall only competitive admissions program.
2. Applications are accepted from July 15th to February 1st.
3. For questions regarding applications, contact Sullivan, Katie Katilyn.Sullivan@siu.edu (618)-453-8214.
4. For questions regarding academics, contact the Academic Advisor, Naishon Patterson naipatt001@siu.edu.

For Cardiac-Interventional Admission:

Students will apply to the Radiography program and pick a specialization.

The applications will be reviewed along with the applicant's education background. The applicant's educational background will determine the program's entry point.

The following are the program entry points and the qualifications to be considered for each entry point. One thing to note, is a student may have a University standing of a freshman, sophomore, etc. classification, but their entry point is what the Radiography program classifies them as in the program:

Freshman (Year 1): The freshman spots are for those applicants that have no or very few college credits. Those applicants are ranked according to the High School GPA. (Up to 15 Slots available)

Sophomore (Year 2): To be considered for a year 2 slot, applicants must have completed or currently in progress of the following courses:

- Anatomy
- Physics or Chemistry
- Math

During selection, points are given for the grades in the required courses. Points are given as follows: (A= 2pts, B= 1pt, C= 0pts, enrolled in course during the spring term .5pts.). The point total is added to the overall GPA. The total points are calculated and then ranked. *(The total amount of slots available are dependent on how many of the previous year's freshmen continue in the program). (20 max).*

Transfer Spot (Year 4): To be considered for a Year 4 spot, a student must have completed a Radiography program at another institution and be credentialed with the *ARRT. Courses that will be reviewed for admission to the Cardiac Interventional modality are:

- Radiography Physics
- Anatomy *(If the applicant's Radiography program did not require anatomy and physiology, we will utilize their Radiography anatomy)*
- Math

(The total amount of slots available are dependent on how many of the previous year's radiography students are on the Cardiac Interventional track and pass their ARRT examination). (20 max).

For the equivalent transfer courses, you can contact the Academic Advisor or you can visit the articulation and evaluation website at <https://articulation.siu.edu/>.

*ARRT: The American Registry of Radiologic Technologist <https://www.arrt.org/>

B.S. Radiologic Sciences - Cardiac-Interventional (CI) Radiography Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirement	39
UCC to include UNIV 101U, AH 241, or Anatomy Equivalent AH 105	2
Cardiac-Interventional Core Requirements	48

Degree Requirements	Credit Hours
Including: RAD 102, RAD 112, RAD 112L, RAD 122, RAD 202, RAD 212, RAD 222, RAD 232, RAD 232L, RAD 312, RAD 322, RAD 332, RAD 342, RAD 352	
Cardiac-Interventional Radiography	31
RAD 407, RAD 417, RAD 427, RAD 437, RAD 447, RAD 457, RAD 467, RAD 477	
Total	120

Diagnostic Medical Sonography (Ultrasound) Specialization

Sonography is a diagnostic medical procedure that uses high frequency sound waves (ultrasound) to produce dynamic visual images of organs, tissues, or blood flow inside the body. This type of procedure is called a sonogram. There are several areas of specialization in the field of Sonography. While most Sonographers work in hospitals, many will also find employment in clinics, private practice physician offices, public health facilities, laboratories, and other medical settings performing examinations in their areas of specialization. Career advancement opportunities exist in education, administration, research, and in commercial sales and education/application specialists.

Students who are accepted into the Sonography program as a freshman or a sophomore will receive a minor in Health Care Management by completion of the additional requirements. Year three transfer students or students who are accepted into the Sonography program as a Junior must complete the Health Care Management minor requirements. Some of the additional requirements may be substituted for those newly transfer or newly accepted Junior students.

Within the Diagnostic Medical Sonography Program, each student must complete RAD 329, RAD 349U, RAD 359C, RAD 359U, RAD 369, RAD 379C, RAD 379U, RAD 389, RAD 399A, RAD 399B, RAD 399C, RAD 409A, RAD 409B, RAD 459A, RAD 459B, RAD 479A, RAD 479B, and RAD 489 with a grade of "C" or higher and RAD 409A and 409B with a grade of "B" or higher. Any student not completing the above mentioned requirements will not be allowed to graduate/progress through the Sonography Program and must re-apply for admission into the program through the program's online application process.

Competitive Admission Process - Radiologic Sciences - Medical Sonography

1. The RADS program is a fall only competitive admissions program.
2. Applications are accepted from July 15th to February 1st.
3. For questions regarding applications, contact Anderson, Shannon sanderson@siu.edu (618)453-2375.
4. For questions regarding academics, contact the Academic Advisor, Naishon Patterson naipatt001@siu.edu.

For Diagnostic Medical Sonography (DMS) Admission

Students will apply to the Radiography program and pick a specialization.

The applications will be reviewed along with the applicant's education background. The applicant's educational background will determine the program's entry point.

