

## **Medical Physics Graduate Certificate Program for Ph.D. holders**

### **Description**

This certificate program offered by a CAMPEP-accredited program is designed to provide the essential didactic elements of medical physics to Ph.D. holders seeking to pursue an alternative pathway to medical physics residency. It is intended to enable individuals with a doctoral degree in physics or a related discipline to meet the didactic requirements needed to enter a CAMPEP-accredited residency program.

Students enrolled in the Certificate program may also register for Part I of the American Board of Radiology board exam in Medical Physics.

Students with a Ph.D. in physics, physical sciences, mathematics or engineering who are interested in this program may apply for admission to the regular graduate program of the Physics Department. Also, students who are officially admitted as doctoral students in the above-mentioned fields may apply.

### **Prerequisites for entering the program**

Applicants must have a Ph.D. in Physics or a related discipline.

### **Courses Description**

1. RAT 6686. *Radiation Physics* (3 credits)  
Course covers the basics of ionizing and non-ionizing radiation, atomic and nuclear structure, basic nuclear and atomic physics, radioactive decay, interaction of radiation with matter, radiation detection, and dosimetry.
2. BSC 6834. *Introduction to Radiation Biology* (3 credits)  
An overview of the effects of ionizing radiations on human and other biological systems. The course involves consideration of cell survival after exposure to ionizing radiations, repair of radiation damage, radiosensitizers and radioprotectors, doses and risks in diagnostic radiology, cardiology, nuclear medicine, and basic safety rules.
3. RAT 6628. *Radiation Therapy Physics* (3 credits)  
Introductory course with a clinical orientation that reviews the rationale,

basic science, methods, and applications of radiation therapy to the treatment of human diseases. Low-and high-energy photon therapy, electron and proton therapy, and low-and high-dose rate brachytherapy.

4. RAT 6616. *Medical Imaging Physics* (3 credits)  
Course covers the mathematical and physical principles of medical imaging and its applications as recommended by the AAPM. Students obtain a good understanding of Radiography, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound Imaging (US), Fluorescence and Nuclear Medical Imaging.
5. RAT 6310. *Radiation Protection and Safety* (3 credits)  
Knowledge and technical background to understand the calculation methodology, compliance with the safety standards, and use of quantitative risk assessment for radiation protection & safety.
6. BSC 5931. *Human Morphology and Function 1* (3 credits). Normal structure and physiology of the human skeletal, muscle, and nervous systems.
7. BSC 5931. *Human Morphology and Function 2* (3 credits). Normal structure and physiology of the human cardiovascular, renal, respiratory, gastrointestinal, endocrine, and reproductive systems.