

**KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
DEPARTMENT OF PHYSICS**

**Physics 212 – Modern Physics - Spring Session 2005 - 2006 (Term 052)
Course Schedule and Grading Policy**

Instructor : Dr. Abdullah AlSunaidi
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Lecture: S.M.W. 10.00-10.50
Room 6/105
Laboratory: M/T 2.10-5.10
Room 6/239
Office Hours: Sat. 11-11.50 (you may find me in room 239)
Mon. 11.00-11.50
Wed. 11.00-11.50

Course Description An introductory course in Modern Physics. Topics covered include: Special Relativity; the nuclear atom; electromagnetic radiation; the wave nature of matter; Bohr's theory of the atom; atomic x-ray spectra; selected topics on atomic, nuclear, and solid state physics.

Pre-requisites : PHYS 102 General Physics II
MATH 102 Calculus II

Textbook : "Modern Physics", by R. A. Serway, C. J. Moses and C. A. Moyer, 2nd Ed., Saunders College Publishing (1997).

References : 1) A. Biser, "Modern Physics, McGraw-Hill, NY (1981).
2) H. C. Ohanian, "Modern Physics", Prentice-Hall (1987).
3) R. T. Weinder and R. L. Sells, "Elementary Modern Physics", 2nd Ed., Allyn and Bacon Inc., Boston (1973).

Goals : To introduce the students to the basic concepts of the major theories of the 20th century, namely the special theory of relativity and quantum mechanics and to discuss some selected topics in atomic, solid state, nuclear and particle physics.

Grading Policy : The course grade will be evaluated as follows:

	<u>%age</u>
Homework	10%
Laboratory	15%
Quizzes	5%
First major exam	20%
Second major exam	20%
Final exam	30%
Total	100%

*There will be a 5-point bonus for term paper.

Laboratory work

The lab work score will be based on any or a combination of the lab reports and lab quizzes. **Lab sessions will start on the second week of the classes.**

Term paper : Any student who wishes to start working on a term paper who should come and see me no later than March. 14

Major and final examinations

The major exams and the final exam will be of **solving type**. The exams are scheduled as follows:

First major exam	Tuesday, 21 March 2006	(Chapters 1-3)
Second Major Exam	Tuesday, 25 April 2006	(Chapters 4-6)
Final Exam	TBD	(Comprehensive)

Policy on make-up exams

If you miss a major or the final exam, you should come and **see me** with your official excuse **within three days** after the exam. Personal excuses are not allowed. If you miss the exam without a valid excuse, you get a **ZERO** score for that exam

Attendance: Attendance will be **enforced and evaluated** according to current university regulations. A **DN** grade will be given to any student exceeding 9 absences without official excuses and/or three absences in laboratory experiments. **Any student in possession of an excuse for officially authorized absence must present this excuse to his instructor no later than one week following his resumption of class attendance**

Physics 212 Lecture Schedule Spring 2006 (Term 052)

Week	Date	Topics	Chapter	Sections	Experiment
1	13 Feb.	Overview; Principle of Relativity	1	1,2	No lab.
	15	Michelson-Morley experiment.	1	3,4	
	16	Postulates of Special Relativity	1	4,5	
2	18 Feb.	Lorentz transformation	1	5,6	Speed of light (demonstration)
	20	Relativistic form of Newton's laws	1	7,8	
	22	Relativistic energy, momentum and mass.	1	9,10	
Wednesday – 22 Feb. 2006 - Last day for dropping courses without Grade of W					
3	25 Feb.	Maxwell's eq.'s and Hertz's experiment	2	1	Problem Session
	27	Black body radiation and quantization	2	2,3	
	01 Mar.	Photoelectric effect and Compton effect	2	4,5	
4	4 Mar.	Particle-wave complementary	2	6,7	Photoelectric effect
	6	Atomic nature of atoms	3	1,2	
	8	Review	3	-	
5	11 Mar.	Spectral series	3	2,3	Atomic Constants
	13	The Bohr atom	3	3,4	
	15	The Correspondence principle	3	4,5	
6	18 Mar.	<i>Davison-Germer experiment</i>	4	1,2	No Lab.
	20	Matter waves	4	3,4	
	22	Heisenberg's uncertainty principle	4	5,6	
7	25 Mar.	Wave particle duality.	4	7,8	Frank-Hertz
	27	Free particle wave-function	5	1	
	29	The Schrodinger's equation	5	2,3	
Wednesday – 29 Mar. 2006 - Last day for dropping courses with grade of "W" Mid Term Break					
8	03 Apr.	Particle in a box	5	3,4	Electron diffraction
	05	Finite square well	5	5	
9	06 Apr.	The quantum oscillator	5	6	CAL lab.
	08	Observables and operators.	5	7,8	
	10	Review	-	-	
10	13 Apr.	<i>The square barrier</i>	6	1	A visit to the surface science lab at Phys. Dept.
	15	Tunneling applications, STM	6	2	
	17	Particle in a three-dimensional box	7	1	
Wednesday – 15 Apr. 2006 - Last day for withdrawal from all courses with grade of "W"					
11	20 Apr.	Angular Momentum	7	2,3	No Lab
	22	Space quantization	7	3,4	
	24	Hydrogen-like atoms, selection rules.	7	4,5	
12	27 Apr.	Orbital magnetism, electron spin	8	1,2	Zeeman effect
	29	Spin-orbit interaction	8	2,3	
	01 May	<i>The exclusion principle.</i>	8	4,5	
13	04 May	The periodic table, X-ray spectra	8	6	Super-conductivity
	06	Molecular Bonding	10	-	
	08	Bonding in solids	11	-	
14	11 May	The Maxwell-Boltzmann distribution	9	1,2	Radio-activity
	13	Quantum Statistics	9	2,3	
	15	Nuclear Structure	12	1,2	
15	18 May	Particle Physics and cosmology	13		
	20	Lasers	-	-	
	22	Nuclear Reactors	-	-	
	27	Nano-science			

Dr. A. AlSunaidi
Physics 212-Instructor