

Classical Mechanics – Fall 2005

PHYS-330

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Class meeting times: Tuesday and Friday, 12:45-2:00 PM

Office hours: Open—Wed and Thur 3-3:30 PM, Mon 3-5PM
Sign-up—Mon, Wed, and Thur 2-3 PM

Classical mechanics introduces many of the fundamental concepts and mathematical techniques upon which the rest of theoretical physics is built. It underpins the mechanical, structural and civil engineering that makes much of modern life possible. It combines common sense and mathematical rigor to bring uncommon clarity to the macroscopic world around us.

Roughly, the topics we will cover are the motion and dynamics of point particles, rigid objects, and interacting collections of such objects. The dynamical forces we consider in most detail will be gravity, the harmonic (Hooke's) force, and contact forces like the normal force and friction. We will begin with Newton's formulation of dynamics and later learn Lagrangian and Hamiltonian dynamics and the power of the Principle of Least Action.

Concurrent enrolment in or completion of Calculus III, MATH-313, is required, and concurrent enrollment or completion of Differential Equations, MATH-321 would be helpful, but it is not required. University Physics I, PHYS-110, is also required.

Course Materials:

- Text:** *Classical Mechanics of Particles and Systems*, Thornton and Marion, 5th Edition, Brooks/Cole—Thomson Learning, ISBN 0-534-40896-6
- Optional Text:** *Student Solution Manual for Classical Mechanics of Particles and Systems*, 5th Edition, Brooks/Cole—Thomson Learning.
- Calculator:** Scientific calculator.

Communication: This course will use the Blackboard system of American University for distribution of information outside of class time.

Email: You must have an American University email account to use this system; if you use an email provider other than American, forward your American mail to that account. On-line quizzes will be taken through Blackboard, on-line discussion sessions will be managed through Blackboard, and solutions to homework and tests will be posted on Blackboard. Check your email and the class website of Blackboard frequently to stay up-to-date. I usually respond fairly promptly to email and it is my preferred method of communication outside of class and office hours.

Discussion Boards: Please make use of the discussion boards to ask questions, vent frustrations, share neat ideas or websites, etc.

Privacy: For the record, I can track Blackboard viewing, i.e. count the hits on each page and see who accessed it. However, you can post on the discussion board anonymously, and I really can't see you said it.

Etiquette: Express yourself freely in this class, in email and on Blackboard. However, be respectful and polite to your fellow students.

Course requirements and grading: Your final grade will be based on the following:

Warm-ups	20%
Homework	40%
Midterm	20%
Final	20%

Grading scale: Everything will be graded on a four point scale.

Warm-ups: Twelve times during the semester, on-line warm-ups will be made available over Blackboard, roughly one before each normal class (see Schedule). These cover concepts in the reading assignment due for the next class, i.e. they cover material that will be discussed in class AFTER the quiz is due. As a result, the quizzes will be graded for effort and thoroughness. (You can get a perfect score even if you don't know what you are doing as long as you show real effort!) Typically, the warm-up quiz will be available on-line for 24 hours, starting at 11 AM the day before class and ending at 11 AM the day of class (generally Fridays). Your responses to the warm-up quiz will help shape what happens in the following class. You may use your book and notes to help you answer the questions but you must work alone. Any communication about the quiz with other students about the content of or the answers to the quiz is a violation of the Academic Integrity Code (AIC) (see below). There are no acceptable excuses for missing a quiz, but only the best eleven will be included in your grade.

Homework: Twelve times during the semester assigned homework will be required to be turned in. The homework assignments will be posted on Blackboard at least one week before the due date. You may work with others to complete these assignments, but you must turn in your own work. I will explain the format for the homework that is required. This is a super-important part of your grade! You may not copy the homework from someone else, as that is a violation of the AIC. You are encouraged to attempt all the homework on your own before seeking assistance, as that will provide the greatest practice for the tests. The homework will be due in class (generally on Tuesdays) with no extensions possible except for excused absences (see below). Only your best eleven homework assignments will count towards your grade.

Mid-Term and Final: There will be one test and a final during the final exam period. They will be closed-notes and closed-book and will consist of multiple-choice questions, short written answers and free-response problems. The final is cumulative. Test results and answer keys will be posted on Blackboard.

Regrades: If you feel homework or a test has been misgraded, DO NOT WRITE on it. Write a note on a separate piece of paper and give it to me in class or office hours or slip it in my mailbox in McKinley 102 within one week of the date it was returned. The assignment will be regraded more carefully. Note: your grade may go up OR down based on the regrade. That's the chance you take for me looking at it more carefully.

Succeeding in this class and getting help: To succeed in this class, it is imperative that you interact with the material every day. Physics is like a foreign language, you cannot learn it just from attending class. Make sure you do the readings before class and lab, do all the warm-up quizzes and homework, come to office hours. This is a three-hour class, so you should spend *at least* six hours a week outside of class time thinking about and practicing physics.

On-line discussions: On Blackboard there will be on-line discussion board. You can you this to ask me questions publicly, discuss homework with your peers and voice concerns and opinions about the material and the class.

Other Blackboard resources: Lots of other good stuff will be on our course's Blackboard site. Check it out regularly.

Office hours: You are super-welcome to come to office hours. One hour a week is specifically reserved just for this class. We will have a good time there. If you can't make any of the times listed above, call or email me, and we can work something out.

Students with disabilities: You should be registered with the University, who will send me a letter describing your special needs. We can accommodate your needs, but occasionally patience will be required.

Academic Integrity Code: Read it and follow it. It is your responsibility to know it and abide by it. Follow all instruction given here or given on a specific assignment or the full due process of the AIC will come down on you.

Excused absences and extensions: Severe illness, religious observance, University business, and family emergency are acceptable reasons for missing class or needing an extension on an assignment. I have the right to request reasonable documentation, in accordance with University policy. Do not notify me of an absence, such as missing an exam or needing an extension, at the last minute. Use email and notify as far in advance as possible. I will be strict about this .