

RAS

Radiation Sciences

- RAS 472G INTERACTION OF RADIATION WITH MATTER. (3)**
Basic aspects of the interaction of ionizing radiation with matter. Bohr atom, atomic spectra, radioactivity, energetics of decay. Sources of radiation, penetration of charged particles, electromagnetic radiation, and neutrons through matter; excitation and ionization processes; selected nuclear reactions; basic radiation detection and dosimetry. Prereq: PHY 213 or 232; MA 114 (may be taken concurrently); or equivalent. (Same as PHY/RM 472G.)
- RAS 545 RADIATION HAZARDS AND PROTECTION. (3)**
An analysis of common radiation hazards encountered in medicine, research, industry, and the environment. Regulations and procedures for the safe use of ionizing and nonionizing radiations. Lecture, two hours; laboratory, two and one-half hours. Prereq: PHY/RM 472G or consent of instructor. (Same as PHY/RM 545.)
- RAS 546 GENERAL MEDICAL RADIOLOGICAL PHYSICS. (3)**
The uses and dosimetric aspects of radiation in medicine will be analyzed, including many basic applications in the fields of diagnostic radiology physics, therapy physics, and nuclear medical physics. Prereq or concur: RM/PHY 472G or consent of instructor. (Same as PHY/RM 546.)
- RAS 601 ADVANCED RADIATION DOSIMETRY. (2)**
Advanced aspects of the interaction of radiation with matter and specialized topics in the dosimetry of ionizing radiations. Modifications of Bragg-Gray theory for application to megavoltage sources. Beta dosimetry. Specialized calibration techniques. Relative response functions of various media. Nontraditional techniques. Dosimetry of radiation fields including complex spectra. Prereq: PHY 472G, RM 546, or equivalent. (Same as RM 601.)
- RAS 647 PHYSICS OF DIAGNOSTIC IMAGING I. (3)**
Specialized and advanced topics in diagnostic imaging, including modulation transfer function analysis, image processing algorithms, acceptance testing, CT, NMR, ultrasound, etc. Prereq: PHY/RM/RAS 546 or consent of instructor. (Same as RM 647.)
- RAS 648 PHYSICS OF DIAGNOSTIC IMAGING II. (3)**
A continuation of RAS/RM 647. Specialized and advanced topics in nuclear medicine imaging physics, including positron emission tomographic procedures, emerging new modalities, and quality control. Prereq: RM/RAS 647 or consent of instructor. (Same as RM 648.)
- RAS 649 PHYSICS OF RADIATION THERAPY. (3)**
Specialized external beam and brachytherapy treatment planning; advanced Bragg-Gray cavity applications, including N_{gas} and TG-21; calibration, acceptance testing, and quality control of therapy physics equipment. Prereq: RAS/RM/PHY 546 and RAS/RM 601, or consent of instructor. (Same as RM 649.)
- RAS 650 PHYSICS OF RADIATION THERAPY II: BRACHYTHERAPY PHYSICS. (2)**
A presentation of the full scope of use of implanted radiation sources for medical purposes. The course includes consideration of all aspects of brachytherapy dosimetry and treatment planning as well as modern and cutting-edge brachytherapy clinical practice. Characteristics of interstitial, intracavitary, and intraluminal implants, as well as remote afterloaders, are considered. Prereq: RAS/RM/PHY 546; RM/PHY 472G; RAS/RM 649 (may be co-requisite). (Same as RM 650.)
- RAS 651 ADVANCED LABORATORY IN DIAGNOSTIC IMAGING PHYSICS. (1-3)**
Specialized experiments involving the use, calibration, and quality control of x-ray and other diagnostic imaging equipment, and the appropriate use of radiation detectors in diagnostic physics measurements. Laboratory, approximately 30 hours per credit. May be repeated to a maximum of three credits. Prereq: RM/PHY 472G, RAS/RM 546; and concurrent: RAS/RM 647, or equivalent, plus graduate standing in the radiation science program.
- RAS 695 RESEARCH IN THE HEALTH-RELATED RADIATION SCIENCES. (1-4)**
Independent directed research on theoretical and practical problems in the health-related radiation sciences. May be repeated to a maximum of eight credits. Prereq: Graduate standing in one of the radiation-related sciences, plus consent of instructor. (Same as RM 695.)

RAS 710 RADIATION SCIENCE SEMINAR (Subtitle required). (1)

Topics of current interest relating to radiation and its applications in the areas of radiological medical physics and health physics. May be repeated to a maximum of four credit hours with consent of instructor. Prereq: Graduate standing in a radiation-related science.

RAS 711 RESEARCH METHODS IN MEDICAL PHYSICS. (1)

This course will introduce the student to, and give them practical experience in, writing research proposals, research reports and carrying out research work. The course will be jointly taught by various medical physics faculty and guest lecturers. Students will be asked to present their own work to be critiqued by the class. The goal is to give the student a hands-on experience of what is involved in doing funded clinical research on human subjects and getting it published in an academic journal. Prereq: Approval of instructor.

RAS 767 DISSERTATION RESIDENCE CREDIT. (2)

Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

RAS 849 RADIATION SCIENCES PRACTICUM. (1-6)

Applied practicum experiences in the radiation sciences. Laboratory, 40 hours per week equals one credit hour. Prereq: Advanced graduate standing in the radiation sciences.