

Radiological Physics

Physics 4672A/9655A

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Office hours: by appointment

Time Tuesday 1:30-2:20 pm, Friday 1:30-3:20 pm
Place P&AB-106, University of Western Ontario

Textbook (required): Introduction to Radiological Physics and Radiation Dosimetry, Frank H. Attix, Wiley-VCH (2004)

Suggested reference: Radiation Physics For Medical Physicists, E.B. Podgorsak, Springer-Verlag (2006).

	Attix Chapters	Podgorsak Chapters
September		
Introduction to Ionizing Radiation:		
• quantities, units, counting statistics	1	1
Radiation sources (radioactivity , x-ray tubes, accelerators, reactors, cyclotrons)	6	3
Interactions of x and γ rays with matter I – overview:		
• interpretation of the exponential attenuation of photons	7,3	7
October		
Interactions of x and γ rays with matter II:		
• Thomson and Compton scattering	7	7
Interactions of x and γ rays with matter III:		
• Coherent scattering, Photoelectric effect, Pair production	7	7
Interactions of charged particles with matter I:		
• Scattering and stopping powers	8	5
Interactions of charged particles with matter II:		
• X-ray production (Bremsstrahlung)	8,9	5
Mid-term exam		
November		
Inter-relationship of Quantities:		
Fluence, KERMA, Absorbed Dose	2	
• Radiation Equilibrium (Temporal and Spatial)	4,6	handout
Monte Carlo Method and Convolution Principles	handout	handout
General Dosimetry	11,12	handout
Air ionization chambers, calorimetry, chemical dosimeter		
Practical Dosimetry		
• ion chambers, diodes, film, TLD	14,15	handout
• Cavity theory and dose measurement with ion chambers	handout	handout
December		
Radiation Protection Guidelines & Canadian Regulations	handout	handout
Review		

Evaluations:

- 6 homework assignments (40%):
These assignments are there to help you learn the subject matter. A portion could be extension of what was taught in class and might contain materials that help you learn on your own. You may talk to each other about the assignments, but it would only help if you compose your thoughts and write your own assignments, rather than simply copying. Please see statement below on plagiarism.
- Mid-term exam (20%): TBA, approx first week of November.
- Final exam (40%): Scheduled by the office of the registrar.
- The Department of Physics and Astronomy may, in exceptional cases, adjust the final course marks in order to conform to Departmental policy.

Medical or other serious issues:

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: <http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: https://studentservices.uwo.ca/secure/medical_document.pdf

Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

Scholastic Offenses:

Cheating

University policy states that cheating is a scholastic offence. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf

The commission of a scholastic offence is attended by academic penalty, which may include expulsion from the program. If you are caught cheating, there will be no second warning. Cheating includes having available any other electronic devices than a watch and a calculator during a test or exam. You may not have a cell phone accessible, even to use it as a calculator or watch.

Plagiarism

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

Co-requisites:

- Phys 3300A/B
- Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Accessibility:

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.
