



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE OUTLINE

1. **Course:** Physics 561, Stable and Radioactive Isotope Fundamentals

Lecture Sections:

L01: MWF, 16:00 – 16:50, ST 061

Instructor: A.L. Norman

Office: SB 133

Tel. No. 403-220-5405

e-mail address: alnorman@ucalgary.ca

Office Hours: T 9:30-11 AM, R 10:30-noon

Desire 2 Learn (D2L) course name: Stable and Radioactive Isotope

Departmental Office: SB 605, 403-220-5385, phasugrd@ucalgary.ca

This course will provide an overview of nuclear physics with an emphasis on isotope formation, stable and radioactive isotope fractionation and the application of radioactive and stable isotope techniques. The purpose of the course is to give an overview of fundamental physical processes governing the abundance of isotopes.

2. **Prerequisites:** consent of the department

3. **Grading:** The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments (3)	30%
Independent Study Project	15%
Presentation	5%
Midterm tests (2)	50% (February 13, April 6, 2015)

Percentage to letter grade conversion scale:

> = 95 %	A +	> = 78 %	B +	> = 65 %	C +	> = 50 %	D +
> = 88 %	A	> = 74 %	B	> = 60 %	C	> = 45 %	D
> = 83 %	A -	> = 69 %	B -	> = 55 %	C -	< 45 %	F

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

5. **Scheduled out-of-class activities:** Students are expected to work on their independent study project outside of normal class hours at times appropriate to their schedule. Independent studies may include lab work, at the student's discretion, at times suitable to the student's availability. Approximately one hour of approved class activities for independent study projects will be held outside of class hours each week.

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **Course Materials:** Relevant course material will be distributed to the class and/or posted on D2L. There is no textbook for this course.

7. **Examination Policy:** Midterm exams are closed book but calculators are allowed. Students should also read the Calendar, [Section G](#), on Examinations.

8. **Writing across the curriculum statement:** In this course, the quality of the student's writing in independent study reports will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

9. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- (a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties.
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: Students with Disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html> [B.1](#) and Student Accessibility Services: <http://www.ucalgary.ca/access/>.
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **Student Union Information:** VP Academic Phone: 220-3911 Email: suvpaca@ucalgary.ca.
SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombudsman](#)
- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

10. Lecture Schedule: see attached

Department Approval _____ Date _____

Physics 561 Draft Lecture Schedule

W2015

Instructor: A.L. Norman

MWF 16:00 - 16:50

Week Dates Material to be covered

1. Jan 12 – 16 Course Introduction Outline, Expectations, Nuclear Properties, Chart of Nuclides
2. Jan 19 - 23 Binding Energy, Semi-Empirical Mass Formula, Nuclear Models, Radioactivity
3. Jan 26 – 30 Decay Chains, Exposure, Equilibrium/Disequilibrium, Dose and Exposure
4. Feb 2 – 6 Applications of Radioactive Isotopes, Nuclear Reactors
5. Feb 9, 11 Nuclear Processing and Waste **Feb 13 Midterm Exam I**
6. READING WEEK FEB 16-20
7. Feb 23 – 27 Nucleosynthesis
8. Mar 2 – 6 Mass Spectrometry and Vacuum Technology
9. Mar 9 – 11 Data Correction, Isotope Fractionation
10. Mar 16 – 20 Spectroscopy, Rotational, Vibrational & Translational Energy
11. Mar 23 - 27 Partition Function Ratios, Equilibrium Fractionation, Teller Redlich Theorem
12. Mar 30 - Apr 3 Kinetic Isotope Fractionation, Examples of Isotope Fractionation
13. Apr 6 – 10 **April 6 Midterm Exam II**, Student Presentations
14. Apr 13 – 15 Student Presentations

