Health Physics

Health Physics

Degree Offered:	M.S.
Program Director:	Emily Caffrey, PhD, CHP
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Program Information

Health physics is the science of radiation protection. This interdisciplinary field combines physics, biology, chemistry, and radiological science to improve human lives. The UAB program offers unique didactic coursework, an applied internship, and the option to complete either a capstone project or a master's thesis.

Admission Requirements

In addition to the general Graduate School admission requirements, applicants to the M.S. program must:

- Have a baccalaureate degree in biology, physics, chemistry, biomedical sciences, bioengineering, or a related degree from an accredited college or university,
- Have a minimum undergraduate GPA of 3.0 (A= 4.0), computed from all undergraduate credits or from the last 60 semester hours of undergraduate course credit,
- Apply for admission to the UAB MHP Program,
- International students from non-English speaking countries are required to submit English proficiency scores (TOEFL/IELTS/PTEA/Duolingo) that meet the Graduate School's minimum score requirements: TOEFL - 80; IELTS - 6.5; PTEA:- 53; IELA - 176 - Duolingo - 120. See other international admission requirements at https://www.uab.edu/graduate/admissions/international-applicants.

The completed application must be on file with the program office by March 1st for a priority interview to be granted. All eligible applicants will be interviewed in March for admission decisions in early April. Eligible late applicants will be considered on a space-available basis up to August 1st.

If accepted, students must complete the UAB medical history questionnaire and physical, provide proof of required immunizations, and receive satisfactory screening by the UAB Medical Center Student Health Service before enrollment. A background check and drug screen will be required at program admission and prior to clinical placement.

Persons with a baccalaureate degree may be eligible to register for courses as non-degree seeking graduate students before acceptance into the M.S. program. If a non-degree seeking graduate student meets the M.S. program admission requirements, up to 12 semester hours of approved non-degree graduate coursework may be accepted for the M.S. degree. Admission of a student to any course as a non-degree student does not constitute admission to the M.S. degree program.

Early Acceptance

Early Acceptance Programs are designed for academically superior high-school students. Early Acceptance Programs allow high achieving students to be admitted to the Health Physics program at the same time they are admitted to an undergraduate program.

Eligible students are required to maintain a 3.5 undergraduate GPA.

Program Accreditation and Professional Credentials

Established Health Physics programs may seek accreditation from the Applied Science Accreditation Commission (ASAC) of the Accreditation Board for Engineering and Technology (ABET). Programmatic accreditation can be sought when the program is fully implemented and has graduated its first cohort of students. Program graduates will be eligible for part I of the certification examination administered by the American Board of Health Physics (ABHP).

Additional Information

Entry Term:	Fall Semester
Deadline for Application Materials to be in the Graduate School Office:	First Consideration: March 1st; Space available basis after first consideration, up to August 1
Entrance Tests:	For international applicants from non-English speaking countries, minimum score requirements: TOEFL - 80; IELTS - 6.5; PTEA:- 53; IELA - 176 - Duolingo - 120.

Contact Information

For detailed information, contact the Department of Clinical and Diagnostic Sciences, Health Physics Program, UAB School of Health Professions, SHPB 446, 1716 9th Avenue South, Birmingham, Alabama 35294-1212.
Telephone 205-934-3209.
E-mail AskCDS@uab.edu

Master of Science in Health Physics

Requirements		Hours
1st Fall Semester (11 hours)		
MHP 602	Radiation Physics	3
MHP 610	Radiation Detection and Measurement	4
CDS 610	Research Design and Statistics	3
CDS 505	Professional Skills Development	1
1st Spring Semester (11 hours)		
MHP 620	Principles of Dosimetry	3
MHP 621	Nonionizing Radiation	3
MHP 653	Research Methodology and Publication Analysis	2
MHP 645	Radiation Shielding and Protection	3
1st Summer Semester (15 hours)		
MHP 651	Advanced Radiation Biology	3
MHP 657	Monte Carlo Techniques for Health Physicists	1
MHP 691	Supervised Practice	6
MHP 698	Non-Thesis Research	5
or MHP 699	Thesis Research for MHP	
2nd Fall Semester (15 hours)		
MHP 611	Physics of Diagnostic Imaging	3
MHP 655	Contemporary Issues in Health Physics and CHP Exam Review	3
MHP 654	Laser Safety and Protection	3

MHP 691	Supervised Practice	6
Total Hours		**52**

Courses

MHP 601. Principles of Health Physics. 3 Hours.
Introduction to the practice of health physics. Topics include accelerator and cyclotron health physics, environmental radiation, emergency response, decommissioning and decontamination, and nuclear reactors.

