Course Syllabus

Last update: 01/17/2013

Course Information:
Physics 2421-001 Honors Physics I – Mechanics/Heat Spring 2013
Tuesday, Wednesday, and Thursday 11:30-12:45 PM in SLC 1.202A.
Midterm exams on Monday, 7:00-9:45 PM in GC 1.208B

Professor Contact Information
Prof. J. M. Izen Office: ECSN 2.512 (972) 883-2598
Office hours: Tues 12:45–1:45 PM in ECSN 2.512, by appointment, or just "drop in". Afternoons are usually better.
Email: joe@utdallas.edu. I do not read eLearning email, only standard Internet email.

TA: Kanwal Ahmed Email: kja102020@utdallas.edu (Please send Kanwal an email for her phone number.)
Office Hours: Monday 11:00–12:45 PM in SLC 1.202B or by appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions
Prerequisite: B+ or better in MATH 2413 (Differential Calculus) or MATH 2417 (Calculus I).
Corequisite: MATH 2414 (Integral Calculus) or MATH 2418 (Calculus II) and PHYS 2125 (Physics Laboratory I). A thorough mastery of graph-rereading (K-12 level), pre-calculus and calculus prerequisites is expected. Familiarity with the Ideal Gas Law, heat capacity and phase change at the level of high school chemistry is assumed.

Course Description
This class is a more rigorous version of PHYS 2325 with additional topics in analysis of accelerometer measurements and possibly thermal physics. Derivations often handle more general cases and rely more heavily on calculus concepts and use of vectors. More challenging problems and applications. Two lectures plus a required recitation session per week.

Topics: Calculus-based physics study of space and time, kinematics, forces, energy and momentum, conservation laws, rotational motion, torques, harmonic oscillation, fluids, and if time permits, kinetic theory of heat and thermodynamics.

Student Learning Objectives/Outcomes
Students will master the derivation and application of the following physical concepts:

- Use of vectors, vector addition, vector subtraction, dot and cross products
- Linear motion: displacement, velocity, acceleration
- The nature of forces
- Newton's Laws of Linear Motion
- Energy and Potential
- Momentum and Collisions
- Gravitation, Orbits
- Center of mass, motion of rigid bodies
- Angular motion: angle, angular velocity, angular acceleration, angular momentum, torque.
- Static equilibrium
- Harmonic motion
- Wave motion
- Kinetic theory of heat for an ideal gas (time permitting)

Required Textbooks and Materials
Online HW: Mastering Physics for Young/Freedman, 13th ed., Course ID: PHYS2421IZEN2013
http://www.masteringphysics.com/ support@masteringphysics.com

Online MasteringPhysics HW is required, and can be purchased as a stand-alone license or bundled with . You should have ***some*** text. A good text is: University Physics, Volume 1, 13th edition (paperback), by Young & Freedman or the hardcover version that is the equivalent of paperback Volumes 1, 2, and 3. The content of previous editions of this series, and other calculus-based series for scientists and engineers (Serway, Tipler, Halliday and Resnick…) are **essentially equivalent**. I will refer to chapters in University Physics, 13th edition, but if you have an older edition or a different book from an older sibling or a roommate, I suggest using it to reduce the cost of your college education. I am appending an opinion piece that I wrote for the UTD Mercury. I encourage you to read it before purchasing a text.

Homework Assignments & Online Course Resources

Online HW may be supplemented with "old-fashioned" problems and accelerator/altimeter vest assignments to be submitted via email to your TA in pdf format. Supplemental problems will be assigned via the course Yahoo®!Group. Students should request a free Yahoo ID from www.yahoo.com if they don't already have one. Please join the group by sending an email to phys2421–subscribe@yahoogroups.com and then follow the instructions in the return email. To unsubscribe your email, use phys2421–unsubscribe@yahoogroups.com. You may choose to read and send postings by email or via the WWW page http://groups.yahoo.com/group/phys2421/. It is your responsibility to register for online HW, to join the Yahoo®!Group, and to check the Yahoo and Mastering Physics sites regularly for HW assignments. HW will typically be assigned on Thursday evening or Friday. Students should be prepared to present their solutions in class on Tuesdays, to complete online HW by 12:01 AM Wednesday mornings, and to submit a ***scan*** of traditional paper assignments by email. You may use a CV or library scanner if you don't have your own. Deviations from this schedule will be announced in online Mastering Physics assignments and/or via a Yahoo®!Group posting. You may ask any of your classmates for homework hints if you are stuck. In fact, you are ***encouraged to do so***, but you may not directly copy someone else's solution, or let someone else complete your online homework. It's OK to ask more advanced students for help, but after you've received help, I expect you to start with a clean sheet and work the problem yourself. Late HW will only be accepted by prior arrangement with the instructor. Classroom presentation of problems will count toward your HW grade. If you are selected (at random) to present a problem and are absent without excuse, you will receive a "zero".

