

Course Syllabus

Course Information

Course Number/Section PHYS 2303- 001
Course Title Contemporary Physics

Term Fall 07
Days & Times TR 10:00-11:15
Room FN 2.106

Professor Contact Information

Professor Dr. John H. Hoffman
Office Phone 972-883-2846
Email Address jhoffman@utdallas.edu
Office Location Founders 2.322
Office Hours Tuesdays 2:00 to 3:00 PM, Wednesdays 3:30 to 4:30 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 or 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.

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 diffraction and interference as applied in single, double and multiple slit interference and 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

Suggested Course Materials

Suggested Readings/Texts

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 | Aug. 16 – Aug. 23 | |
| 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 | Aug. 28 – Sept. 4 | |
| 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 | | | Sept. 6 |
| Interference | 35 | Sept. 11 – Sept. 13 | |
| Coherent sources | 35.1 | | |
| Two-slit interference | 35.2 | | |
| Thin films | 35.4 | | |
| Diffraction | 36 | Sept. 18 – Sept. 25 | |
| Fraunhofer Diffraction | 36.1 | | |
| Single slit | 36.2 | | |
| Multiple slits | 36.4 | | |
| Diffraction grating | 36.5 | | |
| Relativity | 37 | Sept. 27 – Oct. 2 | |
| 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 | | |
| EXAM 2 | | | Oct. 4 |
| The atom | 38 | Oct. 9 – Oct. 16 | |
| 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 | | Oct. 18 – Oct. 23 | |

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|---------------------------------------|-----------------|-------------------|---------|
| De Broglie Waves | 39.1 | | |
| Electron Diffraction | 39.2 | | |
| Probability and Uncertainty | 39.3 | | |
| EXAM 3 | | | Oct. 30 |
| Nuclear Physics | 43 | Oct. 25 – Nov. 13 | |
| 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 | Nov. 15 – Nov. 20 | |
| Fundamental particles | 44.1 | | |
| Other sections as time permits | | | |
| FINAL EXAM | 8:00 – 10:45 AM | Thursday | Nov. 29 |

* 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. 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 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 the 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 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.

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. These may not be the same for each exam.

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

Final grading will be on a curve so that the average class grade will equate to approximately a B-.

Improper deportment in class, if serious enough, could result in the reduction of your final grade.

Course & Instructor 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 10 to 12 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.

Disruption of class will 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.

Technical Support

If you experience any problems with your UTD account you may send an email to: assist@utdallas.edu or call the UTD Computer Helpdesk at 972-883-2911.

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 printed 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, Series 50000, Board of Regents, The University of Texas System*, 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) and online at <http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html>

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, any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

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.

Copyright Notice

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials, including music and software. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owner's rights and such infringement is subject to appropriate disciplinary action as well as criminal penalties provided by federal law. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. As a UT Dallas student, you are required to follow the institution's copyright policy (Policy Memorandum 84-I.3-46). For more information about the fair use exemption, see <http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm>

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)
disabilityservice@utdallas.edu

If you anticipate issues related to the format or requirements of this course, please meet with the Coordinator of Disability Services. The Coordinator is available to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Services to notify them of your eligibility for reasonable accommodations. Disability Services can then plan how best to coordinate your accommodations.

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.

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