

COURSE TITLE: HPS 300 – Physics of Ionizing Radiation (FA15)

INSTRUCTOR: Gary Cerefice, Health Physics & Diagnostic Sciences
Harry Reid Center, Room 307
702-895-2612, cerefice@unlv.nevada.edu

OFFICE HOURS: Wed. 2 – 3:30, Thurs. 2:30 - 4, or by appointment
(if my door is open, feel free to stop in with questions)

COURSE DESCRIPTION: Atomic and nuclear structure, basic quantum theory, radioactivity and decay kinetics, charged-particle interactions, photon interactions, neutron interactions, and sources of ionizing radiation

COURSE OBJECTIVES: To provide the students with an understanding of the fundamental principles of modern physics to serve as a foundation for future training in health physics. Outcomes for HPS 300 include:

- Understand and apply fundamentals of quantum mechanics & nuclear physics
- Understand and calculate radioactive decay and activity
- Understand and predict interactions of radiation with matter
- Understand and be able to predict outcomes of nuclear reactions

WEEKLY SCHEDULE: Two 1.5 hour class period per week.

TESTING: Weekly homework. Two scheduled exams and a comprehensive final will be administered.

GRADING: Grading for the course will be based on the scheduled exams, final exam, and weekly homework. Tentative grade weights given to each evaluation tool as follows:

Examinations (2)	50%
Final Exam	30%
Homework	20%

HOMEWORK POLICY: Homework will be due on the dates listed in the assignment, unless modified by the instructor. Late homework will be subject to a penalty of 10% per week late, unless approved by the instructor prior to due date. Homework submitted after solutions are posted will receive an additional 50% penalty.

REQUIRED TEXT: Atoms, Radiation, and Radiation Protection, 3rd Edition. James E. Turner. John Wiley & Sons, Inc. 978-3527406067.

RECOMMENDED TEXT: Nuclides and Isotopes: Chart of the Nuclides. 16th Edition. Knoll Atomic Power Laboratory. 2002.
see <http://www.ChartoftheNuclides.com> for more information.

HPS 300: Physics of Ionizing Radiation

Fall 2015 WEEKLY SCHEDULE
(Subject to Change, Chapters listed correspond to Turner)

Week 1 (8/24) Introduction / History of Modern Physics, Review (Ch. 1 & 2)

Week 2 (8/31) Atomic Physics & the Nucleus (Ch. 3)

Week 3 (9/07) Nuclear Reactions / Alpha & Gamma Decay (Ch. 3)

Week 4 (9/14) Beta Decay / Radioactive Decay (Ch. 4)

Week 5 (9/21) Radioactive Decay (Ch. 4)

Week 6 (9/28) Radioactive Decay (Ch. 4) / *Review*

----- End Exam 1 material (through Chap. 4) -----

Week 7 (10/05) **Exam #1** / Interactions of Heavy Charged Particles with Matter (Ch. 5)

Week 8 (10/12) Interactions of Heavy Charged Particles with Matter (Ch. 5)

Week 9 (10/19) Interactions of Electrons with Matter (Ch. 6, 7)

Week 10 (10/26) Interactions of Photons with Matter (Ch. 8)

Week 11 (11/02) Neutrons – Sources and Nuclear Reactions (Ch. 9)

----- End Exam 2 material (through Chap. 8) -----

Week 12 (11/09) Neutrons – Fission and Criticality (Ch. 9)

Week 13 (11/16) Review / **EXAM #2**

Week 14 (11/23) *TBD / Thanksgiving Break*

Week 15 (11/30) *Review*

FINAL EXAM – Dec 8th, 6 – 8 pm

Grading Curve

The departmental grading scale is as follows.

100 – 93	A
93 – 90	A-
89 – 87	B+
86 – 83	B
82 – 80	B-
79 – 77	C+
76 – 73	C
72 – 70	C-
69 – 60	D

To account for variations in exam difficulty, a curve may be applied to the exams and final. The instructor will provide details of the curve if it is applied.

Standard Provost's Statements

Academic Misconduct – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <http://studentconduct.unlv.edu/misconduct/policy.html>.

Copyright – The University requires all members of the University Community to familiarize themselves and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://provost.unlv.edu/copyright/statements.html>.

Disability Resource Center (DRC) – The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you.

If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to me during office hours so that we may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Religious Holidays Policy – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The **make-up** will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the end of the first two weeks of classes, **September 4**, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the test or examination at an alternate time would impose an undue hardship on the instructor or the university that could not reasonably been avoided. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=4&navoid=164>.

Incomplete Grades - The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring – The Academic Success Center (ASC) provides tutoring and academic assistance for all UNLV students taking UNLV courses. Students are encouraged to stop by the ASC to learn more about subjects offered, tutoring times and other academic resources. The ASC is located across from the Student Services Complex (SSC). Students may learn more about tutoring services by calling (702) 895-3177 or visiting the tutoring web site at: <http://academicsuccess.unlv.edu/tutoring/>.

UNLV Writing Center – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>

Rebelmail – By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students’ e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. Emailing within WebCampus is acceptable.

Library Resources – Students may consult with a librarian (www.library.unlv.edu/consultation) about research needs. For this class, the subject librarian is Xan Goodman. UNLV Libraries provides resources to support students’ access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at www.library.unlv.edu/

Final Examinations – The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.