

**NucE001S Atomic Adventures
Freshman Seminar
Spring 2008**

8:00-9:15 am NOTE NEW TIME

Office: 227 Reber Bldg.
Office hours:
atm2@psu.edu

Textbook: None.

References: Various handout materials and internet sites listed on ANGEL

Instructor: Several

Coordinator: Arthur Motta, Professor of Nuclear Engineering and Materials Science and Engineering.

Teaching Assistant: Zach Van Horn

Goals: To provide students with an introduction to nuclear engineering. Nuclear radiation and its applications will be discussed.

Students will learn about nuclear concepts through lectures and hands-on experiments.

Topics:

- (1) Introduction and Basic Considerations
- (2) Nuclear Radiation and Detection
- (3) Reactor Designs
- (4) Fission, criticality and neutron moderation
- (5) Nuclear Reactor Systems: Safety Design
- (6) Nuclear waste issues
- (7) Health Safety
- (8) Reactor Controls
- (9) Nuclear Materials
- (10) Reactor Safety
- (11) Research reactor operation and pulsing
- (12) Space Nuclear Power
- (13) Neutron Activation Analysis

Grading: Final course grades will be determined in the following manner:

Homework Assignments 40%

In-class participation 40%

Final Report 20%

Examinations: All homework assignments will be based on class lectures and assigned readings. The final reports will be due at the last class, April 29, 2008. The topic of the report will be a discussion of a nuclear engineering-related article chosen by the student from a list prepared by the instructor. More instructions will come later.

Class participation: In order to participate in class, it is necessary to be present. It is expected that students will attend all classes, and attendance is automatically taken at the reactor. If students need to miss a class, they should email the instructor before the class with the justification for the absence to be excused.

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1. 1/15: Overview (Motta)
2. 1/22: Introduction to RSEC (Davison)
3. 1/29: Counting Experiment (Motta/Davison)
4. 2/5: Nuclear Radiation Lab (Davison)
5. 2/12: Fission/Criticality/Moderation (Motta/Davison)
6. 2/19: Nuclear Reactor Systems (Heidrich)
7. 2/26: Environmental Effects of Energy Production(Motta)
8. 3/4: Radioactive Waste Disposal (Motta)
- 3/11: Spring Break
9. 3/18: Controls/Demos (Edwards)
10. 3/25: Health Safety (Brenizer)
11. 4/1: Reactor Safety (Kim)
12. 4/8: Pulse Demonstration (Davison)
13. 4/15: Space Nuclear Power (Heidrich)
14. 4/22: Neutron Activation Analysis (lecture) (Hauck/Unlu)
15. 4/29: Neutron Activation Analysis (lab) (Hauck/Unlu)