

## Course Syllabus

### PHYS 3710 Nuclear, and Particle Physics

#### Spring Semester 2013

**Instructor:** Dr. Farhang Amiri

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#### Course Description

This is a one-semester undergraduate level course on the concepts and applications of Nuclear and Particle Physics. The goal of the course is to introduce the students to the main concepts and to prepare them to use the methods to solve problems. This course is also expected to prepare the students for more advanced courses and research in experimental or theoretical physics.

#### Brief Outline

1. Nuclear Physics: Basic Concepts, Nuclear Models, Nuclear Reactions
2. Particle Physics: Elementary Particles, Quark Model, Quantum Chromodynamics

#### Recommended Literature

Textbook: Richard Dunlap, The Physics of Nuclei and Particles

Others books:

- D. Perkins, Introduction to High Energy Physics
- K. Krane, Introductory Nuclear Physics

#### Classroom, Class Hours and Office Hours

**Classroom:** SL 240

**Time:** MWF, 12:30-1:20

**Office hours:** 9:00-10:00 Monday, Tuesday, Friday

## Course Schedule

CHAPTER	NO. OF CLASS SESSIONS	ASSIGNMENTS	DUE DATE
Ch. 3 (Dunlap) Nuclear Composition	3	3.1, 3.4, 3.7, 3.8	Monday, 1/14
Ch. 4 (Dunlap) Binding Energy	3	4.1, 4.2, 4.4, 4.6, 4.9	Wednesday, 1/23
Ch. 5 (Dunlap) The Shell Model	2	5.1, 5.3, 5.4	Monday, 1/28
<b>Exam 1, Tuesday, January 29</b>			
Ch. 7 (Dunlap) Decay Processes	2	7.2, 7.4, 7.5, 7.7	Monday, 2/4
Ch. 8 (Dunlap) Alpha Decay	2	8.2, 8.5, 8.8	Friday, 2/8
Ch. 9 (Dunlap) Beta Decay	2	9.5, 9.7, 9.8	Wednesday, 2/13
Ch. 12 (Dunlap) Fission Reactions	3	12.1, 12.5, 12.6, 12.7	Friday, 2/22
Ch. 13 (Dunlap) Fusion Reactions	2	13.2, 13.5, 13.7	Wednesday, 2/27
<b>Exam 2, Thursday, February 28</b>			
Ch. 14 (Dunlap) Particles and Interactions	5	14.2, 14.5 plus supplements	Wednesday, 3/20
Ch. 15 (Dunlap) The Standard Model	6	15.1, 15.2, 15.4, plus supplements	Wednesday, 4/3
<b>Exam 3, Thursday, April 4</b>			
Ch. 16 (Dunlap) Particle Reactions	5	16.1, 16.2, 16.8	Wednesday, 4/17
Ch. 17 (Dunlap) Grand Unification	2	17.1	Not Collected
<b>Exam 4, Wednesday, April 24</b>			

## Exam Schedule

EXAM	CHAPTERS	DATE
1	3, 4, 5 (Dunlap)	Tuesday, 1/29
2	7, 8, 9, 12, 13 (Dunlap)	Thursday, 2/28
3	14, 15 (Dunlap)	Thursday, 4/4
4	16, 17 (Dunlap)	Wednesday, 4/24

## Grades

Grades will be assigned based on the homework assignments and the exams. Every student should attempt to solve all problems. The homework solutions are to be turned in at the given deadlines. The instructor's solution of the problems will be posted on the web page shortly after. The homework assignments will be graded and each score will be normalized to 100 points. Discussions of the problems among students are encouraged, but each student should turn in his/her own solutions. In addition, there will be *four* exams that will be given in the Testing Center. Please consult the exam schedule for the included chapters and the times. Exams are *open book* but *not open notes*.

- Exams: 19% each
- Homework: 24%

A, A-	B+, B, B-	C+, C, C-	D+, D, D-	F
89-100	77-88.9	64-76.9	50-63.9	< 50

## Honor Code

Students are expected to uphold the Academic Honor Code published in the Weber State University Student Handbook. The Academic Honor System is based on the premise that each student has the responsibility to (1) uphold the highest standards of academic integrity in the student's own work, (2) refuse to tolerate violations of academic integrity in the university community, and (3) foster a high sense of integrity and social responsibility on the part of the university community.