The Yahoo®!Group is also intended to be a discussion/question/answer forum for the class. You are expected to keep posts on topic, following commonly accepted practices of netiquette. Abusive posts will be referred to the Dean of Students and/or Judicial Affairs for disciplinary action.

Attendance is required and expected. Questions based on Classroom discussions and demonstrations will appear on tests. Absence excuses are entirely at instructor's discretion. Expect to provide documentation for medical problems, court appearances, car accidents, and deaths in the family if you wish to have an excuse considered. If you have a conflict with another official university activity, you must let Prof. Izen know at least a week ahead of time. Unexcused absences may result in a grade reduction at the instructor's discretion.

Note taking is an important part of learning. Students are required to scan and email a copy of their class notes for the previous week's lectures by 11 AM Tuesday for grading. Your class notes should include definitions, derivations presented in class plus your annotations describing explanations for key steps, example problems, descriptions of demonstrations and the principles involved. Notes should be legible. They should be submitted electronically by email in pdf format to the TA. Grading will be Pass/Fail with one chance to redo an unsatisfactory set of class notes. A transcription of what is written on the whiteboard by itself is not sufficient.

A library electronic reserve password will be distributed in class. Online, streamed recordings of lectures (but not discussion sessions) will be provided to students on a best effort basis with no guarantee of availability. Recordings are the intellectual property of the instructor and are copyrighted. Capturing and/or redistributing videos on physical media, electronically, or in any other form will likely result in both disciplinary and civil legal proceedings.

Texting, cell phone usage, and reading or sending emails during class and during exams is forbidden without instructor approval. Use of online resources is permitted exclusively for online HW/text book access or for delving further into a lecture topic that has been covered during the past five minutes. Tablet PC's and laptops may be used for note-taking so long as students abide by all course policies. This privilege may be withdrawn for individual students or the entire class, completely at the instructor's discretion.

Grading Policy

Individual online HW problems are usually given equal weight and are graded on a 10 point scale.
Accelerometer/Altimeter vest homework and Six Flags data-taking and analysis can be carried out individually or within your "vest" team; however the assignments/reports must be written independently. Copying the HW of a classmate is an academic integrity violation that will result in penalties for all involved parties.

Online/written HW will count for 10% of the course grade.
In-class presentation of HW problems will count for 5% of the course grade.
Accelerometer/Altimeter vest HW will count for 5% of the course grade.
Class notes will count for 10% of the course grade.
Your Six Flags report will count for 20% of the course grade.

There will be four exams; the last exam will be given during Finals period. Your two best exams will each count for 15%. Your two poorest exams will each count for 10%. No test scores will be dropped. Quizzes are not anticipated, but may be introduced into the grading scheme at the instructor's discretion.

Course & Instructor Policies

The availability of a make-up test for a missed exam is entirely at the instructor's discretion. Expect to provide documentation for medical problems, court appearances, car accidents, and deaths in the family if you wish to have an excuse considered. If you have a conflict with another official university activity, you must let me know at least a week ahead of time.

Exams and exam solutions that are provided to the class are strictly for personal use. They do not become the property of the student, and they may not be distributed or shared outside the class.

Seeking help from an instructor homework solution manual or a homework solution posted on the Internet is not allowed.

Cheating on tests and other academic honesty violations will be prosecuted per the UTD Academic Dishonesty policy. My recommended penalty to the UTD Judicial Officer for any violation is likely to be a course grade of F, even for minor infractions. Possession of materials in violation of a copyright will be reported to publishers as permissible by law.