The following are the program entry points and the qualifications to be considered for each entry point. One thing to note, is a student may have a University standing of a freshman, sophomore, etc. classification, but their entry point is what the DMS program classifies them as in the program:

Freshman (Year 1): The freshman spots are for those applicants that have no or very few college credits. Those applicants are ranked according to the High School GPA. (Up to 15 Slots available)

Sophomore (Year 2): To be considered for a year 2 slot, applicants must have completed or currently in progress of the following courses:

- Anatomy
- Physics
- Algebra

During selection, points are given for the grades in the required courses. Points are given as follows: (A= 2pts, B= 1pt, C= 0pts, enrolled in course during the spring term .5pts.). The point total is added to the overall GPA. The total points are calculated and then ranked. *(The total amount of slots available are dependent on how many of the previous year's freshmen continue in the program). (20 max).*

For the equivalent transfer courses, you can contact the Academic Advisor or you can visit the articulation and evaluation website at <https://articulation.siu.edu/>.

B.S. Radiologic Sciences - Diagnostic Medical Sonography (Ultrasound) Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirement	39
To include: UNIV 101, MATH 108, PHYS 101	
Sonography Requirements	51
RAD 329, RAD 349U, RAD 359C, RAD 359U, RAD 369, RAD 379C, RAD 379U, RAD 389, RAD 399A, RAD 399B, RAD 399C, RAD 409A, RAD 409B, RAD 459A, RAD 459B, RAD 479A, RAD 479B, RAD 489	
Additional Requirements	13
AH 241	2 + (2)
AH 105	2
HCM 310	3
HCM 415	3
HCM 364	3
HCM Minor: Please see HCM Program for HCM Minor Requirements	18
Total	121

Magnetic Resonance Imaging/Computed Tomography Specialization

This specialization is designed to prepare technologists in the advanced areas of magnetic resonance imaging (MRI) and computed tomography (CT). The MRI and CT components will emphasize physics, technology, instrumentation, sectional anatomy, and pathology. Technologists employed in these capacities will be supervised by a board certified radiologist, but will be afforded a greater amount of responsibility and independence in the performance of their duties.

Competitive Admission Process - Radiologic Sciences - MRI/CT

1. The RADS program is a fall only competitive admissions program.
2. Applications are accepted from July 15th to February 1st.
3. For questions regarding applications, contact Walker, Jen jennifer.walker@siu.edu (618)453-8812.
4. For questions regarding academics, contact the Academic Advisor, Naishon Patterson naipatt001@siu.edu.

For MRI/CT Admission:

Students will apply to the Radiography program and pick a specialization.

The applications will be reviewed along with the applicant's education background. The applicant's educational background will determine the program's entry point.

The following are the program entry points and the qualifications to be considered for each entry point. One thing to note, is a student may have a University standing of a freshman, sophomore, etc. classification, but their entry point is what the Radiography program classifies them as in the program:

Freshman (Year 1): The freshman spots are for those applicants that have no or very few college credits. Those applicants are ranked according to the High School GPA. (Up to 15 Slots available)

Sophomore (Year 2): To be considered for a year 2 slot, applicants must have completed or currently in progress of the following courses:

- Anatomy
- Physics or Chemistry
- Math

During selection, points are given for the grades in the required courses. Points are given as follows: (A= 2pts, B= 1pt, C= 0pts, enrolled in course during the spring term .5pts.). The point total is added to the overall GPA. The total points are calculated and then ranked. *(The total amount of slots available are dependent on how many of the previous year's freshmen continue in the program). (20 max).*

Transfer Spot (Year 4): To be considered for a Year 4 spot, a student must have completed a Radiography program at another institution and be credentialed with the *ARRT. Courses that will be reviewed for admission to the MRI/CT modality are:

- Radiography Physics
- Anatomy *(If the applicant's Radiography program did not require anatomy and physiology, we will utilize their Radiography anatomy)*
- Math

(The total amount of slots available are dependent on how many of the previous year's radiography students are on the MRI/CT track and pass their ARRT examination). (20 max).

For the equivalent transfer courses, you can contact the Academic Advisor or you can visit the articulation and evaluation website at <https://articulation.siu.edu/>.

*ARRT: The American Registry of Radiologic Technologists <https://www.arrt.org/>

B.S. Radiologic Sciences - Magnetic Resonance Imaging/Computed Tomography Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirement	39
To include: UNIV 101U, AH 241 or Anatomy Equivalent AH 105	2
Professional Core Requirements	48

Degree Requirements	Credit Hours
Including: RAD 102, RAD 112, RAD 112L, RAD 122, RAD 202, RAD 212, RAD 222, RAD 232, RAD 232L, RAD 312, RAD 322, RAD 332, RAD 342, RAD 352	
MRI and CT	31
Including: RAD 364, RAD 374, RAD 384, RAD 394, RAD 404, RAD 414, RAD 424, RAD 434	
Total	120

Radiation Therapy Technology Specialization

Radiation therapy technologists assist radiation oncologists in all aspects of the administration of radiation therapy treatment; their primary responsibility consists of exposing specific areas of the patient's body to prescribed doses of ionizing radiation. Radiation therapy technologists also provide appropriate patient care; this includes exercising judgment when administering treatment and adhering to the principle of radiation protection for the patient, self and others.

