

Physics 310: Mechanics

Dr. Anuradha Gupta

Spring 2024

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Office Hours: WF 12:30 - 1:30 pm

Office: Lewis 208

Zoom: <https://olemiss.zoom.us/j/85339247671>

Class Hours: MWF 2:00 - 2:50 pm

Class Room: Lewis 109

Course Description

This course is a study of static and dynamic aspects of particle and rigid body systems analyzed with Newtonian, Lagrangian and Hamiltonian treatments. Resistive forces, non-inertial frames and harmonic oscillators as models for more complex systems are covered.

Prerequisites

Math 353, Physics 212 or 303

Course Objectives

On completion of this course, you should be able to:

- Develop equations of motion for mechanical systems from energy considerations
- Evaluate physical systems using the Newtonian, Lagrangian and Hamiltonian formulations
- Evaluate physical systems in noninertial frames
- Model simple mechanical systems numerically

Textbook

Taylor, John R. Classical Mechanics. University Science Books, ISBN-13: 978-1891389221.

Softwares

The softwares required for this course are the following:

- Glowscript Vpython: This runs in the Chrome or Firefox (and possibly other) browsers; no download is required. Log in with UM email address and password at www.glowscript.org.
- Matlab: Matlab can be run in the browser using Matlab Online <https://www.mathworks.com/products/matlab-online.html> or it can be installed on a local machine. For a license go to myolemiss-student tab-technology-research software-matlab.

Grading

Class Exercises, Homeworks and Exams have the following weightage in the grand total:

Class Exercises & Summaries	4%
Homeworks	36%
Exam 1	12%
Exam 2	12%
Exam 3	12%
Final Exam	24%
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Grand Total	100%

Grading Scale

$90\% \leq A \leq 100\%$

$80\% \leq B < 90\%$

$70\% \leq C < 80\%$

$50\% \leq D < 70\%$

$F < 50\%$

Evaluation

Class Exercises & Summaries

When I'll do an exercise in the class, you will do that as well with me. You will then send your copy of class exercise together with the summary of that class (with 3 – 5 bullet points) to me via email by the midnight of that day class. Each summary should have the heading, "Summary of class of 00/00/00", the date of the class that they are summarizing. There will be no make-ups for class exercises.

Homeworks

Homework will be due weekly via Blackboard on the due date (Fridays at 11:59 pm CT). You need to upload your clearly written work as a single PDF file on Blackboard. You are encouraged to work together to solve homework problems, however, you should not copy solutions wholesale.

Homework must be completed by the deadline for full credit, but can be completed after the deadline for partial credit by requesting an extension.

Exams

There will be three mid-term exams and a comprehensive final, as shown on the schedule on the last page. All exams will be closed-book written exams. Each exam will have two parts: multiple choice and free-response problems. The dates of the midterm exams and final will not change unless class is canceled for unforeseen reasons (weather, emergency, etc.). The chapters covered on each exam may change, if needed. No make-up exams will be given unless arrangements are made in advance. If you miss an exam or the final without making prior arrangements, you will receive a zero.

Course Policies

Attendance Policy

Attendance is required. If you are absent for more than 3 class meetings during the semester, **the final calculated grade will be reduced by a letter grade** when final grades are assigned. Note that allowances will be made in case of illness due to covid-19 or other illness. University of Mississippi policy requires that attendance be verified for every student during the first two weeks of classes. If you must be absent for tests, it is your responsibility to contact me before the test to determine whether the absence will be excused and whether the test will be rescheduled. For unexpected test absences, you must contact me by email, video meeting or telephone within 24 hours after the absence or the test will not be rescheduled under any circumstances

Academic Integrity and Honesty

Every student of the University of Mississippi, by virtue of choosing to be part of the university community agrees to abide by the University of Mississippi Creed and the UM Academic Integrity Policy which covers academic integrity. Cheating on any assignment is forbidden and, in this course, will result in a zero grade on the given assignment. If a second case of cheating occurs, this will result in an F for the entire course. Students should familiarize themselves with the UM Academic Integrity Policy which is available in the Course Documents folder on Blackboard.

