



Course	Special Topics: Force and Motion PHYS 5V49
Professor	Mary L. Urquhart
Term	Fall 2006
Meetings	Tuesday evenings (5:30-8:15) in FN 2.306. Some course work will be online.

Professor's Contact Information

Office Phone	972-883-2499
Other Phone	972-883-2496 (main office)
Office Location	FN 3.308F
Email Address	urquhart@utdallas.edu
Office Hours	Mondays 1-2, Tuesdays 3:30-4:30 and by appointment
Other Information	Assignments should be submitted through WebCT, or on paper when necessary. Other correspondence with the instructor should be by regular email at the address given above.

General Course Information

Pre-requisites, Co-requisites, & other restrictions	Significant physics experience is required as a prerequisite. Course assumes students have an interest, and preferable experience, in pre-college teaching.
Course Description	This course is designed for students who have substantial physics knowledge but who wish to learn strategies for sharing this understanding with others in the context of teaching (pedagogical content knowledge) Students will work closely with pre-college teachers learning or deepening their understanding of classical mechanics concepts in an integrated lab/lecture setting. Much of the class will be done workshop style, with hands-on materials available in local districts or demonstrations and experiments that can be done with inexpensive or common materials, and students will be expected to work with the teachers in small group experiences. Students will also be expected to think critically about how topics discussed in the course can relate to instruction in pre-college and undergraduate classrooms. This course is the first in a series of three, and will focus on classical mechanics (motion, force, energy, and momentum) concepts which will be explored in the context of the everyday world. Behavior of systems of particles (fluids, waves, sound, temperature and heat, light, and physical chemistry concepts will be more fully integrated into in the second and third parts of this three-course sequence.
Learning Outcomes	At the completion of this course, the successful student will: <ul style="list-style-type: none">• Demonstrate an ability to apply a deep understanding of the physical science <i>concepts</i> related to motion of objects in the everyday world, including force, energy, and momentum to physics instruction at an 80% level as determined through written responses post-instructional journals and peer teaching.• Show an ability to utilize and critically evaluate instructional

approaches and hands-on activities (some of which will use instructional equipment available at the university or in local school districts including probeware and CPO) through instructor-observed performance in small group work and class discussions, written activity reports, and written journals to an 80% level.

- Demonstrate an understanding of common student misconceptions related to force and motion and demonstrate strategies for addressing these misconceptions in an instructional context through responses in journals and discussions, and serving as a content expert in small group interactions to within 80% of the rubric.
- Demonstrate an awareness of the physics backgrounds that can be expected of incoming undergraduate students as reflected in the National Science Education Standards and the Texas Essential Knowledge and Skills (TEKS) through matching appropriate all appropriate physical science TEKS/National Standards to assignments dealing with instruction at a specific grade level and through vertical alignment exercises.
- Demonstrate an ability to assist others in developing an understanding of physics in the everyday world through discussions and through peer teaching to within 80% of the rubric.
- Demonstrate ability to apply course content and findings from the physics education research community through journals and a final paper, each meeting 80% of the rubric.
- Individual papers in the Physics Education Research literature as assigned by the instructor.
- A scientific calculator will be useful in most, if not all class meetings. Please bring yours to each class session. (Also be prepared to assist the teachers in the proper use of their own calculators.)
- Access to a computer and the Internet outside of class.

**Required Texts &
Materials**

Two texts are recommended for the teachers, who teach grades 4-8, or high school in a field other than physics.

**Suggested Texts,
Readings, &
Materials**

1. *Conceptual Physics* (Paul Hewitt) is a high school conceptually-based physics text. A college text is also available
2. *Physics* (James Walker, 2nd Edition) is an excellent algebra-based physics

Assignments & Academic Calendar

[Topics, Reading Assignments, Due Dates, Exam Dates]

August 27	1. Orientation and Program Overview Pre-tests and Surveys Introduction to course equipment
August 29	2. Tools of the Trade: Mathematics and Physics Begin Motion in One-Dimension
Sept. 5	3. Motion in One vs. Two Dimensions
Sept. 12	4. Newton's Laws of Motion
Sept. 19	5. Gravity (part one)
Sept. 26	6. Forces and Motion in Two and Three Dimensions
Oct 3	7. Conservation of Energy
Oct 10	8. Force, Work, and Energy Mechanical Advantage and Simple Machines
Oct 17	9. Linear Momentum
Oct 18	10. Introduction to Angular Motion
Oct 24	11. Mechanical Advantage in Rotating Simple Machines
Oct 31	Online Class Only
Nov 7	12. Angular Momentum and Energy
Nov 14	13. Gravity (part 2)
Nov 21	14. Periodic Motion (Portfolios Due)
Nov 28	Final Exam Period
Exams	Weekly post-journals will serve as mini-exams. Our final exam period will be used for post-tests and student lesson presentations.

Course Policies

Grading (credit) Criteria	<p>Pre-Journals, Class Discussions, and Group Work (20%): Much of the class will be done in the style of an educator workshop. You will be expected to be an active participant in all activities and in discussions and contribute to the learning environment for your classmates. The quality of your contributions and the evidence of deep thinking and development of your ability to assist others in developing understanding will be part of this grade.</p> <p>Post-Journals (30%): Post-journals should be considered mini-exams and will be used to critically analyze teaching strategies related to the course content. They may be given in class or through WebCT.</p> <p>Peer Teaching (20%) You will be expected to serve as an assistant instructor in this course, by doing demonstrations, assisting with small group work in the capacity of a content expert, and</p> <p>Final Paper (30%): Throughout the course you will be creating a portfolio of resources that can be used in future teaching. Your portfolio will be required to include an original lesson plan using the 5 E model. You will have the option of either peer teaching the lesson during the semester or describing the lesson to the class in an oral presentation at the end of the course.</p>
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Make-up Exams	By arrangement with the professor
Extra Credit	NA
Late Work	Accepted only at the discretion of the professor
Special Assignments	If you need special arrangements, talk with the instructor as soon as possible.
Class Attendance	Attendance of all courses and field trips is required! You <i>must</i> get all absences excused by the professor, in advance if possible.
Classroom Citizenship	This is a graduate class and students are expected to behave accordingly. Your presence should enhance rather than detract from the learning of your classmates. Your classroom citizenship is part of your participation grade.
Field Trip Policies	Both field trips are day or evening trips, and will require you to arrange your own transportation.
Student Conduct and Discipline	<p>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, <i>A to Z Guide</i>, which is provided to all registered students each academic year.</p> <p>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 <i>Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3</i>, and in Title V, Rules on Student Services and Activities of the university's <i>Handbook of Operating Procedures</i>. 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).</p> <p>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.</p>
Academic Integrity	<p>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.</p> <p>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.</p> <p>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.</p>
Email Use	The University of Texas at Dallas recognizes the value and efficiency of

	<p>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.</p>
Withdrawal from Class	<p>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.</p>
Student Grievance Procedures	<p>Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's <i>Handbook of Operating Procedures</i>.</p> <p>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.</p> <p>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.</p>
Incomplete Grades	<p>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.</p>
Disability Services	<p>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.</p> <p>The contact information for the Office of Disability Services is: The University of Texas at Dallas, SU 22</p>

	<p>PO Box 830688 Richardson, Texas 75083-0688 (972) 883-2098 (voice or TTY)</p> <p>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.</p> <p>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.</p>
<p>Religious Holy Days</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>Off-Campus Instruction and Course Activities</p>	<p>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 http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean.</p>

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