Physics 321: "Intermediate Mechanics", Syllabus - Spring 2026

Professor: Dr. Mark Henriksen
Office: Physics 414
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Class meets: M/W/F 2:00 – 2:50 in Physics 201
Office Hours: After class or by appointment.

Course Overview

The list of topics covered include: Newtonian and Lagrangian mechanics and their application to oscillators, central-force motion, and the dynamics of rigid bodies. New mathematical techniques will be introduced that will provide the foundation of intermediate classical mechanics. Our goal is that you will be able to work with these new methods and understand their applications by the end of the semester. Most of the first section of the textbook (through Chapter 11) will be covered in this course. A schedule of the topics covered is found later in the syllabus. During lectures there will be time for discussion. We will also examine some of the homework problems in detail during class.

Textbook: "Classical Mechanics" by John R. Taylor

Grading

There will be two midterm exams, each will be worth 25% of your final grade. The final exam will also be 25% of your final grade. Homework is 25% of your grade.

Homework

Homework is typically posted on UMBC Blackboard on Mondays and is due on the date given on the homework, which is usually the next Monday. Homework is due at the beginning of class. Homework turned in at any other time will be considered late unless an acceptable medical excuse is provided. Electronic submission will not be accepted.

Classical mechanics is challenging so start early so you have enough time to complete sometimes lengthy problem sets. Provide a narration of the steps in your homework. Doing this is good preparation for writing up research projects. Solutions must be reasonably neat so that I can follow what you are doing. Consider working out the solutions and then copying them over neatly for submission. This gives you a review of the material right after you have worked on it, one of the methods for learning material that has proven to be effective.

Schedule

Forces and Momentum (1.1-3.5)	Jan 26 : Jan 30

Energy (4.1-4.8)	Feb 2 : Feb 13
Linear Oscillators & Green's Functions (5.1-5.9)	Feb 16 : Feb 20
Lagrangian Mechanics (6.1-7.6)	Feb 23 : Mar 4
First Exam	Friday March 6
Spring Break	Mar 16 : Mar 20
Continue LM	Mar 23: March 30
Coupled Oscillators (11.1-11.7)	Apr 1 : Apr 6
Central Forces (8.1-8.7, 14.1-14.6)	Apr 8-15
Second Exam	Friday April 17
Non-Inertial Reference Frames (9.1-9.2)	April 20 - 24
Rotating Reference Frames (9.3-9.9)	Apr 27 : May 1
Rigid Body Motion (10.1-10.10)	May 4 : May 8
Final Exam	May 16, 1-3pm

Achieving Course Goals and Meeting Academic Expectations

Attending class, completing all homework assignments, and reviewing sample problems in the lectures will ensure that you do very well in the course. Please keep in mind that **I'm here to help you do well in Classical Mechanics.** The concepts introduced in this course have applicability to other areas of physics so it is important to get a firm foundation in classical mechanics.

Statement on Use of Outside (of the lectures and textbook) Resources

You can use any resource that helps you understand the material and assists you in doing the homework problems when you get stuck (including getting help from me). This includes AI, other students, other textbooks and online resources.

Policy on Academic Integrity

"Academic integrity is an important value at UMBC. 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."

Student Support /Disability Services

"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 for students to have equal access and inclusion in all courses, programs, and activities at the University”