

# MHP-Health Physics

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## **MHP 575. Preparatory Physics and Math for Health Physics. 3 Hours.**

Introduction to the basic mathematics and physics for health physicists, basic algebra and calculus, units in various systems and their interconversion, basic concepts, and problem-solving techniques.

## **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. 3 Hours.**

Principles and mechanisms of nuclear radiation detection and measurement. Topics include operation and characteristics of nuclear electronic instrumentation, applications of detectors for alpha, beta, and gamma radiation, digital spectroscopy, and the 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:** MHP 610 [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 602 [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.

## **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 650. Health Physics Research Methods. 3 Hours.**

Introduction to research design and basic statistics as applied in health physics practice and scholarship; overview of the research process, literature reviews, developing research hypotheses; statistical methods for health physicists.

## **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.

## **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 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 692. Project Based Alternative for Supervised Practice. 1-6 Hour.**

Hands-on experience in applying radiation safety principles when their previous work experience makes additional internships, fellowships, or volunteer observation within health physics less productive. Working with a Health Physics mentor to solve a modern applied or operational health physics problem resulting in a presentation and/or publication.

**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