UT DALLAS | School of Natural Sciences and Mathematics

PHYS 2325: MECHANICS

Course Syllabus updated on November 21st - 2024

COURSE TITLE/SECTION: PHYS2325.001 – Mechanics (Fall 2024)

TIME: Tuesday & Thursday 11:30-12:45 pm LOCATION: SCI 1.220

Instruction Mode: Traditional Classroom (In Person).

Instruction is delivered as in person traditional classroom settings in the classroom Science Building (SCI) room 1.220. The instructor may record meetings of this course if needed. Any recordings will be available to all students registered for this class through the blackboard as they are intended to supplement the classroom experience. The lecture (if recorded) could be provided for those students who could not make it to an in-person class. The professor will determine to continue or terminate such practice as course goes along for the benefit of learning outcome for the students.
Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student Access Ability has approved the student to record the instruction, students are expressly prohibited from recording any part of this course.

The descriptions and timelines on this syllabus are subject to change at the discretion of the Professor.

Course Information

PHYS 2325
Mechanics

Term	Fall 2024
Days & Times	Tuesday & Thursday 11:30AM - 12:45PM
Room	**In person** SCI 1.220

Instructor Contact Information

Instructor	Dr. Alexandre Goncalves Pinheiro
E-mail	agp240000@utdallas.edu

Folder link (QR) with the materials of this course:
https://cometmail-my.sharepoint.com/:f:/g/personal/agp240000_utdallas_edu/Em1kzL7jJ0JGvTK9il8qNfUBtlChDUO-8R3lmv1BIL_12w?e=BMD0Fm

University supported Tutoring:

Through the Student Success Center http://studentsuccess.utdallas.edu/

Teaching Assistants:

Primary TA:
Muhammad Khalid
Office: SCI 2.179 Muhammad.Khalid@UTDallas.edu

TA Office Hours: Tuesday & Thursday 2-3 pm & Friday 4-5 pm at SCI2.179. Other than these three time slots, the TA has generously offered more time if needed for the office hours. Any student if you need help, we can schedule either online office hours via Teams, in-person in my office, or any public space at SCI building. Please email the TA at Muhammad.Khalid@UTDallas.edu for questions or making appointment.

Supplemental Session (SI) information:

Supplemental Instruction (SI) is offered for this course. SI sessions are collaborative group study sessions, scheduled two times per week. Sessions are facilitated by an SI Leader, who has taken the course and received a high final grade. Attendance is voluntary. For information about the days, times, and locations for SI sessions, refer to http://www.utdallas.edu/studentsuccess/help-with-courses/supplemental-instruction/.

Supplemental Session (SI)				
PHYS 2325 (001)	Instructor	SI leader	Contact information	
	Bing Lv	Mark Baskharoun	Mark.Baskharoun@UTDallas.edu	

SI Session Details:

Days: Tuesdays and Thursdays
Times: T: 2:30-3:45 PM
Th: 4:00-5:15 PM
Location: MC. 3.606A, Third floor of library
ATTENTION: No SI sessions scheduled for the first week, and **the first one will be next Tuesday Aug. 27th**.

Peer Tutoring Resources: Tutoring is also available through the student success center, 3rd floor McDermott Library, MC 3.606. It allows both drop-in Tutoring, and 1-on-1 Appointments. Specifically, tutoring for PHYS 2325 is available:

- Monday-Thursday, 10am-8pm
- Friday-Saturday, 10am-5pm

Details regarding Peer Tutoring is described below in the Peer Tutoring section.

I. Course: Physics 2325 - Mechanics

A. Description: 3 Credit Hours. Calculus based. Primarily for science and engineering majors. Two lectures per week. Basic physics including a study of space and time, kinematics, forces, energy and momentum, conservation laws, rotational motion, torques, harmonic oscillation, and waves. Two lectures per week.

B. Course Pre-requisites, Co-requisites, and/or Other Restrictions: Prerequisite: MATH 2413 or MATH 2417. Co-requisites: MATH 2414 or MATH 2419 and PHYS 2125.

II. Course Objectives & Outcomes: The objective of this course is to learn the principles of mechanics through application of Newton's laws, understand the concept of energy and be able to apply these concepts to describe the motion of objects.

