

PHYS 310- (Undergraduate) Theoretical Mechanics I (3 credits)
Department of Physics & Astronomy, University of Hawaii
Instructor: Prof. Pui K. Lam
Fall Semester 2018

Time: Tu, Th 9:00 - 10:15 a.m.

Place: WAT 114

Instructor: Prof. Pui K. Lam (956-2988; plam@hawaii.edu)

Office Hours: TBD

Grader: TBD

Text: "Classical Mechanics" by John R. Taylor, University Science Books.

Pre-req: Pre: 151 or 170 or 170A, and MATH 244 (or concurrent) or MATH 253A (or concurrent); or consent.

Course Outline:

Ch.1 Newton's Law of Motion - (3L)

Ch. 2 Projectiles and Charge Particles (3L)

Ch. 3 Momentum and Angular Momentum (3L)

Midterm1 (9/20/2018)

Ch. 4 Energy (3L)

Ch. 5 Oscillations (4L)

Ch. 6 Calculus of Variations (4L)

Midterm 2 (11/1/2018)

Ch. 7 Lagrange Equations (4L)

Ch. 8 Two-Body Central-Force Problems (4L)

Final (12/13/2018, 9:45 a.m. - 11:45 a.m.)

Class Participation:

I will give you in-class exercise/problems to work on almost daily. You will turn it in for participation credit. No make up, but you may miss 3 class participations.

Homework:

Typically, one homework set per week, 3 or 4 questions per set, and due on Thursdays. The idea of having homework due on Thursday is that typically students work on homework on weekends; if there are questions they can ask them in class or during office hours the following week. Homework assignments will be posted on Laulima. Late homework will be deduce by 20% per day late (excluding weekends)

Homework Answer Format:

In between formulae, there should be narrative explaining what you are doing (pretend you are writing a solution manual). If the grader does not understand what you are doing, the grader cannot give you credits.

Exams:

Midterms: 15 conceptual questions (2 pts each), 2 calculational problems (35 pts each)

** The conceptual question part of the midterm and final is cumulative.

A sheet of hand-written note (8.5" x 11") is allowed.

Course Grade Distribution:

Total (100%) = Homework (30%) + (Midterm 1+ Midterm 2 + Final=(60%)) + class participation (10%)

The combined % for Midterm 1+ Midterm 2 + Final=60%; the highest score=25%, middle score=20%, lowest score=15%

Grade Scale: (Based on an absolute scale)

- 96-100 (A+), 91-95 (A), 86-90 (A-)
- 81-85 (B+), 76-80 (B), 71-75 (B-)
- 66-70 (C+), 61-65 (C), 56-60 (C-)
- 51-55 (D+), 46-50 (D), 41-45 (D-)
- <40 (F)
- No "incomplete" (I Grade) will be given.

Student Learning Outcomes:

At the successful completion of this course a student is expected to have:

- A good understanding of Newtonian (non-relativistic) mechanics and the types of approximations needed to render the problems tractable.
- A good introduction to Lagrangian formulation of mechanics.
- A good introductory understanding of the fundamental difference between non-relativistic and relativistic mechanics
- A set of mathematical skills to solve a variety of problems in mechanics