Physics 336k, Classical Dynamics, Spring 2016

Section: Unique #55895, Meets MWF, 2-3 PM, RLM 7.104

Pre-requisites: Math 427L or 364K, Physics 315, and Physics 115L

Instructor: Dan Heinzen; Office: RLM 10.324; Phone: 471-3960;
e-mail: heinzen@physics.utexas.edu ;   Office Hours: Th 2-3, or by appointment.

Grader: TBA   Grader Office Hour: TBA

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

Canvas: Lecture notes, recitation section notes, handouts, homework solutions, and grades will be posted on Canvas.

Homework: Assigned approximately once per week. You may work together on the homework. However, each student must hand in his or her own solution, and must contribute substantially to the solution of any problem he or she hands in. Some homework assignments may require numerical solutions, which you will need to provide using Excel, Mathematica, or some other programming environment. Homework assignments will all be worth the same point value even though their difficulty level and length will vary. Homework will be accepted one lecture late with a penalty of 10%. No homework will be accepted after that, except as discussed below. Your lowest homework grade will be dropped in the calculation of your final course grade.

If the workload on the grader is excessive due to the large enrollment of this course, we may need to base homework grades on partial grading of assignments.

Recitation sessions: Recitation sessions will be scheduled on an as-needed basis. These will be used to review material, do additional practice problems, and/or as homework help sessions. Attendance at these sections is optional.

Tests: There will be three in-class tests. Your lowest test score will be dropped in the calculation of the final grade.

Final: There will be a comprehensive final exam during the scheduled exam time for this class.

Make-up tests and homework: You may *not* skip tests or hand in late homework without [(i) a legitimate reason (illness, family emergency, etc.) (ii) appropriate documentation (*e.g.* doctor's note), and (iii) advance permission from me, if it is reasonably possible for you to make such a request] OR [because of observance of a religious holy day (see below)]. If you satisfy *all three* of requirements (i)-(iii) or the religious exception, you will be allowed to turn in the homework late, or take a make-up test. Otherwise your score for that homework or test will be zero.

Course grade: Homework 24%, Highest two test scores 20% each, and Final Exam 36%. Course grades will be determined strictly from your calculated weighted average score using the above weight factors. If differences between the average scores of tests are large, I may scale the scores to make their averages more similar. I do not use fixed grade breakpoints. I will provide some guidance during the semester of *approximate* grade breakpoints. You will *not* be able to earn a grade based only on your Final Exam score.

Disabilities: Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, http://www.utexas.edu/diversity/ddce/ssd/

Religious observance: Students are entitled to a make-up exam or to turn in late work if this is needed for observance of a religious holy day. Students who want to exercise this right must inform me of the observance 14 days in advance.

University Honor Code: The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Test schedule:

Test 1: Mon., Feb. 22

Test 2: Weds., Mar. 30

Test 3: Fri., Apr. 29

Course Outline

Tentative. Content and schedule may be revised as course proceeds.

Date(s)	Activity	Topic
Jan. 20-25		Newton's laws, projectiles. (Taylor, chapters 1-2)
Jan. 27	HW 1 due	
Jan. 27-Feb. 1		Motion of charged particles. Momentum and angular momentum. (Taylor, chapters 2-3)
Feb. 3	HW 2 due	
Feb. 3-8		Energy (Taylor chapter 4)
Feb. 10	HW 3 due	
Feb. 10-15		
Feb. 17	HW 4 due	Driven and damped oscillations, Fourier series (Taylor chapter 5)
Feb. 22	In-class test 1	
Feb. 17, 19, 24		Calculus of variations, Lagrange's equations (Taylor chapters 6-7)
Feb. 26	HW 5 due	
Feb. 26-29, Mar. 2		Lagrange's equations, cont'd. (Taylor chapter 7)
Mar. 4	HW 6 due	
Mar 4-9		Two-body central force problems. Non-inertial frames. (Taylor chapter 8-9)
Mar. 11	HW 7 due	
Mar. 14-18	Spring Break	
Mar. 11-23		Rotating frames. Centrifugal and Coriolis Force. (Taylor Chapter 9)
Mar. 25	HW 8 due	
Mar. 30	In-class test 2	
Mar. 25, 28 Apr. 1		Rotations of rigid bodies. (Taylor chapter 10)
Apr. 4	Last drop day	Last day to drop class with Dean's approval except for "urgent and substantiated non-academic reasons"
Apr. 4	HW 9 due	
Apr. 4-8		Coupled oscillations and normal modes (Taylor chapter 11)
Apr. 11	HW 10 due	
Apr. 11-15		Hamiltonian mechanics (Taylor chapter 13)
Apr. 18	HW 11 due	
Apr. 18-22		Nonlinear dynamics (Taylor chapter 12)
Apr. 25	HW 12 due	
Apr. 29	In-class Test 3	
Apr. 25, 27, May 2		Nonlinear dynamics, cont'd. (Taylor chapter 12)
May 4	HW 13 due	
May 6	Last Class Day	
May 11-17	Final Exams	