

Physics 310

Instructor: Dr. Cecille Labuda
Class time/location: 10:00 am Lewis 104
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Office hours: MW 4 – 5:00 pm, T 1 – 2:00 pm Lewis 211. By appointment in 1031 NCPA except Thursdays.
Syllabus version 2: 01/23/2018

Text

[Taylor, John R. Classical Mechanics. University Science Books, ISBN-10: 189138922X, ISBN-13: 978-1891389221.](#)

Description

Static and dynamic aspects of particle and rigid body mechanics, including generalized coordinates, Lagrangian and Hamiltonian mechanics and noninertial frames.

Prerequisites / Corequisites

Math 353. Physics 212 or 303.

Course Objectives

On completion of this course, students should be able to do the following:

- Develop equations of motion for mechanical systems by considering the energy of the system
- Use Lagrange's formulation to solve mechanical systems
- Use Hamilton's formulation to solve mechanical systems
- Solve mechanical systems in noninertial frames

Grading Scale

- $90\% \leq \mathbf{A} \leq 100\%$
- $80\% \leq \mathbf{B} < 90\%$
- $70\% \leq \mathbf{C} < 80\%$
- $50\% \leq \mathbf{D} < 70\%$
- $\mathbf{F} < 50\%$

Evaluation

Preliminary Tests + Exercises (10%)

- In-class preliminary test covering basic physics and mathematics knowledge assumed will be given the first week of class. The same test will be given as a take-home test.

- In-class exercises and blackboard presentations of problem solutions in some class meetings.

Exams (40%)

- 3 closed-book exams weighted as follows.
 - 2 exams highest grades: $15\%+15\%=30\%$
 - 1 exam lowest grade: 10%

Homework (25%)

- Homework sets will be assigned and must be turned in at the beginning of class on the due date. No late homework will be accepted.
- Students are encouraged to work together to solve homework problems, however, no student should copy solutions from another student or from online solutions wholesale.
- Homework solutions must be presented according to the homework rubric. Homework that differs from the rubric in presentation will not be graded.

Final exam (25%)

- The final exam is comprehensive. The format will be similar to major tests

Policies

Attendance

Students are expected to attend all classes. University of Mississippi policy requires that attendance be verified for every student during the first two weeks of classes. Students whose attendance is not verified will be automatically dropped from the course. No make-ups of graded classroom exercises and presentations will be given except for absences due to verified university sanctioned activities. If you must be absent for tests, it is your responsibility to speak to 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 or telephone within 24 hours after the absence or the test will not be rescheduled under any circumstances

Academic Integrity

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. Please consult the M-Book, Academic Integrity document for details on university policy and the academic creed.

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

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University of Mississippi Access and Inclusion

The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content or the use of non-captioned or non-transcribed video and audio files. Students must also contact Student Disability Services at 662-915-7128 so that office can 1) provide you with an Instructor Notification form, 2) facilitate the removal of barriers and 3) ensure you have equal access to the same opportunities for success that are available to all students.

Audio and video recording

Audio and/or video recording of class lectures is not allowed unless explicit permission is given by the instructor. Permission will only be given if the student has a Student Disability Services request. In such cases, recordings may only be used by the student to whom permission is given and all recordings must be deleted at the end of the semester. Recordings may not be distributed online or elsewhere.

Important Dates

- January 22 – classes begin
- March 5 – Midterm grades
- March 10 - 18 - Springbreak
- May 4 – last day of class

Examinations

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

Test 1: 02/21

Test 2: 04/04

Test 3: 04/25

Final Exam: **Friday May 11**, 8:00 am.

Course Schedule (subject to change)

Week	Topic	Textbook Sections
01: 01/22 – 01/26	Newton's laws of motion, Projectiles and air resistance, Momentum and angular momentum	Ch 1, Ch 2, Ch 3
02: 01/29 – 02/02	Energy	Ch 4
03: 02/05 – 02/09	Energy, Oscillations	Ch 4, Ch 5
04: 02/12 – 02/16	Oscillations, Calculus of variations	Ch 5, Ch 6
05: 02/19 – 02/23	Lagrange's equations 02/21: TEST 1	Ch 7
06: 02/26 – 03/02	Lagrange's equations	Ch 7
07: 03/05 – 03/09	Mechanics in noninertial frames	Ch 9
08: 03/12 – 03/16	SPRING BREAK	
09: 03/19 – 03/23	Mechanics in noninertial frames, Rotational motion	Ch 9, Ch 10
10: 03/26 – 03/30	Rotational motion, Coupled oscillators	Ch 10, Ch 11
11: 04/02 – 04/06	Coupled oscillators 04/04: TEST 2	Ch 11
12: 04/09 – 04/13	Coupled oscillators, Hamiltonian mechanics	Ch 11, Ch 13
13: 04/16 – 04/20	Hamiltonian mechanics	Ch 13
14: 04/23 – 04/27	Hamiltonian mechanics 04/25: TEST 3	Ch 13
15: 04/30 – 05/04	Hamiltonian mechanics	Ch 13