

Course Syllabus

Course Information

<i>Course Number/Section</i>	PHYS 2303- 001
<i>Course Title</i>	Contemporary Physics
<i>Term</i>	Spring 2007
<i>Days & Times</i>	TR 2:30-3:45
<i>Classroom</i>	FN 2.106

Professor Contact Information

<i>Professor</i>	Dr. John H. Hoffman
<i>Office Phone</i>	972-883-2846
<i>Email Address</i>	jhoffman@utdallas.edu
<i>Office Location</i>	Founders 2.322
<i>Office Hours</i>	Tuesdays 10 – 11 AM, Wednesdays 3 to 4 PM By appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions

No prerequisites. Introductory course. Some knowledge of algebra, geometry and trigonometry is assumed.

Course Description

Introductory course in physics including optics and concepts of nature developed in the 20th century. Topics include the nature of light, fundamentals of geometric optics, interference, diffraction, introduction to special relativity, atomic particles, atomic structure, emission and absorption spectra, the nucleus, nuclear reactions, radioactivity, fundamental particles, leptons and quarks. Demonstrations of physical phenomena will be a fundamental part of the course.

Student Learning Objectives/Outcomes

Upon completing this class, students will:

- Be able to explain image formation, location and magnification by spherical mirrors and lenses.
- Be able to explain the theory of interference as applied in single and double slit interference patterns and single and multiple slit diffraction patterns, diffraction gratings, and thin films.
- Be able to discuss time dilation and length contraction, Lorentz transformations, and spacetime coordinates.
- Be able to describe the properties of atomic particles, the structure of the atom, emission and absorption spectra, and the nucleus.
- Be able to discuss nuclear reactions, radioactivity and its applications.

Required Textbooks and Materials

Required Texts

University Physics, Young and Freedman, 11th Edition, Volumes 2, and 3

Publisher; Pearson-Addison Wesley

Reading Assignments & Academic Calendar

Topics, Reading Assignments, Due Dates, Exam Dates

<u>Topic</u>	<u>Study Assignment*</u> (Chapter in Text)	<u>Dates Subjects Presented in Class*</u>	<u>Exam Date</u>
Optics-	33	Jan. 8 – Jan. 16	
Nature of light	33.1		
Reflection and refraction	33.2,		
Total internal reflection	33.3		
Dispersion	33.4		
Polarization - linear	33.5		
Scattering of light	33.6		
Geometrical optics	34	Jan.18 – Jan. 25	
Reflection -plane surface	34.1		
Reflection -spherical surface	34.2		
Refraction –spherical surface	34.3		
Images – thin lenses	34.4		
Optical instruments	34.5 – 34.8		
EXAM 1			Jan. 30
Interference	35	Feb. 1 – Feb. 8	
Coherent sources	35.1		
Two-slit interference	35.2		
Thin films	35.4		
Diffraction	36	Feb. 8 – Feb. 20	
Fraunhofer Diffraction	36.1		
Single slit	36.2		
Multiple slits	36.4		
Diffraction grating	36.5		
EXAM 2			Feb. 22
Relativity	37	Feb. 20 – Mar. 1	
Invariance of physical laws	37.1		
Relativity of simultaneity	37.2		
Relativity of time intervals	37.3		
Relativity of length	37.4		
The Lorentz Transformation	37.5		
The Doppler Effect	37.6		
The atom	38	Mar. 13 – Mar. 20	
Emission and absorption of light	38.1		
Photoelectric effect	38.2		
Atomic line spectra and Energy Levels	38.3		
Nuclear atom – Rutherford experiment	38.4		
Bohr model	38.5		
The laser	38.6		
Continuous spectra	38.8		
The Wave Nature of Particles			
De Broglie Waves	39.1	Mar. 22 – Mar. 27	
Electron Diffraction	39.2		
Probability and Uncertainty	39.3		

EXAM 3			Mar. 29.
Nuclear Physics	43	Apr. 3 – Apr. 12	
Properties of nuclei	43.1		
Nuclear binding and nuclear structure	43.2		
Nuclear stability and Radioactivity	43.3		
Activities and half lives	43.4		
Nuclear reactions	43.6		
Nuclear fission	43.7		
Nuclear fusion	43.8		
Particle Physics	44	Apr. 12 – Apr. 19	
Fundamental particles	44.1		
Other sections as time permits			
FINAL EXAM			April 24

* Reading assignments and due dates may be updated during the semester.

Problem Assignments

Assignments will be selected from those at the end of each chapter from the sections marked Discussion Questions and Exercises.

Homework assignments will be placed in WebCT6 (webct6.utdallas.edu) in the section devoted to this class, PHYS 2303, Section 001. Go to the section marked “Assignments”. Each assignment will be identified by the date it first appears, which should be the date we cover that material in class. Solutions to problems will be available 3 days after the assignment opens, also under Assignments. This gives you a chance to work out the problems before seeing the solution (highly recommended. – you will not have the solutions to refer to during quizzes and exams, so it is best to try to figure out the solutions before they are available in WebCT).

Homework assignments will not be handed in.

You are responsible for doing the home work to the extent that you understand the materials and are prepared to answer similar questions and work similar problems in quizzes and exams.

Grading Policy

There will be 3 major exams plus the final exam which may be comprehensive.

Each major exam will count 20% of the final grade.

The final exam will count 25% of the final grade.

The lowest major exam grade will be dropped provided ALL major exams are taken. The final exam must be taken.

If one or more major exams are not taken those exams will receive a grade of 0 that will be averaged with the exams that are taken.

Each exam will be given a numerical score.

A scale of equivalent letter grades will be made available at the time each exam is returned and discussed in class. The scale may not be the same for each exam. **DO NOT AVERAGE THE LETTER GRADES.** These are only an indication of how well you are doing.

Randomly given quizzes in class will count 15% of the final grade.

The numerical scores will be averaged to obtain the final numerical score. Then final grades will be assigned.

Final grading will be on a curve so that the average class grade will equate to approximately a B-. Improper department in class, if serious enough, could result in the reduction of your final grade.

Course Policies

Make-up exams

There will be no make up exams, except for prearranged serious interferences that you can document PRIOR to the date of the exam. email Dr. Hoffman your request for missing the exam and the reason BEFORE the exam is given.

Quizzes can NOT be made up. However, the three lowest grades on quizzes will be dropped. You can expect from 12 to 15 quizzes throughout the semester.

Extra Credit

None

Late Work

There are no requirements for handing in homework.

Special Assignments

None

Class Attendance

Highly encouraged. Quizzes may be given any time in any class period and may NOT be made up for any reason. They count 15% of the grade.

Classroom Citizenship

For the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regards to all class interactions.

Serious disruption of class may be grounds for reduction in your grade.

Cell phone and beepers are to be turned off during class time. NO CELL PHONE CALLS, EITHER IN OR OUT, ARE ALLOWED DURING CLASS. If your cell phone or beeper disturbs the class, it will be confiscated for the remainder of the class period. Cell phone usage will be considered disruption of the class.

Be on time for class. Do not leave early. Do not rustle papers in preparation to leave before class is over. These activities will be considered disruption of the class.

Field Trip Policies / Off-Campus Instruction and Course Activities

None

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and

regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter

called “the respondent”). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent’s School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean’s decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the Dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester’s end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student’s responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of

the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

Off-Campus Instruction and Course Activities

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address given below. Additional information is available from the office of the school dean. (http://www.utdallas.edu/Business Affairs/Travel_Risk_Activities.htm)

These descriptions and timelines are subject to change at the discretion of the Professor.