Upon completion of this course, students will be able to:

- Add and subtract vector quantities, perform scalar and vector products, determine vector magnitudes and angles relative to a reference frame.
- Demonstrate how position, velocity, acceleration and time are related mathematically, particularly under conditions of constant acceleration.
- For 2D and 3D systems, apply position, velocity and acceleration as vector quantities, including situations of circular motion and relative velocity
- Understand Newton's three laws relating forces and motion
- Apply Newton's laws to predict motion for various geometries and for problems involving friction (Exam 1 line)
- Understand and use conservation of energy, work, kinetic energy, and power
- Convert potential energy to force and apply with energy conservation
- Interrelate momentum and impulse; understand conservation of momentum; apply momentum to collisions.
- Understand rotational motion, angular momentum, moments of inertia and how they relate to kinetic energy (Exam 2 line)
- Understand simple harmonic motion
- Understand properties of waves such as wave functions, dynamics, power and superposition

Other learning outcomes include:

1. Students completing this course will be able to convey knowledge of the principles of physics and be able to use these principles to solve problems.
2. Students will be able to take a real life problem and use physical principles and mathematical tools to describe the problem.

III. Course Content: This course will cover chapters 1-16 which include the following topical areas:

1. Vectors
2. Newtonian Mechanics: Motion in 1-D, 2-D and 3-D
3. Newton's Laws: Force and Motion
4. Work and Energy
5. Momentum and Collisions
6. Systems of Particles
7. Circular Motion
8. Rotational of Rigid Bodies
9. Gravitation, and Fluid Mechanics
10. Oscillations
11. Waves and Sound

IV. Course Structure:

This course uses Blackboard eLearning, https://www.utdallas.edu/elearning/. All the class slides, sample problems exercised in the class, formula sheet for the test will be posted through eLearning. You need your UTD NetID to log in the system.

This course uses the Pearson Mastering Physics online homework system, see below.

V. Textbooks:

1. (Official text, but see all notes below) **Sears and Zemansky*'s University Physics with Modern Physics*, 15th edition, by Young and Freedman.** Bear in mind that you will need volume 2 for PHYS 2326. The 14th, 13th and 12th editions are also good. See additional notes below.
2. (Included with new texts) Mastering Physics Student Kit, which is access to http://www.masteringphysics.com. This can be purchased directly on the site, or it comes with new versions of the text. The "Access Card" option is a must, as you will need it to register the class and do the homework. The "eText" and other choices are optional.

Once upon a time, the bookstore also had a package with volume 1 and 2 loose leaf with access code to Mastering Physics for a discounted price. Don't know if this still exists.

The access kit with or without an e-book is available at www.pearsonmastering.com. See the course website for more options for purchasing the textbook.

Other texts at the same level are also OK but must be calculus based (e.g. Halliday and Resnick and others) If you are purchasing the Young and Freedman text for the first time, be certain it includes the student access kit in order to do on-line homework. If you already have the 13th edition or any other appropriate text, and are not already registered for on-line homework (Mastering Physics for 15th edition)), you will need to register at www.masteringphysics.com so that you can access the homework web site for this class.

Other Course Materials and Electronics:

Cell Phones: Please silence during class
Calculator: Any model can be used.

Class Materials

The instructor will provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

VI. Course Requirements

A. Class Attendance and Project Assignments: Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. Class participation is documented

by faculty. Occasionally there will/might be pop-quizzes conducted during the class (format to be determined).

B. **Classroom Recordings:** Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience.

C. **Pretest and PostTest:** We are conducting two multiple choice tests to probe student performance at the beginning and at end of this course. The tests will account for 2% bonus points towards to your final grade. There will be no credit given for taking only one quiz.

Both tests will be taken at ***the testing center that is on the first floor of the Synergy Park North 2 building (SPN2).*** These quizzes are on eLearning sites which is different from the one used for our lecture class, and is called **", and under instructor name Paul. Mac Alevey.** No pens or pencils are needed and no books, notes, calculators or communications devices are allowed during the test.

Students need to reserve a seat in the Testing Center for this quiz at https://ets.utdallas.edu/testing-center/. This page also gives the times when the Testing Center is open. Tests are unavailable when the Test Center is not open or when the Test Center is fully reserved. ***Please reserve a time for the posttest when you are reserving a time for the pretest***, otherwise you will forget to arrange the posttest near the end of the semester! Avoid guessing at answers.

The ***pretest is available in the Test Center from Mon Aug 19 to Fri Aug 30. The posttest is available in the Test Center from Mon Nov 11 to Saturday Nov 23.*** The Test Center requires students to reserve their time at least 48 hours before the intended exam time. This means that students can't register two days before the end of the 'windows' above.

If you are ARC/OSA students who need special accommodations, please send over a your accommodation letter to Prof. Paul MacAlevey at paulmac@utdallas.edu.

Pretest and Posttest (Bonus is 0.25 in the final average for each test)

D. **SI instruction:** Supplemental Instruction (SI) is offered for this course. SI sessions are free group study opportunities, scheduled two per week. Sessions are facilitated by an SI Leader, who has recently taken the course and received a high final grade.

