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Radiologic Sciences

The Radiologic Science professional is a member of the health care team who has knowledge of the characteristics and clinical relevance of radiographic imaging, is cognizant of patient care procedures and has the education and expertise necessary to generate diagnostic medical images including sonograms, computer and, MRI images, and x-rays. The mission of the Master of Science in Radiologic Sciences program through Southern Illinois University Carbondale (SIUC) is to provide a quality program integrating education, research, and service in order to meet the needs of the profession and improve health care of the people and communities we serve.

Master of Science (M.S.) in Radiologic Sciences

Objectives and Goals

- Prepare the student to practice as a radiologic sciences educator or manager by offering a balanced curriculum and quality didactic/experiential instruction.
- Provide didactic and experiential opportunities that lead to research in educational, professional, or health care issues relating to radiologic sciences education and/or management.
- Provide avenues to students for development and growth within the profession.
- Provide avenues for students to develop and apply skills in effective communication, analytical and critical thinking, and problem solving necessary for successful allied health practice.
- Provide an experiential and didactic environment which leads to the refinement of skills and competence appropriate for an advanced educator/manager in the radiologic sciences.
- Provide an accessible opportunity for regional radiologic science professionals to acquire a terminal degree.
- Provide an accessible opportunity for regional radiologic sciences professionals to acquire the necessary means to succeed in a global and diverse workforce/workplace.

Admission

The minimum admission guidelines of the M.S. in Radiologic Sciences program mirror those of the Graduate School at SIUC; however, to elaborate on those requirements, the following is provided:

- Candidates will be granted admittance to the SIUC Graduate School.
- Candidates will possess a baccalaureate degree and have completed a program of study in an associated field to Allied Health, Radiology, Sonography, Medical Imaging, Health Care Management, or an equivalent field.
- Candidates will be nationally licensed by the ARRT, the ARDMS, the NMDCB, or an equivalent National or International Licensing Body in diagnostic imaging.
- Candidates will have a minimum cumulative grade point average (GPA) of at least 2.7 (where 4.0 = A).
- Student background checks will only be completed if required in the legal agreement to perform the internship.
- The GRE is not required for admission to this program.
- TOEFL score requirements will follow the requirements set forth by the SIUC Graduate School.
- Transfer students will follow the same criteria as all other students.
- Students will complete and submit an application for enrollment in the M.S. in Radiologic Sciences program and submit a \$65 application fee to the program.

Requirements

The M.S. in Radiologic Sciences program is a comprehensive program that will prepare students to enter the professional workforce with a graduate degree in radiology, specializing in management and education. The academic objectives of the program include:

1. Successful completion of 30 didactic credit hours (MHA 511, RAD 516, RAD 521, RAD 526, MHA 531, MHA 536, RAD 541, RAD 546, RAD 551, and RAD 556) plus objective 2
2. Successful completion of RAD 593 which consists of six credit hours of research/thesis project, culminating in a final scholarly work as outlined by the SIUC Graduate School.

To facilitate completion of the objectives of the program, the course of instruction will consist of 36 credit hours. As part of these 36 credit hours, students will complete a research/thesis project.

The curriculum will consist of didactic courses. Course material will cover educational theory (including the foundations of education) and/or management theory. Additionally, advanced study of radiologic sciences coursework including radiation physics, radiation biology, anatomy, pharmacology, human disease/pathology, advanced imaging methods, advanced imaging modalities, and patient care will be undertaken for individuals choosing education as their area of specialization. Upon program completion, the student is expected to be fully capable of teaching these topics at an introductory level for basic radiologic science professionals. Special project assignments, conference attendance and presentations, and journal article reviews are an integral part of the curriculum.

All students graduating from the M.S. in Radiologic Sciences program will be required to meet the qualifications of the graduate school at SIUC. Students will be required to complete a culminating scholarly work which may include a research/thesis paper, or graduate project.

Students may complete courses within the Masters of Health Administration (MHA) or the Masters in Health Informatics (MHI) to receive a concurrent degree with the MSRS degree. Please see the MHA and MHI programs for updated concurrent degree requirements.