Within the radiation therapy specialization, each student must complete RAD 360, RAD 370, RAD 380, RAD 390, and RAD 400 with a "C" or higher and RAD 410, RAD 420, RAD 430, and RAD 440 with a "B" or higher. Any student not completing the above mentioned requirements, will not be allowed to graduate with the radiation therapy specialization and must re-apply for admission into the specialization. The student will also not be cleared to take the ARRT radiation therapy examination if they do not meet the minimum criteria through the program's online application process.

Competitive Admission Process - Radiologic Sciences - Radiation Therapy

1. The RADS program is a fall only competitive admissions program.
2. Applications are accepted from July 15th to February 1st.
3. For questions regarding applications, contact McKinnies, Rick rmck@siu.edu (618)453-7260.
4. For questions regarding academics, contact the Academic Advisor, Naishon Patterson naipatt001@siu.edu.

For Radiation Therapy Admission

Students will apply to the Radiography program and pick a specialization.

The applications will be reviewed along with the applicant's education background. The applicant's educational background will determine the program's entry point.

The following are the program entry points and the qualifications to be considered for each entry point. One thing to note, is a student may have a University standing of a freshman, sophomore, etc. classification, but their entry point is what the Radiography program classifies them as in the program:

Freshman (Year 1): The freshman spots are for those applicants that have no or very few college credits. Those applicants are ranked according to the High School GPA. (Up to 15 Slots available)

Sophomore (Year 2): To be considered for a year 2 slot, applicants must have completed or currently in progress of the following courses:

- Anatomy
- Physics or Chemistry
- Math

During selection, points are given for the grades in the required courses. Points are given as follows: (A= 2pts, B= 1pt, C= 0pts, enrolled in course during the spring term .5pts.). The point total is added to the overall GPA. The total points are calculated and then ranked. *(The total amount of slots available are dependent on how many of the previous year's freshmen continue in the program). (20 max).*

Transfer Spot (Year 4): To be considered for a Year 4 spot, a student must have completed a Radiography program at another institution and be credentialed with the *ARRT. Courses that will be reviewed for admission to the Radiation Therapy modality are:

- Radiography Physics
- Anatomy (*If the applicant's Radiography program did not require anatomy and physiology, we will utilize their Radiography anatomy*)
- Math

(The total amount of slots available are dependent on how many of the previous year's radiography students are on the Radiation Therapy track and pass their ARRT examination). (20 max).

For the equivalent transfer courses, you can contact the Academic Advisor or you can visit the articulation and evaluation website at <https://articulation.siu.edu/>.

*ARRT: The American Registry of Radiologic Technologists <https://www.arrt.org/>

B.S. Radiologic Sciences - Radiation Therapy Technology Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirement	39
To include: UNIV 101U, AH 241 or Anatomy Equivalent AH 105	2
Radiation Therapy Technology Core Requirements	48
Including: RAD 102, RAD 112, RAD 112L, RAD 122, RAD 202, RAD 212, RAD 222, RAD 232, RAD 232L, RAD 312, RAD 322, RAD 332, RAD 342, RAD 352	
Radiation Therapy Technology	31
Including: RAD 360, RAD 370, RAD 380, RAD 390, RAD 400, RAD 410, RAD 420, RAD 430, RAD 440	
Total	120

Radiologic Sciences Management/Education Specialization

This specialization is designed to allow entry level radiographers the opportunity to study educational theories, philosophies, styles, and techniques. Additionally, the student will be introduced to management concepts as they relate to medical imaging departments. The primary focus of the radiology management/education specialization is to allow students who wish to enter either radiography education or radiography management the opportunity to learn and develop the skills necessary for success in these two environments. Students will be required to complete an undergraduate research project related to radiology education or management.

B.S. Radiologic Sciences - Radiologic Sciences Management/Education Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirement	39
To include: UNIV 101U, AH 241 or Anatomy Equivalent AH 105	2
Radiologic Sciences Management/Education Core Requirements	48
Including: RAD 102, RAD 112, RAD 112L, RAD 122, RAD 202, RAD 212, RAD 222, RAD 232, RAD 232L, RAD 312, RAD 322, RAD 332, RAD 342, RAD 352	
Radiologic Sciences Management/Education	31
Ten Courses:	31
RAD 345, RAD 355, RAD 415, RAD 425A, RAD 425B, RAD 435, RAD 476, HCM 360, HCM 364, HCM 388	
Total	120

Capstone Option for Transfer Students

The SIU Carbondale Capstone Option may be available to eligible students who have earned an associates degree or the equivalent. The Capstone Option reduces the University Core Curriculum requirements from 39 to 30 hours, therefore reducing the time to degree completion. See the Capstone Option section for more information on this option.