Field Trip Policies
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 http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.

A required field trip to an amusement park outside of class hours is planned. An alternative assignment or schedule may be substituted for students who are unable to participate due to health, disability, religious, or schedule reasons. Prof. Izen is to be alerted 4 weeks in advance if an alternative is required. Students should not go on any ride at Six Flags that would cause them discomfort, nor should a student participate in any activity that would endanger their health.

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 demonstrates 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).

Please consult Course and Instructor Policies for more specific information pertaining to this course. It is a student's responsibility to seek guidance if a policy or its application to a specific situation is not clear.

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 deal 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.

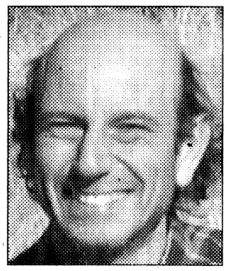
(Tentative) Course Calendar for 2013

Class	Day	Date	Chapter	Topics
1	Tu 11:30	1/15	1	Introduction, Units, Vectors
2	W 11:30	1/16	2	Velocity, Acceleration, 1-D Motion
3	Th 11:30	1/17	3	2-D and 3-D Motion, Constant Acceleration
4	Tu 11:30	1/22	1-3	Discussion Session
5	W 11:30	1/23	4	Newton's Laws
6	Th 11:30	1/24	4	Newton's Laws
7	Tu 11:30	1/29	4	Discussion Session
8	W 11:30	1/30	5	Applications of Newton's Laws
9	Th 11:30	1/31	5	Applications of Newton's Laws
10	Tu 11:30	2/5	5	Discussion Session
11	W 11:30	2/6	6	Work
12	Th 11:30	2/7	6,7	Work, Potential Energy
Exam	M 7:00 PM	2/11	1 - 5	Exam I: (Up to Applications of Newton's Laws)
13	Tu 11:30	2/12	6,7	Discussion Session
14	W 11:30	2/13	7	Potential Energy
15	Th 11:30	2/14	7	Potential Energy
16	Tu 11:30	2/19		Return Exam I, Discussion Session
17	W 11:30	2/20	13	Gravity
18	Th 11:30	2/21	13	Gravity
19	Tu 11:30	2/26	7, 13	Discussion Session
20	W 11:30	2/27	8	Momentum, Impulse
21	Th 11:30	2/28	8	Collisions in 1-D
Exam	M 7:00 PM	3/4	6 - 7, 13	Exam II: (Work, Potential, Gravity)
22	Tu 11:30	3/5	13, 8	Discussion Session
23	W 11:30	3/6	8	Collisions in 2-D
24	Th 11:30	3/7	9	Angular Motion (Spring Break: 3/11 – 3/15)
25	Tu 11:30	3/19	8,9	Return Exam II, Discussion Session
26	W 11:30	3/20	9	Moment of Inertia
27	Th 11:30	3/21	10	Torque, Rolling
28	Tu 11:30	3/26	9,10	Discussion Session
29	W 11:30	3/27	10	Angular Momentum
30	Th 11:30	3/28	10	Static Equilibrium
31	Tu 11:30	4/2	10	Discussion Session, Six Flags Planning
32	W 11:30	4/3	11, 14	Static Equilibrium, Simple Harmonic Motion
33	Th 11:30	4/4	14	Simple Harmonic Motion
Trip	Sat/Sun	4/6		Six Flags Trip: 4/6. Rain Date: 4/7
34	Tu 11:30	4/9	11,14	Discussion Session
35	W 11:30	4/10	15	Waves
36	Th 11:30	4/11	15	Waves
Exam		4/15	8-11	Exam III (Collisions, Angular Motion, Angular Momentum, Static Equilibrium)
37	Tu 11:30	4/16	15	Discussion Session
38	W 11:30	4/17	12	Pressure
39	Th 11:30	4/18	12	Buoyancy
40	Tu 11:30	4/23	12	Return Exam III, Discussion Session
41	Tu 11:30	4/24	12	Fluid Flow, Bernouilli's Equation
42	Th 11:30	4/25	18	Kinetic Theory of Ideal Gas
43	Tu 11:30	4/31	12, 18	Discussion Session
44	W 11:30	5/1	19	Thermodynamics, PV Diagrams and/or Six Flags analysis discussion
45	Th 11:30	5/2	20	Engines and Refrigerators and/or Six Flags analysis discussion
Exam	M 8:00 PM	5/13	14,15, 12, 18-20	Final Exam (IV) (Harmonic Motion, Waves, Pressure, Buoyancy, Flow, Thermodynamics)