Sample Schedule of Course Offerings

Fall Semester

- MHA 511: Fundamentals of Health Care Systems (3 CH)
- RAD 516: Cultural Foundations and Theories of Education (3 CH)
- RAD 521: Advance Practice of Radiologic/Imaging Sciences I (3 CH)
- RAD 526: Seminar in Radiologic/Imaging Sciences I (3 CH)

Spring Semester

- MHA 531: Human Resources in Health Care (3 CH)
- MHA 536: Strategic Leadership in Healthcare (3 CH)
- RAD 541: Advance Practice of Radiologic/Imaging Sciences II (3 CH)
- RAD 546: Seminar in Radiologic/Imaging Sciences II (3 CH)

Summer Semester

- MHA 551: Legal and Ethical Fundamentals of Health Care (3 CH)
- RAD 556: Individual Research in Healthcare (3 CH)
- RAD 601: per semester Continuing Enrollment (1 CH)

Final Portion of Program

- RAD 593: Individual Research (6 CH)

The delivery method will be through distance education via Desire2Learn or the current classroom management system in use at SIUC.

Radiologic Sciences Courses

RAD510 - Introduction to Medical Dosimetry This course introduces the concepts associated with medical dosimetry. Topics include common mathematical approaches, radiation protection, cross-sectional anatomy, common cancers and treatment techniques, QA, and radiation physics. This course is twenty weeks in length. Restricted to admission to the Medical Dosimetry Program. Credit Hours: 2

RAD515 - Medical Dosimetry Clinical I This is the first course of a three course sequence. During the three course sequence, students will complete eight clinical rotations including Brachytherapy, Simulation, Gamma Knife, Treatment Aids, IMRT, External Beam, Physics, Special Measurements and QA. The length of these rotations varies from one to eleven weeks. During this course students will perform two to four of these rotations depending on the rotation schedule. While in the clinical setting students will observe and work directly with a medical dosimetrist. Emphasis is given on learning and understanding the role and responsibilities of a medical dosimetrist in the clinical setting. This course is twenty weeks in length. Restricted to admission to the Medical Dosimetry Program. Credit Hours: 4

RAD516 - Cultural Foundations and Theories of Education Seminar provides an examination of the historical, social, economic and psychological foundations of allied health education with emphasis given to the nature and role of education and training in preparing for the field of medical education. The objectives of this seminar will allow the student to explore the nature and theories of education, the behavioral aspects of education including the assumptions and practices which underlie education. Special approval needed from the instructor. Credit Hours: 3

RAD520 - The Physics of Medical Dosimetry I This course covers the following topics: Radiologic Physics, production of x-rays, radiation treatment and simulation machines, interactions of ionizing radiation, radiation measurements, dose calculations, computerized treatment planning, dose calculation algorithms, electron beam characteristics, and brachytherapy physics and procedures. This course is twenty weeks in length. Restricted to admission to the Medical Dosimetry Program. Credit Hours: 3

RAD521 - Advance Practice of Radiologic/Imaging Sciences I This course will include a review of the following topics: Radiation physics, radiation biology, anatomy, pharmacology, human diseases/pathology, advanced imaging methods, advanced imaging modalities, and patient care. Credit Hours: 3

RAD525 - Seminars in Medical Dosimetry I (Same as RAD 526) This course consists of various seminars/literature reviews associated with radiation oncology. Topics include treatment techniques for various cancers, technological advances in cancer treatment, cancer treatment trends, and the role of a medical dosimetrist. This course is twenty weeks in length. Restricted to admission to the Medical Dosimetry Program. Credit Hours: 3

RAD526 - Seminar in Radiologic/Imaging Sciences I (Same as RAD 525) This course consists of various seminar/literature reviews associated with the radiologic/imaging sciences. Topics include imaging techniques, technological advances in the radiologic/imaging sciences, patient care trends, and the role of an imaging professional. This course is twenty weeks in length. Credit Hours: 3

RAD530 - The Essentials of Medical Dosimetry This course expands on the essential concepts associated with radiation physics, dose calculations, radiation measurements, external beam and brachytherapy treatment planning, treatment aids, heterogeneities, electron and proton therapies, and IGRT. This course is twenty weeks in length. Prerequisite: A grade of C or better in RAD 510, RAD 515, RAD 520, and RAD 525. Credit Hours: 2

RAD535 - Medical Dosimetry Clinical II This is the second of a three course sequence. During the three course sequence, students will complete eight clinical rotations including Brachytherapy, Simulation, Gamma Knife, Treatment Aids, IMRT, External Beam, Physics, Special Measurements and QA. The length of these rotations varies from one to eleven weeks. During this course students will perform two to four of these rotations depending on the rotation schedule. While in the clinical setting students will observe and work directly with a medical dosimetrist. Emphasis is given on learning and understanding the role and responsibilities of a medical dosimetrist in the clinical setting. This course is twenty weeks in length. Prerequisite: A grade of C or better in RAD 515. Credit Hours: 4