Radiologic Sciences Courses

RAD102 - Introduction to Radiologic Technology and Radiographic Technique This course is designed to introduce the student to the medical radiography profession. Students will begin their study of medical terminology, professional behavior, ethics, theory of radiographic exposure and its application to computed radiography and digital radiography. Included is an introduction to the principles of radiation protection. Restricted to RADS majors. Credit Hours: 3

RAD112 - Radiographic Anatomy and Positioning Designed to provide the student radiographer with didactic instruction leading to the development of clinical competencies. It serves as a foundation for the progression towards advanced clinical knowledge. Radiographic anatomy and positioning of the extremities, chest, abdomen, vertebral column, and routine fluoroscopic procedures will be stressed. Also, emphasis is placed on the soft-tissue structures demonstrated by radiographs of these areas. The principles of radiation protection for the patient and for the radiographer are stressed. Routine radiographic positioning common to most health facilities will be described. Must be taken concurrently with RAD 112L. If RAD 112L is dropped, then RAD 112 must be dropped. Prerequisites: AH 241 with a grade of C or better. Co-requisites: RAD 112L, RAD 102 and RAD 202. Restricted to RADS majors. Credit Hours: 3

RAD112L - Radiographic Anatomy and Positioning Laboratory This course is the laboratory to accompany RAD 112. Designed to provide the student radiographer with didactic instruction leading to the development of clinical competencies. It serves as a foundation for the progression towards advanced clinical skills. Radiographic anatomy and positioning of the extremities, chest, abdomen, vertebral column, and routine fluoroscopic procedures will be stressed. The principles of radiation protection for the patient and for the radiographer are practiced as well. Routine radiographic positioning common to most health facilities will be described, demonstrated and practiced on phantoms in the energized X-ray labs. Two laboratory sessions per week. Must be taken concurrently with RAD 112. If RAD 112 is dropped, then RAD 112L must be dropped. Prerequisite: AH 241 with a grade of C or better. Co-requisites: RAD 112, RAD 102 and RAD 202. Restricted to RADS majors. Lab fee: \$75. Credit Hours: 1

RAD122 - Seminar in Radiologic Sciences Study will focus on developing a professional identity, an understanding of the integrated health care team, an understanding of the language of medicine in general and radiology in particular, and development of basic patient care techniques and skills. Restricted to admission to major or consent of school. Credit Hours: 2

RAD202 - Radiographic Physics This course will concentrate on general theories of physics as they relate to matter, mechanics and electricity. It also involves the study of the nature and production of radiation and understanding of the complexity of radiographic equipment and x-ray circuitry. Co-requisites: RAD 102, RAD 112 and RAD 112L. Restricted to RADS majors and acceptance into the Radiologic Sciences Program. Credit Hours: 3

RAD212 - Special Radiographic Procedures Includes the study of contrast producing agents which are used to visualize specific parts of the body. Radiographic technique employed in this type of imaging is highly specialized and will be studied in depth. Prerequisite: RAD 222 with a minimum grade of C. Co-requisites: RAD 232 and RAD 232L. Credit Hours: 2

RAD222 - Radiography Clinic I The student is assigned to a selected clinical education center for the entire semester. During this semester, the student radiographer is expected to practice and perfect the professional skills developed the previous semester on campus. The student will participate in specific experiences and film critique assignments designed to meet objectives for the semester. Prerequisites: C or better in RAD 102, RAD 112, RAD 112L and RAD 202. Restricted to RADS majors. Credit Hours: 9

RAD232 - Selected Radiography Systems This course is designed to instruct the student in the anatomy of the skull, facial bones, paranasal sinuses, mandible, digestive system, urinary system, biliary system, and human reproductive systems. Routine imaging protocols common to most health facilities will be described. Particular emphasis will be placed on radiographic imaging of the trauma patient. This course must be taken concurrently with RAD 232L. If RAD 232 is dropped then RAD 232L must be dropped. Prerequisite: C or better in RAD 222. Co-requisites: RAD 232L and RAD 212. Restricted to RADS majors. Credit Hours: 3

RAD232L - Selected Radiography Systems Laboratory This is the laboratory component associated with RAD 232. Designed to instruct the student in the anatomy and positioning of the skull, facial bones, paranasal sinuses, digestive, urinary, biliary and human reproductive systems. Routine imaging projections common to most health facilities will be practiced on a phantom in the energized laboratory. Particular emphasis is placed on radiography of the trauma patient. Principles of radiation protection for the patient and the radiographer are practiced as well. One laboratory session per week. Must be taken concurrently with RAD 232. If RAD 232 is dropped then RAD 232L must be dropped. Prerequisite: RAD 222 with a minimum grade of C. Co-requisites: RAD 232 and RAD 212. Restricted to RADS majors. Lab fee: \$75. Credit Hours: 1

RAD299 - Individual Study Provides students with opportunity to develop a special program of studies to fit a particular need not met by other offerings. Enrollment provides access for advanced radiologic sciences students to the resources of the radiologic sciences facilities. Each student will work under the supervision of a sponsoring program faculty member. Restricted to RADS majors. Credit Hours: 1-16

RAD312 - Radiographic Pathology Deals with the etiology and processes of trauma and disease. Emphasis will be placed on radiographic pathology of the body systems and the manifestation of this pathology. Prerequisite: RAD 332 with a minimum grade of C. Co-requisites: RAD 322, RAD 342 and RAD 352. Credit Hours: 3

