The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

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**Med Phys 1E03**

**PHYSICS IN MEDICINE AND BIOLOGY**

[http://www.science.mcmaster.ca/medphys/courses.html](http://www.science.mcmaster.ca/medphys/courses.html)

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**M. FARQUHARSON**

BSB/129

E-mail: farquhm@mcmaster.ca
Ext.: 23021

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**Objectives:**

To provide an understanding of examples of physics that are applicable to medical and biological applications.

**Text:** Custom Courseware available through the Avenue to Learn.

Clickers will be used during this course.

**Content (lectures):**

**X-Rays and X-ray Imaging:** X-ray photons, X-Ray production, X-ray interactions with the human body, image receptors (film and digital), diagnostic image production Tomographic imaging of the human body (CT)

**Nuclear Medicine:** Nuclear structure, Radioactivity and radioactive decay, pair production, functional diagnostic image production. Single photon computed tomography, Introduction to positron emission tomography (PET).

**Magnetic resonance imaging:** A qualitative introduction to Magnetic Resonance Imaging (MRI), Magnetic dipole moments, bulk magnetisation vectors, resonance, relaxation mechanisms, pulse sequences and image production.

**Imaging with sound:** An introduction to the use of ultra sound in imaging and its applications

**Effects of Radiation:** Introduction to radiobiology and radiation therapy for the treatment of cancer.

Course will include a variety of guest lectures talking about research applications of physics
used to solve problems in the medical and biological field.

Content (Tutorials):
There will be 4-5 in-tutorial quizzes to help you keep up with the lecture material. There will be 4 question sets to work through during the term. *Time permitting*, there will be one laboratory visit where various applications of x-ray techniques will be demonstrated. The tutorials will also be an open forum for you to discuss any issues arising about the course content.

Evaluation:

<table>
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<td>Lecture Iclicker responses</td>
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<tr>
<td>Final Examination</td>
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Academic Dishonesty

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at:

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf#page=19

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work. Copying or using unauthorized aids tests and examinations.
3. In this course we will be using a software package designed to reveal plagiarism. Students will be required to submit their work electronically and in hard copy so that it can be checked for academic dishonesty.

Academic Accommodation of Students with Disabilities:

Students who require academic accommodation must contact Student Accessibility Services (SAS) to arrange for an appointment or http://sas.mcmaster.ca/ Academic accommodations must be arranged for each term of study.