RAD540 - The Physics of Medical Dosimetry II This course covers the following topics: Imaging for radiation oncology, IMRT, stereotactic radiosurgery, special procedures, particle therapy, hyperthermia, and radiation safety. This course is twenty weeks in length. Credit Hours: 3

RAD541 - Advance Practice of Radiologic/Imaging Sciences II This course will continue to cover the same topics that were reviewed in RAD 521 but to a greater level of understanding. Topics include: Radiation physics, radiation biology, anatomy, pharmacology, human disease/pathology, advanced imaging methods, advanced imaging modalities, and patient care. Credit Hours: 3

RAD545 - Seminar in Medical Dosimetry II (Same as RAD 546) This course consists of various seminars associated with radiation oncology. Topics include treatment techniques for various cancers, technological advances in cancer treatment, cancer treatment trends, and the role of a medical dosimetrist. This course is twenty weeks in length. Credit Hours: 3

RAD546 - Seminar in Radiologic/Imaging Sciences II (Same as RAD 545) This course consists of various seminar/literature reviews associated with the radiologic/imaging sciences. Topics include imaging techniques, technological advances in the radiologic/imaging sciences, patient care trends, and the role of an imaging professional. This course is twenty weeks in length. Credit Hours: 3

RAD550 - Medical Dosimetry Clinical III This is the third course of a three course sequence. During the three course sequence, students will complete eight clinical rotations including Brachytherapy, Simulation, Gamma Knife, Treatment Aids, IMRT, External Beam, Physics, Special Measurements and QA. The length of these rotations varies from one to ten weeks. During this course students will perform one to two of these rotations depending on the rotation schedule. While in the clinical setting students will observe and work directly with a medical dosimetrist. Emphasis is given on learning and understanding the role and responsibilities of a medical dosimetrist in the clinical setting. This course is ten weeks in length. Prerequisite: A grade of "C" or better in RAD 535. Credit Hours: 2

RAD555 - Medical Dosimetry Practice This course brings all medical dosimetry concepts and calculations together for a final program exam. Additional topics include radiation biology, knowledge-based treatment planning, professional development, billing/coding, HIPAA, DICOM, infection control, and test taking strategies. This course is ten weeks in length. Prerequisites: RAD 530 and RAD 540 with grades of C or better. Credit Hours: 2

RAD556 - Individual Research in Healthcare This course requires students to complete a research project in the field of healthcare based upon student interest and instructor approval. Each project will have a written paper as a final product and this paper will be submitted for publication, as approved by the instructor, in one of the professional journals within the field of healthcare. Restricted to School of Health Sciences graduate majors. Credit Hours: 3

RAD560 - Seminar in Medical Dosimetry III This course consists of various seminars/literature reviews associated with radiation oncology. Topics include treatment techniques for various cancers, technological advances in cancer treatment, cancer treatment trends, and the role of a medical dosimetrist. This course is ten weeks in length. Prerequisite: A grade of C or better in RAD 545. Credit Hours: 2

RAD565 - Independent Study Directed independent study in selected areas of medical dosimetry studies. Special approval needed from the Program Director. Credit Hours: 1-6

RAD593 - Advanced Research Students complete a research project including a special project related to administration in the student's chosen field which meets Graduate School guidelines. Restricted to School graduate majors and School advisor. Credit Hours: 6

RAD601 - Continuing Enrollment This course is required to satisfy the Graduate School's requirement of continuous enrollment and is intended for those students who are enrolled in the program but cannot take a core academic course during a given semester. Prerequisite: Consent of Program Director. Credit Hours: 1

Radiologic Sciences Faculty

Bickel, Lisa A., Assistant Instructor, Radiologic Sciences, M.S.R.S., Southern Illinois University, 2019; 2019. Diagnostic medical sonography.

Collins, Kevin Scott, Professor and Interim Dean College of Health and Human Sciences, Health Care Management, Workforce Education and Development, Ph.D., RT(R)(T), CMD, Southern Illinois University Carbondale, 2011; 1999. Radiation oncology.

Collins, Sandra K., Professor, Health Care Management, Ph.D., Southern Illinois University Carbondale, 2010; 2002. Health care management.

McKinnies, Richard, Professor and Interim Director School of Health Sciences, Radiologic Sciences, Ph.D., RT(R)(T), CMD, Southern Illinois University Carbondale, 2020; 2006. Radiation oncology.

Mobile, Katherine, Lecturer, Radiologic Sciences, M.S., University of Wisconsin LaCrosse, 2011; 2013. Medical dosimetry.

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