Leaders will still be expected to host two 75-minute sessions a week. Since services are virtual, leaders will poll the class during the first week of school to set up their session dates and times, with a typical T/Th schedule. This semester we will have Tuesdays and Thursdays with times: T: 2:30-3:45 PM; Th: 4:00-5:15 PM

E. **Peer Tutoring**: Tutoring is also available through the student success center, 3rd floor McDermott Library, MC 3.606. Peer tutoring will offer drop-in appointments in the fall along with exam reviews and weekly reviews. Students will be enrolled in a Peer Tutoring eLearning shell like SI and will show up on August 24th. Schedules will be posted to student success center website once they are finalized. For more info, see https://www.utdallas.edu/studentsuccess/help-with-courses/peertutoring/.
You are encouraged to take advantage of these resources to discuss homework and help you to better prepare the exams.

Specifically, tutoring for PHYS 2325 is available:
- Monday-Thursday, 10am-8pm
- Friday-Saturday, 10am-5pm

You can simply stop by during any of these times for help – no need to schedule in advance.

If you have any questions for Peer Tutoring, please direct them to tutoring@utdallas.edu, and check out their website for more info.

F. **Cell Phones**: Please silence during class time

VII. Evaluation and Grading

Examinations
Homework and/or classwork will be assigned online via e-learning platform.

There will be four major exams**: Exam 1, Exam 2, Exam 3, and Exam 4** (Final Exam). All exams will be conducted in person (or online for special cases, such as health issues, etc....) in the classroom and submitted online in eLearning as a PDF file with your solutions unless specified otherwise.

Grading policy

One or more of your homework assignments (tests) with the lowest score will not be counted towards your final grade, applying the same rule for the tests/exams. The instructor will compute how many will be dropped based on the number of assignments using a simple formula. For example, the total number of tests/exams to be considered is calculated as n-int(n/3), where n is the number of given tests/exams.

Example: 5 applied tests/exams => 5-int (5/3)=5-1=4 tests/exams to be used for the final average grade. Every exam will be related by the topics to some homework(s) (HMWKs). The final average will be computed using the formula: (50%HMWKs+50%EXAMS)/2

If the previous average formula **(30%HMWKs+70%EXAMS)/2** gives you the highest grade, that will be the one used, and no action will be taken to penalize the student's grade.

A+ 100
A 92.0
A- 88.5

B+ 86.0
B 80.0
B- 77.5
C+ 75.0
C 69.0
C- 66.5
D+ 64.0
D 58.0
D- 54.5
F <54.5

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.

Tentative Schedule

Date		Lecture#	Lecture Contents	Reading Assignment
15/10	Tue	15	Potential Energy and Energy Conversion	7
17	Thu	16	Momentum, Impulse & Collisions	8
22	Tue	17	Review for Exam 2 (Chapters 6-8)	8
24	Thu	18	Exam 2	(Chapters 6-8)
29	Tue	19	Rotation of Rigid Bodies	9
31	Thu	20	Dynamics of Rotational Motion	10
05/11	Tue	21	Rotational Motion	10
07	Thu	22	Equilibrium	11
12	Tue	23	Exam 3	(Chapters 9-11)
14	Thu	24	Periodic Motion	14
19	Tue	25	Waves	15
21	Thu	26	Recovery-Review test	
26	Tue	-----	Fall Break	
28	Thu	-----	Holiday: Thanksgiving	
03/12	Tue	27	Exam 4 (beginning)	
05	Thu	28	Exam 4 (open - grades computation)	(Chapters 14-15)

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 individuals 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 students. 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**.

Student Accessibility

The goal of Student AccessAbility is to provide students with disabilities equal educational opportunities. Student AccessAbility provides students with a documented letter to present to the faculty members to verify that the student has a disability and needs accommodation. This letter should be presented to the instructor in each course at the beginning of the semester and accommodation needed should be discussed at that time. It is the student's responsibility to notify his or her professors of the need for accommodation. If accommodations are granted for testing accommodations, the student should remind the instructor five days before the exam of any testing accommodations that will be needed. Student AccessAbility is in the Student Services Building, room 3.200. Phone: 972-883-2098. Fax: 972-883-6561; disabilityservice@utdallas.edu. Office hours are Monday – Thursday, 8:30 a.m.

to 6:30 p.m., and Friday 8:30 a.m. to 5:00 p.m. Guidelines for documentation are located on the Student AccessAbility http://www.utdallas.edu/studentaccess/documentation/

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.

Alexandre Goncalves Pinheiro