RAD322 - Radiographic Contrast and Sectional Anatomy An introduction to the use of radiopharmaceuticals for enhancement of various anatomical structures within the human body. Includes coverage of common types of contrast agents, their administration, their physiological effects on various organ systems, and emergent treatment. Sectional anatomy includes the study of body structures in the coronal, sagittal and transverse planes, used in computed tomography (CT) and magnetic resonance imaging (MRI). Emphasis will be placed on 1) identifying the imaging plane; 2) identifying the anatomy visualized in a given plane; and 3) differentiating between images produced by CT and MRI. Prerequisite: RAD 332 with a minimum grade of C. Co-Requisites: RAD 312, RAD 342 and RAD 352. Credit Hours: 3

RAD329 - Sectional Anatomy-Sonography This course introduces the student to human anatomy as seen in the transverse, coronal, and sagittal planes. Emphasis is focused on the organs of sonographic interest to include the anatomy of the thorax, abdomen, pelvis, and extremities. Normal anatomy, anatomic variants, and selected pathologies will be discussed in the various body regions. Restricted to major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 2

RAD332 - Radiography Clinic II The student returns to a clinical education center for the entire semester. The student radiographer will practice and perfect the advanced professional skills developed in the previous semester on campus. The student will participate in specific experiences and film critique assignments designed to meet the objectives for the semester, including advanced modalities. Prerequisite: C or better in RAD 212, RAD 232 and RAD 232L. Restricted to RADS majors. Credit Hours: 9

RAD341 - Fundamentals of Sonography This course is designed to introduce the profession of Diagnostic Medical Ultrasonography. Topics of study include historical perspectives, patient care and communication, medical ethics and terminology. Restricted to RADS majors. Credit Hours: 1

RAD342 - Radiation Biology Designed to instruct the student radiographer in the principles and terminology of radiobiology. Emphasis will be placed on how these principles relate to radiation protection for both the patient and radiographer. Also included are introductions to nuclear medicine and radiation therapy technology. Prerequisite: RAD 332 with a minimum grade of C. Co-Requisites: RAD 312, RAD 322 and RAD 352. Credit Hours: 3

RAD345 - Introduction to Radiology and Diagnostic Imaging Management (Same as DH 345) This course focuses on the unique management issues involved in diagnostic imaging. These problems include accreditation, federal law unique to radiology, and medical-legal issues of patient care. Additionally, state and local licensure laws pertinent to ionizing radiation and radiation safety will be explored. Restricted to the major or consent of school. Credit Hours: 3

RAD349 - Fundamentals of Sonography This course is designed to introduce the profession of Diagnostic Medical Ultrasonography. Topics of study include historical perspectives; medical ethics and law; patient care and communication; exam related documentation; work related musculoskeletal disorders, and terminology. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 1-3

RAD349B - Fundamentals of Sonography This course is designed to introduce the profession of Diagnostic Medical Ultrasonography. Topics of study include historical perspectives, medical ethics and law; patient care and communication; exam related documentation; work related musculoskeletal disorders, and terminology. Restricted to major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 1

RAD349U - Fundamentals of Sonography This course is designed to introduce the profession of Diagnostic Medical Ultrasonography. Topics of study include historical perspectives; medical ethics and law; patient care and communication; exam related documentation; work related musculoskeletal disorders, and terminology. Restricted to major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 2

RAD352 - Special Imaging Modalities This course provides the student with the knowledge and understanding relevant to the function, operation and application of the various techniques used in image production. This course also includes a complete review of the radiography curriculum in preparation for

the American Registry of Radiologic Technologists National certification examination. Prerequisite: RAD 332 with a minimum grade of C. Co-Requisites: RAD 312, RAD 322 and RAD 342. Credit Hours: 3

RAD355 - Teaching Strategies in Radiology (Same as DH 365) This course is designed to introduce the prospective radiology educator to philosophies and strategies required to successfully instruct students in the various fields of allied health, including radiography. Restricted to the major or consent of school. Credit Hours: 3

RAD359C - OB/GYN Sonography II A study of gynecologic and obstetric/fetal anatomy; physiology; patient care; and imaging/interventional techniques. Emphasis will be placed on normal and abnormal obstetric and fetal anatomy, physiology, sonographic patterns, clinical history, physical assessment. Restricted to major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD359U - OB & GYN Sonography I 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, normal and abnormal first trimester obstetric ultrasound, physiology, sonographic patterns, clinical history, physical assessment, and appropriate exam protocol. Restricted to major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD360 - Fundamentals of Radiation Therapy The rationale for and methods employed in the treatment of cancer by radiotherapy. The role of radiotherapy and its relationship to other modalities utilized in the treatment of cancer are explored and defined. Also, an introduction to the principles and concepts of radiobiology. Restricted to RADS majors. Credit Hours: 2

RAD364 - Computed Tomography Technology This course will focus on the physical principles of computed tomography. Topics of discussion will include the history of computed tomography, its instrumentation, data acquisition, image reconstruction, contrast agents, patient care/safety, and quality assurance. Special imaging application for interventional, trauma, and oncology will be discussed. Restricted to major, completion of ARRT in radiography, or consent of school. Credit Hours: 3