Physics profs take on expensive texts, but students must shop smart

Joseph Izen
Contributor | mercury@utd.edu

Editor's note: Joseph M. Izen is a professor of physics and chair of the Physics Undergraduate Curriculum Committee. He is writing in response to UTD Mercury *managing editor Eric Nicholson's Feb. 9 opinion piece, "Professors can prevent another textbook fleecing."*



Nicholson's opinion piece on textbook pricing resonates strongly in the Physics Department.

He correctly describes college students as a captive market for publishers, but he may be unaware of a concerted effort on the part of UTD's physics professors to push back on our students' behalf.

About five years ago, the Physics Undergraduate Curriculum Committee did a complete review of the introductory calculus-based texts used by science and engineering students, and the online homework systems that accompany the texts.

Our committee felt that all the texts were quality offerings, and we unanimously agreed we could easily teach using any of the series we examined. Consequently, cost to students, including the cost of a stand-alone online homework license without a textbook purchase, was the deciding factor in our adoption decision.

As we met with the publisher sales representatives, part of what Nicholson describes as the publishers' "huge marketing machine," my colleagues and I realized that the reason publishers use a three-year update cycle for new editions was to defeat the after-market for used text books.

We were blunt in voicing our displeasure with the frequency of new editions, but we went further and decided to take matters into our own hands. We agreed that we would make our students aware of the option to use older editions of texts that have dramatically lower prices on the used-text market.

For example, my Physics 2421 syllabus lists the recommended text, which is available in the UTD Bookstore, but also tells students that previous editions of the book and other calculus-based texts are essentially equivalent. I urge them to consider using an older edition or a different book if they already have access to it.

There are course-to-course variations on a theme, but all professors teaching in the introductory sequence (Physics 2325, Physics 2326 and the elective honors version of these courses) mention the possibility of using older editions or different texts.

Every spring, I replant this seed in the hope that this will be the year no students purchase a brand new text. Each year, students flock like lemmings to the campus bookstore or online retailers and purchase a brand new book.

If students are fortunate enough to have parents who foot the bill for texts, they make their own parents the captive market! It doesn't have to be this way.

With the hundreds of UTD students that pass through introductory courses each year, it surprises me that some enterprising UTD student or student organization hasn't set up a direct mechanism for students to sell or exchange texts, student to student. It shouldn't take a professor to point out the potential of the Internet to today's wired student body.

I would be remiss if I didn't comment on online homework systems, as they are a part of the product offered by publishers. Many of my colleagues and I were uncomfortable with outsourcing this university function at first.

Acceptance of online homework certainly caught me by surprise. Students embraced the idea of online homework faster than the faculty.

There is no denying the cost advantage over manually graded homework and the improved learning outcome from students actually doing their homework. The jury is still out on whether outsourcing online homework to textbook publishers or building a homegrown online homework system such as the Quest Learning and Assessment System used at UT Austin is the way to go.

Publishers are expending a lot of resources to develop and support online homework, and they are continually improving both the content and the user interface. Competition is clearly driving developments, and the physics faculty are watching.

Meanwhile, students are not without options. The MasteringPhysics online homework license that comes bundled with the University Physics text can be purchased individually and provides access to the MasteringPhysics homework server for two years. Most students require less than one year to complete the two-course sequence. This sounds like another after-market opportunity to me.

Like physics, chemistry and calculus are mature fields with few changes that affect introductory material. I'm sure this is not an exhaustive list of subjects where older introductory texts are as good as the latest editions.

With the support of professors, students can change the marketing equation for the lucrative introductory text industry, but the physics faculty haven't been able to beat this drum loud enough by ourselves.

Or perhaps we just did...

Course Syllabus *Page 6*