

MDPH 613: Health Physics

(Fall 2022)

Instructor(s): John Kildea

Text(s): Class materials & notes provided, no set texts –following used in preparation of class materials:
Introduction to Health Physics, Cember
Practical Radiation Protection in Health Care, Martin
Radiation Physics for Medical Physicists, Ervin B. Podgorsak
Physics in Nuclear Medicine, S. Cherry, J. Sorenson, M. Phelps (Elsevier, 4th edition, 2012)

Credits: 2

Hours of Instruction: 26 (Fall semester)

Recommended References:

- *Radiation Protection in the Design of Radiotherapy Facilities*, IAEA Publications Catalogue – Safety Reports Series No.47
- *The 2007 Recommendations of the International Commission on Radiological Protection - ICRP Publication 103*
- *The Canadian Nuclear Safety Commission – Laws and Regulations*
- *The Emperor of All Maladies*, S. Mukherjee
- *Strange Glow: The Story of Radiation*, T.J. Jorgensen

Evaluation Scheme:

Class quizzes (20%), radiation safety scenarios: continuous assessment (10%), midterm exam (30%), final exam (40%)

Learning Objectives:

The main purpose of the assessments is to ensure that students achieve competency in introductory Health Physics. Since the class is held just once a week there is often a tendency to neglect the material between classes with the result being a panic before the midterm and final exams. With 30% of the overall mark dependent on continuous assessment (quizzes and radiation safety scenarios), each student has an opportunity to improve her/his exam grade by studying during the semester. This should also relieve the study stress at the time of the midterms and finals.

Course Outline (List of topics by week):

Introduction to Health Physics
A review of radiation physics
Quantification of radiation
Detection of radiation
Biological effects of radiation
Radiation protection organizations
Radiation protection regulations
Radiation protection in practice
Medical radiation
Midterm exam
The nuclear power industry
Neutrons and basic shielding concepts
Shielding design for hospital radiation facilities – diagnostic
Shielding design for hospital radiation facilities – therapy
Radiation therapy shielding laboratory
Statistical analysis in radiation quantification
Radiation protection scenarios and review
Final exam