RAD369 - Vascular Sonography 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. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD370 - Techniques and Applications of Radiation Therapy The technical aspects of radiotherapy including dosimetry, shielding, radioactive sources and methodology. Lecture and laboratory format. Restricted to RADS majors. Lab fee: \$100. Credit Hours: 3

RAD374 - Sectional Anatomy and Imaging Applications This course focuses on identifying anatomical structures produced by Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) scanners in the transverse, sagittal, coronal, and orthogonal planes. The MRI and CT images place emphasis on the head, neck, spine, chest, abdomen, pelvis, musculoskeletal (joints), and vascular system. Restricted to major. Credit Hours: 3

RAD379C - Abdominal Sonography II A continuation in the study of abdominal anatomy; physiology; patient care; and imaging/interventional techniques. Emphasis will be placed on normal and abnormal peritoneal, retroperitoneal, gastrointestinal, superficial structures and associated sonographic patterns. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD379U - Abdominal Sonography I A study of abdominal anatomy; physiology; patient care; and imaging/interventional techniques. Emphasis will be placed on normal and abnormal vascular, hepatic, biliary, splenic, and renal systems and associated sonographic patterns. Restricted to major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD380 - Physics of Radiation Therapy Includes a study of the physical principles and applications of radiation in therapy. Defines the nature of radiation, radioactivity, interactions with matter and different radiation therapy instrumentation. Review of basic radiation therapy principles for use in later courses. Credit Hours: 3

RAD384 - Magnetic Resonance Imaging Technology This course will focus on the physical principles of magnetic resonance imaging. Topics of discussion will include the history of magnetic resonance imaging, its physical principles, instrumentation, imaging techniques, contrast agents, patient care/safety, and quality assurance. Prerequisite: completion of ARRT in radiography, or consent of school. Limited to major. Credit Hours: 4

RAD389 - Ultrasound Physics and Instrumentation A study of diagnostic medical ultrasound physics. Topics include ultrasound wave generation and propagation; transducers; pulse echo instruments; pulse echo imaging; image storage and display; Doppler; artifacts; quality assurance; bioeffects and safety. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD390 - Oncology Nursing This course will include nursing techniques on patients with cancer, anatomy, staging of disease, and radiobiologic effects of radiation on the patient. Credit Hours: 2

RAD394 - MRI and CT Pathology This course is designed as an overview of pathologies commonly seen in magnetic resonance imaging and computed tomography. Along with distinguishing various types and pathologies as seen on MRI and CT scan, emphasis will be placed on a general understanding of the description, etiology, epidemiology, signs and symptoms, imaging characteristics, treatment, and prognosis of those pathologies. Restricted to major. Credit Hours: 3

RAD399A - Clinical Practicum I (Lab) A study of sectional anatomy in the transverse, longitudinal and coronal planes, with emphasis on abdominal/small parts, ob/gyn, and vascular ultrasound procedures and protocols. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Lab fee: \$100. Credit Hours: 2

RAD399B - Clinical Practicum II (Lab) A study of sectional anatomy in the transverse, longitudinal and coronal planes, with emphasis on vascular and obstetric procedures and protocols. This is the laboratory component of RAD 359C and RAD 379C and includes a \$100 laboratory fee. Must be taken concurrently with RAD 359C and RAD 379C. If RAD 359C or RAD 379C is dropped then RAD 399B must be dropped. Comprehensive course information may be accessed in the "Master Plan" document located in the program director's office. Prerequisite: RAD 399A with a minimum grade of C. Restricted to RADS majors. Credit Hours: 1

RAD399C - Clinical Practicum III (Lab) A study of sectional anatomy in the transverse, longitudinal and coronal planes, with emphasis on abdominal/small parts, ob/gyn, and vascular ultrasound procedures and protocols. This is the laboratory that must be taken concurrently with RAD 369. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 2

RAD400 - Radiation Dosimetry Includes a study of the principles of radiation dosimetry and related calculations. Topics include calibration, protection, dose determination to points of interest, and basic treatment planning. Credit Hours: 3

RAD404 - MRI and CT Clinical Internship I This is first clinical internship in a two-course sequence. During the first clinical internship, the student will be assigned to a selected clinical education center for the entire semester. During this semester, the student is expected to practice and perfect the professional skills developed the previous semester on campus. Not for graduate credit. Co-requisite: RAD 414. Prerequisite: "C" or better in RAD 364, 374, 384, 394. Credit Hours: 10

RAD407 - Cardiac Patient Interactions & Management A focus on ECG analysis, hemodynamics, lab assessment, wave form analysis and cardiac output. Basic life support is also covered along with medicolegal aspects of healthcare and the history of interventional cardiology. Prerequisite: concurrent enrollment in RAD 417, RAD 427 and RAD 437. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 3

RAD409A - Clinical Practicum IV (Clinic) The student is assigned to a clinical education center(s) to practice and perfect sonography skills. The student will be supervised by qualified sonographers and directed in specific experiences designed to meet course objectives. Restricted to RADS major or consent of school. Students must receive a grade of "B" or higher to advance within the Sonography Program. Credit Hours: 9

