

Physics 321 Intermediate Mechanics

Spring 2020

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Class Meeting: Monday - Wednesday - Friday 2:00 – 2:50
Janet & Walter Sondheim 203

Office Hours: Monday and Wednesday 3-4 (right after the lectures). I will be in my office during these hours, and you will have my undivided attention. I am also available to talk to you for as long as you need after class. If none of these times work, then please email me to set up an appointment.

Textbook: Classical Mechanics by Taylor

Course Overview: This course is the undergraduate upper-level classical mechanics course. You should start the course with an understanding of basic Newtonian mechanics from your introductory physics class. The list of topics covered in this class include: Newtonian, Lagrangian, and (if time permits) Hamiltonian mechanics / specific relativity, and their application to oscillators, central-force motion, and the dynamics of rigid bodies. I expect you to be able to work with these methods and understand these applications by the end of the semester. Also, several mathematical techniques that are used by physicists are covered.

We will cover most of the first section of the textbook (through Chapter 11) in this course, and a schedule of the topics covered is found at the end of this document. Material from other sources will be used, and I will direct you to useful websites where appropriate.

Course Outline and Tentative Schedule:

Math Review

Forces, Momentum and Angular Momentum

Work and Energy

Linear Oscillators

First Midterm Exam

Calculus of Variation

Lagrangian Mechanics

Spring Break

Central Forces

Non-Inertial Reference Frames

Second Midterm Exam

Rigid Body Motion

Coupled Oscillators

Hamiltonian Mechanics (if time permits)

Specific Relativity (if time permits)

Final Exam (May 15, 1-3pm)

Grading: Homework: 30%
Two Midterms (non-cumulative): 15% each
Final Exam (cumulative): 40%
In principle, everyone can get an A. I will not curve the grades but may change (lower) the limits depending on the difficulty of the exams and homework
score > 90 :A
score > 80: B
score > 70: C
score > 60: D
score < 60 : F

Homework: This is one of the most important aspects of this class. Although you will learn a lot from lectures and the textbook, the only way to learn this material is by working through the important derivations and applying the material to problems. The homework will at times be challenging; remember that it is the only time I can ensure that you examine a complicated problem. There is not enough time for this on exams.

Homework will be assigned every Friday and it will be due at the beginning of Friday's class the following week. **No late homework will be accepted for any reason.** Solutions will be posted immediately after grading. It is to your advantage to do all the homework problems and though tempting not to use the solutions that are available through various sources. This is the only way to develop your problem-solving skills and be successful in the class. **You can drop the lowest homework score.** This should take care of any illness, job and family related emergencies. You can talk to your classmates regarding the homework assignments, but each should submit his/her own original solutions. Copying someone else's homework is cheating. Homework will be graded for completeness and accuracy.

Exams Exam solutions should be neat and organized, including explanations of what and why you are doing things (think partial credit!!!). Equations and results that are subsequently used and/or referred to should be numbered. **I will not grade sloppy solutions.** All the exams are closed book. **You will be given a formula sheet for each exam.** Unless otherwise told, the use of a calculator or any form of an electronic device during exams or quizzes is not allowed. You must turn off your cell phone during class and the exams. If you are caught using a cell phone during an exam you will be asked to turn in your paper.

Midterm There is going to be two midterm exams at dates to be announced. **Make up exams will be given only if you miss the exam for a documented medical or legal problem or for a death in your immediate family.** The instructor must be notified within 24 hours of the missed exam. Make up exams maybe oral or written.

Final Exam Date: FRI, MAY 15 1:00-3:00 PM The final exam will be cumulative. No make-up exam will be given for the final (see UMBC policy on incomplete grades <https://catalog.umbc.edu/content.php?catoid=12&navoid=558>).

Course management: I will use Blackboard to post course announcements, reading assignments and homework assignments, and post grades

Academic Integrity By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Director.

Student Disability Services (SDS) UMBC is committed to eliminating discriminatory obstacles that may disadvantage students based on disability. Services for students with disabilities are provided for all students qualified under the Americans with Disabilities Act (ADA) of 1990, the ADAAA of 2009, and Section 504 of the Rehabilitation Act who request and are eligible for accommodations. The Office of Student Disability Services (SDS) is the UMBC department designated to coordinate accommodations that would allow students to have equal access and inclusion in all courses, programs, and activities at the University. If you have a documented disability and need to request academic accommodations, please refer to the SDS website at sds.umbc.edu for registration information and to begin the process, or alternatively you may visit the SDS office in the Math/Psychology Building, Room 212. For questions or concerns, you may contact us through email at disAbility@umbc.edu or phone (410) 455-2459. **If you require accommodations for this class, make an appointment to meet with me to discuss your SDS-approved accommodations.**