MHP 602. Radiation Physics. 3 Hours.
Introduction to the practice of health physics and an introduction to fundamental nuclear physics concepts. Emphasis is placed upon radioactive decay and the interaction of radiation with matter. Topics in support of this include relativistic dynamics, basic quantum mechanics, nuclear reactions, cross sections, basic atomic structure, fission and fusion.

MHP 610. Radiation Detection and Measurement. 4 Hours.
Principles and mechanisms underlying nuclear radiation detection and measurements; operation of nuclear electronic laboratory instrumentation; application of laboratory detectors for measurement of alpha, beta, and gamma radiation; digital spectroscopy; experimental investigation of interactions of radiation with matter.

MHP 611. Physics of Diagnostic Imaging. 3 Hours.
Overview of the various imaging modalities used in a clinical setting. Topics include the basics of X-rays, ultrasound, CT, MRI, SPECT & PET imaging.
Prerequisites: NMT 620 [Min Grade: C]

MHP 620. Principles of Dosimetry. 3 Hours.
Fundamental principles of radiation dosimetry. Topics include the mathematical treatment of internal and external doses from radiation sources, dosimetry models, routes of intake, industrial and medical sources.
Prerequisites: MHP 601 [Min Grade: C]

MHP 621. Nonionizing Radiation. 3 Hours.
Recognition, assessment, and control of nonionizing radiation hazards. Topics include sound, electricity, magnetism, microwaves, visible light, ultraviolet radiation, and lasers.
Prerequisites: MHP 611 [Min Grade: C] and NMT 610 [Min Grade: C]

MHP 645. Radiation Shielding and Protection. 3 Hours.
Principles of shielding from various types of radiation sources; scenario of radiation exposure and properties of various shielding materials; approaches to radiation protection.

MHP 651. Advanced Radiation Biology. 3 Hours.
Effects of radiation at the molecular, cellular and whole-tissue level. Topics include cell survival curves, repair of radiation damage, radiation carcinogenesis, risk assessment models, cancer biology, model tumor systems, and dose fractionation in radiotherapy.
Prerequisites: NMT 641 [Min Grade: C]

MHP 652. Radiochemistry. 3 Hours.
Overview of fundamentals of radiochemistry and experiments including counting statistics, radionuclide generator design, elution and operation, labeling and quality control, liquid scintillation counting, radiotracer techniques and applications, and dating techniques.
Prerequisites: MHP 611 [Min Grade: C] and NMT 610 [Min Grade: C]

MHP 653. Research Methodology and Publication Analysis. 2 Hours.
Perform scientific research, critically evaluate scientific literature, and write an abstract and scientific poster on a topic relevant to health physics.

MHP 654. Laser Safety and Protection. 3 Hours.
Principles of laser, types of lasers, interaction of lasers with the human body, and laser safety regulations.
Prerequisites: MA 125 [Min Grade: C]

MHP 655. Contemporary Issues in Health Physics and CHP Exam Review. 3 Hours.
Exploration of contemporary issues in health physics; in-depth curriculum review to prepare for CHP exam.

MHP 657. Monte Carlo Techniques for Health Physicists. 1 Hour.
Introduction to Monte Carlo techniques that are regularly used by health physicists.

MHP 675. Special Topics in Health Physics. 1-4 Hour.
Exploration of current issues in Health Physics.

MHP 691. Supervised Practice. 1-10 Hour.
Supervised practice experiences in applied health physics.
Prerequisites: MHP 620 [Min Grade: C]

MHP 698. Non-Thesis Research. 1-6 Hour.
Directed research with a faculty mentor to complete an applied master's degree project.

MHP 699. Thesis Research for MHP. 1-6 Hour.
Original research in health physics and interpretation of results. Demonstrates student's acquaintance with literature of field and competency in proper selection and execution of research methodology.
Prerequisites: GAC M