

Overview of Degree Programs

The Graduate Program at the Department of Physics at East Carolina University offers Ph.D. degrees in *Biomedical Physics* and MS degrees in Physics with concentrations in *Applied Physics*, *Medical Physics* and *Health Physics* to satisfy the career goals of most physics students. The MS concentration in *Medical Physics* was initiated in 1990 and has graduated more than 70 students. Currently there are 14 students enrolled and 6-8 are accepted new each year. The MS concentration in *Health Physics* was initiated in 2012. We graduated our first student in May of 2012. Currently, there are 2 students enrolled in the program and we plan to accept 8-10 students each year. The Ph. D in *Biomedical Physics* was initiated in 1998 and has currently 19 students enrolled. We are planning to accept 4 to 5 new students each year and plan to grow to about 30 students.

The MS degree program is designed for completion over a two-year period. The *Applied Physics* concentration is built around a core curriculum designed to give the candidate a thorough foundation in the major fields of physics.

The *Medical Physics* concentration is accredited by the Commission on Accreditation of Medical Physics Education Programs (CAMPEP) (www.campep.org/campeplstgrad.asp). It is designed as a terminal degree program with a substantial clinical component that enables its graduates to move into a career in diagnostic or therapeutic medical physics.

The *Health Physics* concentration is designed to fill an urgent need for trained Health Physics professionals brought about by resurgence in the development of nuclear power, an expansion of programs in national security, and an ageing cadre of current Health Physics professionals.

The primary objective of the Ph.D. program in *Biomedical Physics* is to graduate scientists who can apply the tools and concepts of physics to solve significant biological and medical problems and advance our understanding of fundamental biomedical processes. We just added a new concentration to the PhD program: Integrated PhD and MS in Physics—Medical Physics Concentration. Students admitted to this concentration need to fulfill independently all requirements for both, the MS in Physics—Medical Physics concentration and the PhD in Biomedical Physics. Both degrees will be awarded concurrently. We are planning to accept 1-2 students each year in this concentration.



East Carolina University is committed to equality of educational opportunity and does not discriminate against applicants, students, or employees based on race, color, national origin, religion, gender, age, sexual orientation, or disability. An equal opportunity/affirmative action employer, which accommodates the needs of individuals with disabilities.



Department of Physics Graduate Degree Programs

PhD in Biomedical Physics

MS in Physics

Applied Physics Concentration

Medical Physics Concentration

Health Physics Concentration



Howell Science Complex

For more information please contact us:

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PhD Biomedical Physics

The PhD program requires a minimum of forty-eight semester hours of courses beyond the master's degree. The student will take a minimum of six semester hours of courses from a physics core, a minimum of six semester hours of courses from a biomedical core, and a minimum of thirty-six semester hours of dissertation research courses.

It is preferred that students enrolled in this program have a master's degree in physics, applied physics, medical physics, or related fields, or must have shown a significant progress towards obtaining a master's degree in the above fields. The PhD program will also accept students who have a BS degree in physics or a related science; these students must follow the MS Applied Physics curriculum prior to being accepted for candidacy in the PhD program.

Curriculum: Courses offered beyond the master's curriculum include but are not limited to:

Physics Core (minimum 6 s.h.):

PHYS 6620/21	Adv. Techniques in Exp. Physics (2,1)
PHYS 6810	Topics in Atomic Collisions (3 s.h.)
PHYS 7110	Mathematical Physics II (3)
PHYS 7310	Electrodynamics II (3)
PHYS 7410	Quantum Mechanics II (3)
PHYS 7715	Biomedical Optics (3)
PHYS 7730	Radiation Instrumentation (3)
PHYS 7740	Special Problems in Radiation Dosimetry and Modeling (3)
PHYS 8910	Research Problems in Biomedical Physics (3)

Biomedical Core (minimum 6 s.h.):

BIOS 7021/22	Biostatistics for Health Professionals I/II (3/3)
BIOC 7301	Biochemistry I (4)
BIOC 7310	Molecular Biochemistry (3)
BIOC 8320	Biochemistry II (4)
PHLY 7701	Graduate Cellular Physiology (3)
PHLY 7702	Grad. Organ Systems Physiology (5)
PHLY 7710	Advanced Topics in Physiology (3)
BIOL 6030	Topics in Cell Biology (3)
BIOL 7480/81	Cell Biology (4,0)
BIOL 7870	Molecular Genetics (3)

MS Applied Physics

A minimum of thirty-four semester hours of credit are required of candidates in this concentration. All candidates for the Applied Physics concentration participate in a project involving original research and complete a Master's thesis. This project may involve participation in an already active research program or may be initiated by the student under the active sponsorship of a graduate faculty member.