RAD409B - Clinical Practicum V (Clinic) The student is assigned to a clinical education center(s) to practice and perfect sonography skills. The student will be supervised by qualified sonographers and directed in specific experiences designed to meet course objectives. Restricted to RADS major or consent of school. Students must receive a grade of "B" or higher to advance within the Sonography Program. Credit Hours: 8

RAD409C - Clinical Practicum V The student is assigned to a clinical education center(s) to practice and perfect sonography skills. The student will be supervised by qualified sonographers and directed in specific experiences designed to meet course objectives. Prerequisite: RAD 409B with a minimum grade of C. Credit Hours: 10

RAD410 - Radiation Therapy Clinical Internship I This is the first clinical internship of a two-course sequence. A practicum at a selected clinical education center in which the student functions under direct supervision and applies the knowledge gained in the classroom. The student will function in the clinical setting to interpret and execute the radiation oncologist's orders and operate the ionizing radiation equipment during actual patient treatments and simulations. Construction of treatment aids will also be performed. Not for graduate credit. Prerequisite: A grade of C or better in RAD 360, 370, 380, 390, and 400. Credit Hours: 10

RAD414 - Special Studies in MRI and CT Individual projects in MRI and CT will be selected by the student with approval of the instructor and culminate in case study reviews. In addition, the student will prepare to challenge The American Registry of Radiologic Technologists professional examinations in either MRI or CT. A portion of this course is on-campus. Not for graduate credit. Prerequisite: "C" or better in RAD 364, 374, 384, and 394. Credit Hours: 2

RAD415 - Research Methods (Same as DH 411) This course will introduce the student to the various mechanisms by which scholarly and professional research are conducted. These include quantitative and qualitative methodologies, historiographical, and a mixed methods approach. Restricted to the major or consent of school. Credit Hours: 3

RAD417 - Imaging Procedures Quality control is covered along with contrast agents, pharmaceuticals, cardiac-interventional procedures and equipment. The cardiac procedures reviewed are cardiac output calculations, hemoximetry, shunt detection, pulmonary angiography, hemodynamics, valve measurement, right and left ventriculography, coronary angiography, coronary artery bypass graft angiography, aortography and ventricular volume measurement/ejection fraction (EF). Prerequisite: concurrent enrollment in RAD 407, RAD 427 and RAD 437. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 4

RAD420 - Special Problems in Radiation Therapy A review of the many types of cancer to include discussion of clinical symptoms, treatment patterns, technical pitfalls, survival statistics and patient/family interactions. Quality assurance procedures for a Radiation Therapy Department will also be reviewed to include the different QA tests, tolerances, and frequencies. Both written and oral seminar responses will be included in this course. Not for graduate credit. Prerequisite: RAD 360, 370, 380, 390, 400. Credit Hours: 2

RAD424 - MRI and CT Clinical Internship II This is the second clinical internship in a two-course sequence. The student will be assigned to a selected clinical education center. During this semester, the student will continue to perfect his/her professional skills developed during the previous clinical internship. In addition, the student will focus on developing hands-on skills in radiation therapy treatment simulation, interventional techniques, stereotactic procedure and trauma. Not for graduate credit. Prerequisite: "C" or better in RAD 404 and RAD 414. Concurrent enrollment in RAD 434. Credit Hours: 4

RAD425A - Readings in Radiology Education (Same as DH 425A) Supervised readings of the student's primary area of interest will be conducted under the direction of a faculty member. This is a writing intensive, independent study course. Restricted to the major or consent of school. Credit Hours: 3

RAD425B - Readings in Radiology Management (Same as DH 425B) Supervised readings of the student's primary area of interest will be conducted under the direction of a faculty member. This is a writing intensive, independent study course. Restricted to the major or consent of school. Credit Hours: 3

RAD427 - Cardiovascular Anatomy & Pathology This course gives the student a comprehensive understanding of cardiovascular anatomy as well as pathologic identifications. Prerequisite: concurrent enrollment in RAD 407, RAD 417 and RAD 437. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 3

RAD430 - Radiation Therapy Clinical Internship II This is the second clinical internship of a two-course sequence. A clinical practicum at a selected clinical education center in which the student functions under direct supervision and applies the knowledge gained in the classroom and Clinical Internship I. The student will practice and improve the professional skills developed the previous semester to include radiation therapy treatment, simulation and medical dosimetry. Students receive a "B" or higher to successfully complete the radiation therapy specialization. Not for graduate credit. Prerequisite: A grade of B or better in RAD 410 and RAD 420. Concurrent enrollment required in RAD 440. Credit Hours: 4

RAD434 - Seminar in MRI and CT This course is designed to prepare the student to challenge The American Registry of Radiologic Technologists professional examinations in either MRI or CT. During the course the student will take mock registry exams in either MRI or CT and review pertinent material. Career development activities will include interviewing techniques, resume and cover letter preparation, and the application process. Not for graduate credit. Prerequisite: "C" or better in RAD 404 and RAD 414. Concurrent enrollment in RAD 424. Credit Hours: 2

