FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—PROGRAM CHANGE REQUEST

UGPC APPROVAL _____
UFS APPROVAL _____
CATALOG _____

DEPARTMENT: PHYSICS

COLLEGE: CESCOS

PROGRAM NAME:
PROFESSIONAL SCIENCE MASTER IN MEDICAL PHYSICS (PSMMP)

EFFECTIVE DATE
(PROVIDE TERM/YEAR)
FALL 2016

PLEASE EXPLAIN THE REQUESTED CHANGE(S) AND OFFER RATIONALE BELOW AND/OR ATTACHED:

FOLLOWING THE RECOMMENDATION OF THE COMMISSION ON ACCREDITATION OF MEDICAL PHYSICS PROGRAMS (CAMPEP), WE REQUEST THE FOLLOWING CHANGES IN THE CATALOG DESCRIPRION OF THE PSMMP PROGRAM:

1. THE FRONTIER COURSE BME 6762 BIOINFORMATICS: BIOENGINEERING PERPECTIVES (3CREDITS), BE MOVED FROM THE LIST OF REQUIRED COURSES, TO THE LIST OF ELECTIVE COURSES.
2. THE NEW COURSE RAT 6888 RADIATION PROTECTION AND SAFETY (3CREDITS), BE ADDED TO THE LIST OF CORE COURSES.

Faculty contact, email and complete phone number:	Consult and list departments that might be affected by the change and attach comments.
Dr. Theodora Leventouri, leventou@fau.edu 561-297-2695	No Department will be affected by the requested change.

Approved by:	*Date:*
Department Chair: _____	9/29/15
College Curriculum Chair: _____	
College Dean: _____	
UGPC Chair: _____	
Graduate College Dean: _____	
UFS President: _____	
Provost: _____	

Email this form and syllabus to UGPC@fau.edu **one week before** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

FAU FLORIDA ATLANTIC UNIVERSITY

Dr. Th. Leventouri
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Director, Center for Biomedical and Materials Physics (CBAMP)
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PSM PROFESSIONAL SCIENCE MASTER'S

Professional Science Master in Medical Physics (PSMMP)

Accredited by the **C**ommission on the **A**ccreditation of **M**edical **P**hysics **E**ducation **P**rograms (CAMPEP)

Recognized by the Council of Graduate Schools (CGS) as a Professional MS

CATALOG DESCRIPTION

Description

The Department of Physics offers the Professional Science Master in Medical Physics (PSMMP) degree. The PSMMP is a Professional MS innovative program that develops advanced scientific knowledge and professional skills. It is interdisciplinary and provides hands on learning through on the site training. It aims to engage students with professional goals and help them become scientists uniquely suited to the 21stm century workplace.

Medical Physics is an applied branch of physics devoted to the application of concepts and methods from physics to the diagnosis, treatment of human disease, planning and development of treatment equipment. A qualified Medical Physicist is competent to practice independently one or more of the subfields (tracks) of medical physics.

The PSMMP is a 41 credit hours program (plus the 3 credits prerequisite course). It provides professional training, in partnership with area hospitals, and focusses on the Radiation Therapy track that absorbs ~75% of Medical Physicists.

Admission Requirements

A BS or BA in Physics. Candidates with a BS in Biology, Chemistry, Computer Science, or Engineering with a minor in Physics are considered.

- At least a 3.0 (of a 4.0 maximum) grade point average (GPA) in Science and Mathematics, courses. Have taken the general portion of the GRE. No minimum score is required (or equivalent). Scores must be no more than five years old.

Prerequisite Course for the PSMMP

PCB 3703. Human Morphology and Function 1 (3 credit hours). Normal structure and physiology of the human skeletal, muscle and nervous systems.

CURRICULUM

- 5 core courses
- 2 track-specific courses
- 1 track-specific practicum course
- 1 frontier course
- 1 elective course
- 1 graduate research
- Master's Thesis
- Seminar on Safety and Ethics

Total of **41** credit hours (plus the prerequisite). Typical duration is two years.

PSMMP Courses

Core Courses

- RAT 6686. Radiation Physics (3 credit hours)
  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.

- BSC 6834. Introduction to Radiation Biology (3 credit hours)
  Prerequisite: permission of Instructor.
  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. A student seminar is required at the end of the course.

- RAT 6628. Radiation Therapy Physics (3 credit hours)
  Prerequisite: RAT 6686
  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.

