PHYS 6321: Classical Mechanics
Syllabus

Professor Allison Deiana
Spring 2021

Contents

1   Course Information

Where?	**While Remote: Zoom Room linked on Canvas**
When?	Monday, Wednesday, Friday: 10:00 – 10:50 AM
Instructor	Professor Allison Deiana
	Office: 32A Fondren Science
	Phone: (214)-768-1476
	Email: adeiana@smu.edu
	Twitter/Instagram: DeianaDr
Office Hours	Where: 32A Fondren Science Building
	When: By appointment, I am generally more available in the afternoons
	Request meetings via e-mail
Course Website	https://smu.instructure.com/courses/#### (TBA)
Course Textbook	Classical Mechanics. (2nd or 3rd Edition) by Herbert Goldstein
Optional References	Classical Mechanics with Applications, by Porter Wear Johnson
	Mechanics, by Keith R. Symon
	Classical Dynamics of Particles and Systems. by Thornton and Marion
	Schaum's Outline of Mathematical Handbook of Formulas and Tables

Class will consist primarily of lecture and example problems to demonstrate the derived principles. As frequently as is feasible, students will be encouraged to work problems on the board together. This will be useful as a means of active participation in the learning process, and to clarify ideas through instructor feedback and support.

Students are expected to attend class regularly, to participate in class example problems and discussion of concepts, to complete homework assignments on time, and to prepare for in-class tests. It is also expected that the students will read and study the Goldstein material that is covered in each lecture period, and will contact the instructor to arrange office hours for going over additional questions.

2   Course Objectives

As described in the SMU Graduate Course Catalog:

> *"Topics in classical mechanics, including the mechanics of a system of particles, the two-body central-force problem, Lagrange's and Hamilton's formulations, the special theory of relativity, Hamilton-Jacobi theory, and continuous systems and fields."*

The objective of the course is that students will be able to apply their knowledge of Classical Mechanics in solving graduate-level physics problems.

3   Tests, Assignments and Grading

Your course grade will be based on homework (40%), three in-class tests (40% total), and an in-class final exam (20%). Questions concerning grading of returned assignments will be accepted by the instructor via email **only** within 7 days of the posting of grades. While attendance does not impact your grade, attendance in class is strongly encouraged for understanding the material and performing well on tests/homework. Make-up tests, if a test is missed due to an excusable reason (e.g. health, university-excused absences), will be allowed. Please contact the instructor as soon as you are aware that this will happen, if this is the case.

The grading scale used in this course is standard and that recommended for courses at SMU. For the ranges, a "[" or "]" indicates the adjacent number is included in the range, while a "(" or ")" indicates the adjacent number is excluded from the range.

Grade	Range	Interpretation
A	[94,100]	Excellent Scholarship
A-	[90,94)	Excellent Scholarship
B+	[87,90)	Good Scholarship
B	[84,87)	Good Scholarship
B-	[80,84)	Good Scholarship
C+	[77,80)	Fair Scholarship
C	[74,77)	Fair Scholarship
C-	[70,74)	Fair Scholarship
D+	[67,70)	Poor Scholarship
D	[64,67)	Poor Scholarship
D-	[61,64)	Poor Scholarship
F	[0,61)	Fail

3.1   Class Preparation

Reading will be assigned from the textbook for each class period, as a resource to you for class preparation. This will be announced on the course Canvas page. You will get the most out of lecture periods if you have taken some time to familiarize yourself with the material in advance.

3.2 Homework

- Homework will generally be assigned on Monday and will be due the following Monday, though I will not assign homework on test weeks. Thus, homework is expected to be due on Feb. 3rd, Feb. 10, Feb. 24, March 2, March 9, March 23, March 30, April 6, April 13, April 27, and May 4.

- Solutions must be handed in to me at the beginning of class on the Monday that they are due. Homework will be assigned and can be turned in via scanned documents in Canvas.

- It is permitted to work in study groups for homework, provided that individual work is turned in. However, please practice responsibile social distancing.

- If you are not able to turn your homework in on time, the maximum score you can receive for the homework diminishes by 10% for each late day (e.g. 1 day late = maximum score of 90%).