RAD435 - Problems in Radiology Education and Management (Same as DH 435) The purpose of this course is to identify problems/issues within Radiology Education and Management and to present viable solutions to those problems/issues. Utilizing scholarly research and correlative research from other fields, the student will engage in integrated problem solving. This is an independent study course, conducted under the direction of a faculty member, and is a writing intensive course. Credit Hours: 3

RAD437 - Physics, Instrumentation and Cardiac Image Acquisition An examination of the physics and dosimetry of ionizing radiation and the use of radiation for image formation. Dose tracking and patient safety is included as well as imaging techniques. Prerequisite: concurrent enrollment in RAD 407, RAD 417 and RAD 427. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 3

RAD440 - Seminar in Radiation Therapy This course is designed to prepare the student to challenge the American Registry of Radiologic Technologists Radiation Therapy exam. During this course, the student will take mock registry exams in the specialty of radiation therapy and go through review materials. A portion of this course is on-campus. Professional development is addressed. Students must receive a "B" or higher to successfully complete the radiation therapy specialization. Not for graduate credit. Prerequisite: A "B" or better in RAD 410 and RAD 420. Co-requisite: A "B" or better in RAD 430. Credit Hours: 2

RAD447 - Cardiac-Interventional Clinical I Scheduled clinical time at an affiliated clinical site to perform competency-based examinations. Students will also be required to take call as well. Direct supervision is provided by the hosting facility staff. This experience will give students the confidence and insight needed to perform as autonomous technologist upon graduation of the program. Prerequisites: RAD 407, RAD 417, RAD 427 and RAD 437 with grades of B or better, as well as concurrent enrollment in RAD 457. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 10

RAD457 - Special Studies in CI Procedures A thorough review of the fundamental principles and foundational readings of the field. Newly published literature will also be used to reflect the didactic teachings of previous coursework. Prerequisites: RAD 407, RAD 417, RAD 427 and RAD 437 with a C or better, as well as concurrent enrollment in RAD 447. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 2

RAD459 - Advanced Obstetric & Gynecology Sonography A continuation in the study of obstetric & gynecology sonography to include pathologic, embryologic, and structural complications, clinical history, physical assessment, and the appropriate exam protocol. Credit Hours: 1

RAD459A - Advanced Obstetric & Gynecology Sonography I A continuation in the study of obstetric & gynecology sonography to include pathologic, embryologic, and structural complications, clinical history, physical assessment, and the appropriate exam protocol. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 1

RAD459B - Advanced Obstetric & Gynecology Sonography II A continuation in the study of obstetric & gynecology sonography to include pathologic, embryologic, and structural complications, clinical history, physical assessment, and the appropriate exam protocol. Prerequisite: RAD 459A with a minimum grade of C. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 1

RAD467 - Cardiac-Interventional Clinical II A thorough review of the fundamental principles and foundational readings of the field. Newly published literature will also be used to reflect the didactic teachings of previous coursework. Prerequisites: RAD 407, RAD 417, RAD 427, RAD 437, RAD 447 & RAD 457 with grades of B or better, as well as concurrent enrollment in RAD 477. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 4

RAD476 - Research Project (Same as DH 476) This course requires the selection and investigation of a research topic culminating in a paper to satisfy the research requirement for the MGT/Ed option. Prerequisite: RAD 415. Credit Hours: 4

RAD477 - Cardiac-Interventional Seminar This course is a review of the fundamentals listed in the ARRT exam requirements. This will be a board review, laden with mock exams, outlines and a final examination required for program completion. Prerequisites: RAD 407, RAD 417, RAD 427, RAD 437, RAD 447 and RAD 457 with a C or better, as well as concurrent enrollment in RAD 467. Restricted to Cardiac-Interventional Radiography students only. Credit Hours: 2

RAD479 - Advanced Abdominal Sonography A continuation in the study of abdominal sonography to include interventional, organ transplant, musculoskeletal, pediatric topics, clinical history, physical assessment, and appropriate exam protocol. Credit Hours: 1

RAD479A - Advanced Abdominal Sonography I A continuation in the study of abdominal sonography to include interventional, organ transplant, musculoskeletal, pediatric topics, clinical history, physical assessment, and appropriate exam protocol. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 1

RAD479B - Advanced Abdominal Sonography II A continuation in the study of abdominal sonography to include interventional, organ transplant, musculoskeletal, pediatric topics, clinical history, physical assessment, and appropriate exam protocol. Prerequisite: RAD 479A with a minimum grade of C. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 1

RAD489 - Pediatric Sonography A study of neonatal and pediatric head, spine, hip, abdomen, and urinary systems anatomy, physiology, and pathophysiology. Topics will include patient care, integration of data, and imaging protocol. Restricted to RADS major or consent of school. Students must receive a grade of "C" or higher to advance within the Sonography Program. Credit Hours: 3

RAD499 - Sonography Seminar This course is designed to prepare the student to challenge the national sonography certification examination(s). Professional development and career readiness topics are also addressed. Prerequisite: RAD 409B or RAD 459 or RAD 459A or RAD 479A with a minimum grade of C. Credit Hours: 1-3

Radiologic Sciences Faculty

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