UM Creed The University of Mississippi is a community of learning dedicated to nurturing excellence in intellectual inquiry and personal character in an open and diverse environment. As a voluntary member of this community:

- I believe in respect for the dignity of each person
- I believe in fairness and civility
- I believe in personal and professional integrity
- I believe in academic honesty
- I believe in academic freedom
- I believe in good stewardship of our resources
- I pledge to uphold these values and encourage others to follow my example

All materials distributed electronically and in hard copy in this class are protected under intellectual copyright. Any attempt to upload these documents onto the Internet (or to distribute them by some other means) or to profit from the distribution (by Internet or other means) of these documents constitutes theft and will be in violation of intellectual property law and the UM Academic Conduct Code unless expressly permitted for by the instructor. Accessing such materials for your own use is also in violation of the UM Academic Conduct Code. Additionally, the distribution of your own class notes via the Internet or other means, or access of such materials, is strongly discouraged except for occasional loaning of notes to students concurrently enrolled in the class.

University of Mississippi Access and Inclusion

The University of Mississippi is committed to the creation of inclusive learning environments for all students. University policy calls for reasonable accommodations to be made for students with disabilities on an individualized and flexible basis. It is the responsibility of students with disabilities, however, to seek available assistance at the University and to make their needs known. The University offices that help to ensure equitable access for students with disabilities are the Office of Student Disability Services, the Office of Equal Opportunity and Regulatory Compliance (The Executive Director of Equal Opportunity and Regulatory Compliance is also the ADA Coordinator), and the Office of the University Attorney. Students can contact Student Disability Services at 662-915-7128 so that office can facilitate the removal of barriers and ensure you have equal access to the same opportunities for success that are available to all students.

Class Schedule

Physics 310 Course Schedule (subject to change): Material from Chapters 1 – 9, 13.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
01/22 – 01/26	No class		No class		1.1-1.4
01/29 – 02/02	1.5-1.7		2.1-2.2		2.3
02/05 – 02/09	2.4		2.5		2.6 HW 1 due
02/12 – 02/16	3.1-3.2		3.3-3.5		4.1-4.2 HW 2 due
02/19 – 02/23	Exam 1		4.3-4.4		4.5 HW 3 due
02/26 – 03/01	4.6-4.7		4.8		4.9-4.10 HW 4 due
03/04 – 03/08	5.1		5.2-5.3		5.4 HW 5 due (Deadline for Withdrawal)
03/11 – 03/15	Spring Break (no class)	Spring Break (no class)	Spring Break (no class)	Spring Break (no class)	Spring Break (no class)
03/18 – 03/22	5.5		5.6		6.1-6.2 HW 6 due
03/25 – 03/29	Exam 2		6.3		Good Friday Holiday (no class) HW 7 due
04/01 – 04/05	6.4		7.1		7.2 HW 8 due
04/08 – 04/12	7.3-7.4		7.5		7.6-7.7 HW 9 due
04/15 – 04/19	Exam 3		13.1-13.3		13.4-13.5 HW 10 due
04/22 – 04/26	13.6		8.1-8.3		8.4-8.5 HW 11 due
04/29 – 05/03	8.6-8.8		9.1-9.3		9.4-9.6 HW 12 due
05/06 – 05/10	Final Exam 4:00 pm - 7:00 pm				

Important Dates

Please see the UM academic calendar (<https://registrar.olemiss.edu/spring-2024/>).

Examination Dates

Exam dates and topics are subject to change. The final exam date is fixed and cannot be changed.

- Exam 1: 02/19
- Exam 2: 03/25
- Exam 3: 04/15
- Final Exam: Monday, May 6, 4:00 pm - 7:00 pm