- RAT 6616. Medical Imaging Physics (3 credit hours)
  Course describes the basics of noninvasive imaging techniques, including Magnetic Resonance Imaging (MRI), functional MRI, Diffusion Tensor Imaging (DTI), electro- and magneto-encephalography (EEG, MEG). Course also covers analysis and visualization of high-dimensional datasets.

- RAT 6687. Nuclear Medical Physics (3 credit hours)
  Prerequisite: PHY 4604 (Quantum 1) or permission of Instructor.

Covers the fundamentals of nuclear physics and its application in the medical field as recommended by the AAPM. Students gain understanding of the physics and instrumentation of nuclear medicine.

Radiation Therapy Track-specific Courses

- RAT 6629. Advanced Photon Beam Radiation Therapy (3 credit hours)
  Prerequisite: RAT 6628.
  This course will cover the physics and clinical application of advanced external beam photon therapies with special emphasis on IMRT (Intensity Modulated Radiation Therapy).

- RAT 6947. Radiation Therapy: Clinical Practicum and Shadowing (3 credit hours)
  Application of medical physics to cancer therapy in a hospital setting under close supervision. Dosimetry, calibrations, commissioning, radiation survey, and treatment planning. Clinically oriented laboratory-type projects are assigned.

- RAT 6376. Shielding and Commissioning (3 credit hours)
  Covers the science of opening a new radiation oncology center. Covers shielding calculations, installing and running the acceptance testing of a linear accelerator, high dose rate brachytherapy afterloader, CT simulator, treatment planning systems, commissioning of the treatment planning systems.

Frontier course

- BME 6762. Bioinformatics: Bioengineering Perspectives 3 credits
  Prerequisite: Engineering/Science B.S. Introduction to bio- and genetic-engineering. Concepts and definitions of molecular biological terms. Bioinformatics—definition and applications. Information resources and databases: Proteins and genomes. Biological sequence analysis and applications. Sequence search/analyses tools and protocols. Bioinformatics versus modern information networks and the World Wide Web. (Neelakantas neelakan@fau.edu)

Research and Seminar

- PHY 6918. Graduate Research 3 credit hours
  Prerequisite: Permission of Instructor. Supervised research for M.S.

- RAT 6975 Master's Thesis Research 7 credit hours
  Prerequisite: Permission of Instructor. Supervised by the Thesis Advisor.
- RAT 6932 Seminar in Medical Physics 1 credit hour
  Prerequisite: Permission of Instructor.
  Patient Safety in Radiation Oncology. Code of Ethics for Medical Physicists.

1 elective course

Students may choose from the following 3 credit hours courses offered by an FAU department or center. All program electives are regular catalog courses. Students select with advisor's approval.

STA 5195. Biostatistics 1
Prerequisite: STA 4234 or STA 4102.
An introduction to statistical tools used routinely for inference and data analysis in the health sciences. Topics include biostatistical design of medical studies, measure of disease occurrence and association, methods for rates and proportions, ROC analysis for screening and diagnosis, discrimination and classification, principal component analysis and factor analysis, log-linear models and survival analysis.

BSC 6936. Cell Structure and Function.
This course provides a clear in-depth look into the discoveries made in the recent past and present especially focusing on the key concepts in the exciting areas of Eukaryotic Cell Structure and Function and Molecular Biology while studying a variety of biological processes at the cellular and molecular levels.

PHZ 5715. Introduction to Biophysics.
Prerequisites: PHY 2049 or PHY 2054 or equivalent . A survey of the ideas and application of physics in the realm of biology designed to be accessible to physics or biology students. Emphasis on how the ideas of statistical physics can be used to give physical insights into complex biological problems with quantitative understanding and prediction.

MAP 6211. Introduction to Dynamical Systems and Chaos.
2 Scalar autonomous equations, elementary bifurcations, scalar maps, one-dimensional chaos, scalar nonautonomous equations, bifurcations of periodic equations, equations on tori and circle maps, planar autonomous systems.

PCB 6207. Advanced Cell Physiology.
Prerequisite: Permission of Instructor. Course describes in-depth membrane physiology, intracellular signaling pathways, and cellular function, with an emphasis on neurons and human muscle cells (skeletal, smooth, and cardiac muscle cells).

Contact: Dr. Th. Leventouri, Director Medical Physics Program, leventou@fau.edu