

Phys 702: Classical Mechanics I

Fall 2018

Instructor: Dr. Michael Pravica

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Office Hours: Tentatively Wednesday, 3:00pm – 5:00pm (BPB Room 248-249) or by appointment.

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Lecture: Monday and Wednesday 11:30 - 12:45pm

Location: BPB-248

Text: *Classical Mechanics 3rd Ed.* by H. Goldstein, C. Poole, J. Safko. (Addison Wesley 2002). ISBN: 0-0201-65702-3)

Content: We will be studying graduate level classical mechanics. Topics such as Lagrangians, Hamiltonians and deriving equations of motion from constraints and symmetries for classical systems including oscillations will be covered. We will cover roughly Chapters 1-8 of your text. The amount of detail will be adjusted according based on class interest.

Learning Outcomes: It is expected that you will master the concepts of classical mechanics of arbitrary variables and be able to solve graduate-level problems in this field. You will be expected to, at a bare minimum, you must understand how to generate equations of motion by forming the Hamiltonian and Lagrangians for any given system with constraints. You will also be expected to solve central force problems at a high mathematical level which includes skillful successful use of partial differential equations, tensors, and linear algebra to solve graduate-level problems in classical mechanics.

Grading:

25% Homework

25% Quizzes

25% Midterm Exam (Wednesday, October 17th, 2018)

25% All Inclusive Final Exam (Wednesday, December 12, 10:10am – 12:10pm)

Grading Scale:

90 → 100: A- → A+; 80 → 89: B- → B+; 70 → 79: C- → C+; 60 → 69: D- → D+; Below 60: F

DO NOT AUTOMATICALLY EXPECT A CURVE!

ATTENDANCE FOR THE FINAL EXAM AT THE SCHEDULED TIME IS REQUIRED.

Attendance: You are expected to attend all lecture and laboratory periods. You are responsible for all assignments and announcements given in class. Missed exams will result in a grade of zero. In the event of an extreme emergency (e.g. hospitalization), make-up exams may be given only with the written permission of the Chair of the Physics Department or the Dean of Arts and Sciences. You may be asked to provide written documentation to justify your request to make up material. For example, often an excuse such as “I had a death in the family” is given for an absence. If such is the case, then proof of death and proof of close family relation must be supplied in order for the work to be made up. If you represent UNLV at any official extracurricular activity, you shall have the opportunity to make up assignments, but you must provide official written notification to the instructor no less than one week prior to the missed class. A student missing a class or laboratory assignment because of observance of a religious holiday shall have the opportunity to make up missed work. The student must notify the instructor of anticipated absences by the last day of late registration. Students who represent UNLV at any official extracurricular activity shall have the opportunity to make up lost work but must provide written notification to the instructor no less than one week prior to the missed class(es).

Homework: Homework will be assigned weekly and due one week later. Physics cannot be mastered without working out physics problems. Don't be discouraged when the material initially seems unfamiliar or the homework is difficult. You are not expected to understand the material immediately. Your mastery of physics will be a gradual process that will develop through diligent practice (i.e., homework). Hopefully, you will learn that this is not an unpleasant but intellectually engaging experience. Although each homework assignment is numerically worth the least in terms of your overall grade, it is the most important part of your studies. Although we will discuss homework problems occasionally in lecture, questions on homework can always be raised with your instructor during his office hours.

Exams: The Final Exam will encompass ALL of the material covered in the class.

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Final Note: Though physics has a reputation of being a difficult subject, you will find that the knowledge and problem solving skills that you learn here will be extremely valuable no matter what career path you follow. Therefore, don't be intimidated, try hard, and **never** be afraid to ask questions. **This syllabus may change as the course progresses. The instructor will provide advance notice if and when this happens.**

Tentative Schedule:

Week 1 (8/27, 8/29)	Chapter 1	Survey of the Elementary Principles
Week 2 (9/5)	Chapter 1	Survey of the Elementary Principles
Week 3 (9/10, 9/12)	Chapter 2	Variational Principles and Lagrange’s Equations
Week 4 (9/17, 9/19)	Chapter 2	Variational Principles and Lagrange’s Equations
Week 5 (9/24, 9/26)	Chapter 3	Central Force Problem
Week 6 (10/1, 10/3)	Chapter 3	Central Force Problem
Week 7 (10/8, 10/10)	Chapter 4	Kinematics of Rigid Body Motion
Week 8 (10/15, 10/17)	Chapter 4	Kinematics of Rigid Body Motion &
		Midterm
Week 9 (10/22, 10/24)	Chapter 5	Rigid Body Equations of Motion
Week 10 (10/29, 10/31)	Chapter 5	Rigid Body Equations of Motion
Week 11 (11/5, 11/7)	Chapters 6	Oscillations
Week 12 (11/14)	Chapter 6	Oscillations
Week 13 (11/19, 11/21)	Chapter 7	Classical Mechanics of Special Theory of Relativity

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Week 14 (11/26, 11/28) **Chapter 8** Hamilton Equations of Motion

Week 15 (12/3, 12/5) **Chapter 8 and review** Hamilton Equations of Motion

FINAL EXAMS 5/4 – 5/8: **Wednesday, December 12 from 10:10 am – 12:10 pm.**