Curriculum: The requirement of the Master of Science in Physics with concentration in Applied Physics (MS-AP) may be found in the latest ECU Graduate Catalog (<http://www.ecu.edu/cs-acad/aa/SrchCatalog.cfm>). The curriculum includes the following courses:

Core/Required (28 s.h.):

PHYS 5311	Mathematical Physics I (3 s.h.)
PHYS 5600/01	Modern Electronics (3,0)
PHYS 5900/01	Computational Physics (3,0)
PHYS 6200	Thermodynamics and Statistical Physics (3)
PHYS 6300	Electrodynamics I (3)
PHYS 6410	Quantum Mechanics I (3)
PHYS 6816	Seminar (1)
PHYS 7000	Thesis (repeated once) (3+3)
PHYS 7450	Solid State Physics (3)

Elective (minimum 6 s.h.):

PHYS 6250	Classical Mechanics I (3)
PHYS 6700	Health Physics (3)
PHYS 6715	Biomedical Physics (3)
PHYS 6900	Introduction to Research (3)

MS Medical Physics

A minimum of thirty-nine semester hours of credit are required of candidates in this concentration including a minimum of six semester hours of credit of clinical study in lieu of a thesis . Although there is no formal thesis requirement, involvement in research leading to a publication is recommended in the medical physics concentration. Medical Physics students participate in extensive clinical training at the Brody School of Medicine, the Vidant Medical Center (formerly Pitt County Memorial Hospital), and the Leo Jenkins Cancer Center.

Curriculum: The requirement of the Master of Science in Physics with concentration in Medical Physics (MS-MP) may be found in the latest ECU Graduate Catalog (<http://www.ecu.edu/cs-acad/aa/SrchCatalog.cfm>). The curriculum includes the following courses:

Core/Required (36 s.h.):

PHYS 5410	Intro to Quantum Mechanics (3 s.h.)
PHYS 5600/01	Modern Electronics (3,0)
PHYS 5900/01	Computational Physics (3,0)
PHYS 6700	Health Physics (3)
PHYS 6710	Nuclear Medicine Physics (3)
PHYS 6715	Biomedical Physics (3)
PHYS 6718	Therapeutic Radiological Physics (3)
PHYS 6720/22	Physics of Medical Imaging (4,0)
PHYS 6816	Seminar (1)
PHYS 6992	Radiation Therapy Physics (3)
PHYS 6993	Clinical and Medical Dosimetry (3)
RONC 7370	Biological Effects of Radiation (4)

Elective (minimum 3 s.h.):

PHYS 6300	Electrodynamics I (3)
PHYS 7992	Clinical Rotation in Radiation Therapy Physics (8)

MS Health Physics

A minimum of thirty-nine semester hours of credit are required of candidates in this concentration. In addition, students must complete a 10-16 week rigorous practicum in applied health physics in an industrial, university or national laboratory setting in lieu of a thesis. This program is offered in collaboration with the Department of Health Education and Promotion, College of Health and Human Performance.

Curriculum: The requirement of the Master of Science in Physics with concentration in Health Physics (MS-HP) may be found in the latest ECU Graduate Catalog (<http://www.ecu.edu/cs-acad/aa/SrchCatalog.cfm>). The curriculum includes the following courses:

Core/Required (36 s.h.):

PHYS 5410	Intro to Quantum Mechanics (3 s.h.)
PHYS 5600/01	Modern Electronics (3,0)
PHYS 5900/01	Computational Physics (3,0)
PHYS 6700	Health Physics (3)
PHYS 6750	Risk Assessment, Risk Communication and Regulations (3)
PHYS 6816	Seminar (1)
PHYS 6900	Introduction to Research (3)
PHYS 7730	Radiation Instrumentation (3)
PHYS 7740	Special Problems in Radiation Dosimetry and Modelling (3)
HLTH 6011	Introduction to Epidemiology (3)
EHST 5164	Radiological Health Field Operation (3)
EHST 5800/01	Solid and Hazardous Waste Management and laboratory (3,0)
RONC 7370	Biological Effects of Radiation (4)

Elective (minimum 3 s.h.):

PHYS 6200	Thermodynamics and Statistical Physics (3)
PHYS 7450	Solid State Physics (3)
EHST 6700	Industrial Hygiene Applications (3)