Classical Mechanics • Physics 347 • Fall 2016

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Office: 262 Science • MW 11-12; M 1-2:30; W 2:30-4. Also by appt or if my door is open.
Class: Sci 151 TTh 11:30-12:50.
Web Site: Most materials will be posted on CLEo (http://cleo.whitman.edu/).

Objectives:

In this course, you will:

- expand upon your knowledge of classical mechanics from introductory physics, examining in more depth several different topics concerning the motion of objects, including drag, conservation of momentum, angular momentum and energy, and oscillations
- learn the variational approach to the study of motion using Lagrange's equations
- learn more sophisticated mathematical approaches to solving equations of motion
- expand upon your use of computation for solving physics problems (using Mathematica)

Required Text (in bookstore):

Classical Mechanics (John R. Taylor, University Science Books, 2005)

Course Structure and Requirements

Discussion based course. Because of the small size of the class, this will be a discussion-based course. We will use the textbook as the primary source, working through it together. We'll start each day by discussing assigned readings from the textbook. After this discussion we'll work on problems in small groups. (10% of grade based on participation in discussion)

Problem Sets. There will be problem sets due approximately every Thursday at the beginning of class. You may discuss the problems together, but write up your solution by yourself. Your write-up should be a cleanly constructed final draft demonstration of your solution. Finally, do not consult someone else's solution (e.g. that you find online) to the problems. The college has a strong policy against plagiarism. Start the problems early. If you find yourself having difficulty, talk to me. Please submit your solutions in order. I will grade a subset of the problems, and I will grade mainly on effort, with the last 10-20% depending on the correctness of the solutions. (30% of grade)

Exams. There will be two semester exams (dates to be determined), and one final exam. (60% of grade)

Schedule – will be updated on CLEo throughout the semester.

Week	Topic	Text	Probs
1 (8/29)	Newton's Laws, Drag T: Ch 1, 2.1-2 Th: Ch 2.3-7	1-2	
2 (9/5)	Momentum & Angular Momentum T: Ch. 3.1-3 Th: Ch. 3.4-5	2-3	PS1
3 (9/12)	Energy T: Ch. 4.1-3 Th: Ch 4.4-10	4	PS2
4 (9/19)	Oscillations T: Ch 5.1-5 Th: Ch 5.6-9	5	PS3
5 (9/26)	Calculus of Variations T: 6.1-3 Th: 6.4, 7.1-4; Take-home exam 1	6	PS4
6 [+] (10/3)	Lagrange's Equations T: Exam 1 Th: No Class	7	None
7 (10/10)	Lagrange's Equations T: 7.2-3 Th: 7.4-5	7	PS5
8 (10/17)	Lagrange Con't. T: 7.6-7,10 Th: 7.10; 8.1	8	PS6
9 (10/24)	Central Forces T: 8.2-8.5 Th: 8.6-8	8	PS7
10 (10/31)	NonInertial Frames T: 9.1-9.6 Th: 9.7-9.9	9	PS8
11 (11/7)	Rigid Bodies T: 10.1 Th: 10.2; Take-home exam 2	10	PS9
12 (11/14)	Rigid Bodies T: In class Exam 2 Th: 10.3-4	10	
13 (11/28)	Rigid Bodies T: 10.5 Th: 10.6-8	10	PS 10
14 (12/5)	Coupled Oscillators T: 11.1-3 Th: 11.4-5	11	PS 11
15	Final Exam (Covering Chaps 10-11; Thursday, Dec 15, 2-4 pm)		

[+] Fall Break – no class on Thursday