



**PRAIRIE VIEW A&M UNIVERSITY
DEPARTMENT OF PHYSICS**

**PHYS-3243-001: Intro to Nuclear and Particle Phys
COURSE SYLLABUS
Spring-2007**

Professor: Premkumar B. Saganti, Ph. D.

Office: Room 300-AD, New Science Building

Phone: 936-261-3134

E-mail: pbsaganti@pvamu.edu

Lecture Sessions: Wednesdays 10:00 AM – 12:50 PM
Room: NSB-303

Office Hours: Tuesday/Thursday 11:00 AM – 12:00 PM

Text Book: **An Introduction to the Physics of Nuclei and Particles**
Richard Dunlap
ISBN-0534392946
Thomson-Books/Cole Publication

Supplementary Material and Help:

1. A set of CDs with solutions to problems in the chapters covered from the text book are available in the Coleman Library (on Reserve).
2. A set of binders will also be periodically updated in the Coleman Library (on Reserve) with class notes and other hand-out material.
3. Selected information and test material will also be made available through the website - <http://www.i2i.pvamu.edu/physics/saganti.htm>
4. A series of tutorial sessions are also being made available through the physics department for individual problem discussions.

COURSE DESCRIPTION:

This is an advanced course at the undergraduate level with introduction to Nuclear Physics, Nuclear Structure, Nuclear Reactions, Nuclear Decay including Fundamentals of Radiation Decay Mechanism and Measurement Techniques.

COURSE GOAL and OUTCOME:

The primary goal of this course is to present the fundamental concepts in the fields of (i) NUCLEAR PROPERTIES AND MODELS, (ii) NUCLEAR DECAYS AND REACTIONS, and (iii) RADIATION MEASUREMENT SCIENCE

PERFORMANCE EVALUATIONS and GRADING:

- A set of problems and assignments will be provided based on the in-class discussions and are expected to be worked-out independently and individually and turned in for credit by the specified time.
- There will be two in-class tests: scheduled mid-term and final examination.
- A term project will be assigned on a specific topic for research and to generate a report.
- GRADES → **A:** 90-100 **B:** 80-89 **C:** 70-79 **D:** 60-69 **F:** <60

ATTENDANCE POLICY:

Class will start and end at the prescribed times. Attendance in every class is expected and is the student's responsibility. Absence or tardiness may result in lowered grades. Excessive absenteeism, whether EXCUSED or UNEXCUSED, may result in a student's course grade being reduced or assignment of a grade of "F". Absences are accumulated beginning with the first day of class. More detailed information is available from the **Registration and Term Information Fall 2005** (http://acad.pvamu.edu/content/registrar/files/fall2005_revised.pdf).

ASSISTANCE FOR STUDENTS WITH DISABILITIES:

Lecture class room and additional tutorial session will all be held in New Science building and this building is accessible to people with disabilities. My office is also located in New Science building (Room 330-AD). For any further clarification and requirements, you may contact the Office of Disability Services on campus located in Evans Hall Room 315, Tel: (936) 857-2610.

CONDUCT AND ETHICS:

A strict code of ethics will be imposed in the class room lecture sessions, in all the examinations, and on all homework assignments. It is imperative that the student will make every effort to ensure that he / she will abide by the university standards and expectations and pledge to refrain from any unethical activity and plagiarism.

Introduction to Nuclear and Particle Physics: Radiation Applications

Premkumar B. Saganti, Ph. D.

Spring-2007: PHYS 3243: 10:00 – 12:50 (Wed) NSB-303

A New Course Offered from the Physics Department as Part of the Radiation Interuniversity Science and Engineering (RaISE) Program Support of NASA-JSC

Course-outline:

Introduction to Nuclear Physics, Nuclear Structure, Nuclear Reactions, and Nuclear Decay. Fundamentals of Radiation Decay Mechanism and Measurement Techniques.

NUCLEAR PROPERTIES AND MODELS

- Nuclear Composition and Size
- Binding Energy and the Liquid Drop Model
- The Shell Model
- Properties of the Nucleus

NUCLEAR DECAYS AND REACTIONS

- General Properties of Decay Processes
- Alpha Decay
- Beta Decay
- Gamma Decay
- Nuclear Reactions
- Fission Reactions
- Fusion Reactions

RADIATION MEASUREMENT

- Gamma spec instrumentation and data
- Proton, electron and neutron radiation
- Heavy ion radiation fields
- The physics and particle detectors
- Silicon detector systems
- Ionization chambers

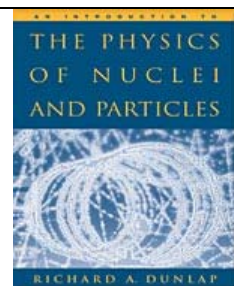
Text – Book:

An Introduction to the Physics of Nuclei and Particles

Richard Dunlap

ISBN-0534392946

Thomson-Books/Cole Publication



COURSE TIME-LINE:

Introduction to Nuclear and Particle Physics: Radiation Applications

This schedule may be modified as needed -

<i>Week:</i>	<i>Start Date</i>	<i>Topic</i>	<i>Comments</i>
1	15-Jan	<i>Introduction and Overview</i>	
2	22-Jan	<ul style="list-style-type: none">• Nuclear Physics Fundamentals	
3	29-Jan	<ul style="list-style-type: none">• BE and Liquid Drop Model	
4	5-Feb	<ul style="list-style-type: none">• The Shell Model	
5	12-Feb	<ul style="list-style-type: none">• Properties of the Nucleus	
6	19-Feb	<ul style="list-style-type: none">• Alpha and Beta Decay	
7	26-Feb	<ul style="list-style-type: none">• Gamma Decay	
8	5-Mar		Mid-Term Exam
9	12-Mar	<i>Spring Break</i>	<i>Spring Break</i>
10	19-Mar	<ul style="list-style-type: none">• Nuclear Reactions	
11	26-Mar	<ul style="list-style-type: none">• Nuclear Instrumentation	
12	2-Apr	<ul style="list-style-type: none">• Proton, electron, neutron radiation	
13	9-Apr	<ul style="list-style-type: none">• Heavy ion radiation fields	
14	16-Apr	<ul style="list-style-type: none">• The physics and particle detectors	
15	23-Apr	<ul style="list-style-type: none">• Silicon detector systems	Course Review
16	30-Apr	Final Examination Period	FINAL Exam