- If you are unable to turn your homework in on Monday, and are unable to locate me on the day you want to turn it in, you can slide it under my office door or scan it and email it. For grading purposes, it counts as turned-in at the time you slide it under my door or successfully send the email.

3.3 Exams

There will be three exams (Exam 1: Monday, Feb. 10th, Exam 2: Friday, March 13th, Exam 3: Monday, April 13th) and a final exam (Tuesday May 12, 8-11 AM).

- For flexibility, you will have a 3-day window to take the mid-semester exams, starting at the scheduled day/time.

- The test will be open book/open notes.

- Once you begin the test, you will have one hour to complete it , which is consistent with a 50-minute class period + 10 minutes to upload solution files.

- Class periods will happen as usual on the week of the test, but there will be no homework assigned.

The final exam will follow the same procedure, but with a 2-day window and a 3h10 maximum allowed time, to allow final grades to be returned within 72-hours of the start of the exam period.

4   Homework and Other Written Materials Policy

This policy applies to homework, tests, or any other written material that you submit for grading. The following information must **always** be at the **top of the front page**.

- Your full **name**.

- The **name of the assignment** (e.g. Homework 1)

- The **date** you have turned it in.

For full credit, your work must also satisfy the following criteria:

- Each question is **titled** (e.g. Problem 1).

- Writing/image quality must be **legible**.

- **Work done** in obtaining the solution must be included. It must be possible to follow the logic of your solution.

- Final answers must be **boxed** and have **correct units**.

5   University Honor Code

The student code of conduct can be found in the 2018 - 2019 Student Handbook which is available on the SMU website (http://smu.edu/catalogs/). All students will be expected to adhere to it. Any student found cheating or plagiarizing another's work will be given a zero for that assignment and a complaint will be filed through the Vice President for Student Affairs Office.

6   Disabilities Accomodation

Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit http://www.smu.edu/Provost/SASP/DASS to begin the process. Once approved and registered, students will submit a DASS Accommodation Letter to faculty through the electronic portal DASS Link and then communicate directly with each instructor to make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

7 Policies Regarding Planned Absences

7.1 Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence (https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays).

7.2 Excused Absences for University Extracurricular Activities

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See 2018-2019 University Undergraduate Catalogue)

8 Course Schedule Overview

The material expected to be covered on a week-by-week basis is as follows:

- Week 1: Goldstein, 2nd Edition, Chapter 1.1-1.4: Survey of Elementary Principles

- Week 2: Goldstein, 2nd Edition, Chapter 1.5-2.4: Lagrange's Equations and Calculus of Variations

- Week 3: Goldstein, 2nd Edition, Chapter 2.4-3.5: Two-body Problems

- Week 4: Test 1, Goldstein, 2nd Edition, Chapter 3.6-3.11

- Week 5: Goldstein, 2nd Edition, Chapter 4.1-4.10: Rigid Body Motion

- Week 6: Goldstein, 2nd Edition, Chapter 5.1-5.8

- Week 7: Goldstein, 2nd Edition, Chapter 5.8-6.5: Small Oscillations

- Week 8: Test 2, Special Relativity (not from Goldstein)

- Week 9: Goldstein, 2nd Edition, Chapter 8.1-8.6: Hamilton equations of motion

- Week 10: Goldstein, 2nd Edition, Chapter 9.1-9.5: Canonical Transformations

- Week 11: Goldstein, 2nd Edition, Chapter 9.5-9.8

- Week 12: Test 3, Goldstein, 2nd Edition, Chapter 10.1-10.5: Hamilton-Jacobi Theory

- Week 13: Goldstein, 2nd Edition, Chapter 10.5-10.8

- Week 14: Goldstein, 2nd Edition, Chapter 11: Perturbation Theory

- Tuesday, May 12: Final Exam

The designated "weeks" of class begin on the week of January 20th (during which we meet only Wednesday and Friday), and continue to the final "week" of April 27th plus the following Monday (May 4th, final day of class). Some slippage of this schedule may occur, given the usual uncertainties on the speed of covering material in a given class.

9 Important Dates

Please see this page (link in pdf) for the full academic calendar.