



DEPARTMENT OF PHYSICS

**PHYS\*3170 Fall 2017**  
**Radioactivity and Radiation Interactions**

**Lecturer:**

Ralf Gellert  
Office: MacN 450  
Ext.: 53992  
e-mail: [rgellert@uoguelph.ca](mailto:rgellert@uoguelph.ca)

**Lectures:**

Tuesdays & Thursdays 11:30 am – 12:50 pm in ROZH 107

**The Purpose of this Course:**

This course introduces the student to concepts in radiation physics with an underlying emphasis on its practical application. Topics include: atomic and nuclear structure, introduction to different types of radiation and their reaction mechanisms, the interaction of radiation with matter, radioactive decay processes, human dosimetry calculations and external radiation shielding. This course is meant to provide the student with the capacity to carry out calculations in this field and provide context to material taught in upper level physics courses.

**Prerequisites:**

(1 of IPS\*1510, Math\*1210, Math\*2080) and (Math\*2170 or Math\*2270)

**Textbook:**

James E. Turner, "Atoms, Radiation, and Radiation Protection", 3rd ed., John Wiley & Sons, 2007. The textbook is available as an ebook through the library, search primo for Turner and radiation

**Evaluation:**

| Component    | Weight |
|--------------|--------|
| Assignments  | 30%    |
| Midterm Exam | 20%    |
| Final Exam   | 50%    |

The 4 or 5 assignments will be posted on the courselink site typically 10 days before the due date. Late assignments will be penalized and no assignments can be accepted after the posting of the solutions on the course page.

**Midterm and Final Exam:**

The midterm exam is planned for October 24 during class. This date has been coordinated with all other courses. The final exam is scheduled for Thursday, December 14<sup>th</sup> from 11:30–13:30. Both the midterm and final exam will be closed book. You will be provided with an equation sheet and are allowed to prepare a one page cheat sheet. Only non-programmable pocket calculators will be permitted. Personal communication or entertainment devices (eg. cell phone, MP3 player) are not permitted.

If you miss a midterm examination due to illness or compassionate reasons, you need to provide the instructor with a waiver slip. See your Program Counsellor if you require assistance. If you miss the final examination, see your Program Counsellor. Please refer to “General Information for Academic Consideration and Appeals” in the 2016/17 Undergraduate Calendar.

### **(Not) Working With Other Students:**

All work submitted for grading in this course must be each individual student's own work. While students are encouraged to share thoughts and ideas, it is not acceptable to share assignment solutions. The work on the assignments is an essential step in the understanding of the material and crucial for the preparation for the exams.

### **Help:**

Your instructor will be a major source for additional help and will be happy to answer questions in class and during office hours. Requests to meet at alternate times will also be considered.

### **Office Hours:**

Tuesday and Thursday, 3 pm in my office, MacN 450, TBD.

### **Class resources:**

Class notes, assignments, additional materials and announcements will be posted on the [CourseLink Desire to Learn \(D2L\) website](https://courselink.uoguelph.ca/shared/login/login.html): <https://courselink.uoguelph.ca/shared/login/login.html>. All students registered in this course have access through their University of Guelph Central Login account. The instructor will also post solutions to assignments and midterms on this site.

### **Other Resources:**

- K.S.Krane, “Introductory Nuclear Physics”, 3rd Edition, Wiley, 1987.
- W. E. Burcham, “Nuclear Physics, An Introduction”, 2<sup>nd</sup> edition, Longmans, 1973.
- C. M. Lederer and V.S. Shirley, “Table of Isotopes”, 7th (or 6<sup>th</sup>) edition, Wiley, 1978.
- H. Cember, “Introduction to Health Physics”, 2<sup>nd</sup> edition, McGraw-Hill, 1992.
- H. E. Johns and J. R. Cunningham, “The Physics of Radiology”, 4<sup>th</sup> edition, Charles C. Thomas, 1983.
- N. A. Dyson, “X-rays in Atomic and Nuclear Physics”, 2<sup>nd</sup> edition, Cambridge University Press, 1990.
- E. J. Hall and A. J. Giaccia, “Radiobiology for the Radiologist”, 7<sup>th</sup> (or 5<sup>th</sup> and 6<sup>th</sup>) edition, Wolters Kluwer Health/Lippincott Williams & Wilkins, 2012.

### **Accessibility:**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services as soon as possible. For more information, contact SAS at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website: <http://www.uoguelph.ca/csd/>

**Academic Misconduct:**

The University of Guelph takes a serious view of academic misconduct and will severely penalize students, faculty and staff who are found guilty of offenses associated with misappropriation of others' work, misrepresentation of personal performance and fraud, improper access to scholarly resources, and obstructing others in pursuit of their academic endeavours. Each student is assumed to be familiar with the regulations surrounding academic misconducts, as spelled out in the Undergraduate Calendar.

**Course and Instructor evaluation:**

The Department of Physics requires student assessment of all courses taught by the Department. These assessments provide essential feedback to faculty on their teaching by identifying both strengths and possible areas of improvement. In addition, annual student assessment of teaching provides part of the information used by the Department Tenure and Promotion Committee in evaluating the faculty member's contribution in the area of teaching.

The Department's teaching evaluation questionnaire invites student response both through numerically quantifiable data, and written student comments. In conformity with University of Guelph Faculty Policy, the Department Tenure and Promotions Committee only considers comments signed by students or by choosing "I agree" in question 14 (online process). Your instructor will see all signed and unsigned comments after final grades are submitted. Written student comments may also be used in support of a nomination for internal and external teaching awards.

NOTE: No information will be passed on to the instructor until after the final grades have been submitted.