

50:750:309 ANALYTICAL MECHANICS I
Fall 2021 Rutgers University Camden

Topics

Newton's Laws of Motion, Projectiles and Charged Particles, Momentum and Angular Momentum, Energy, Oscillations, Calculus of Variations, Lagrange's Equations, Hamiltonian Mechanics, Central Force Problems, Dynamics in Non-Inertial Frames

Learning Goals

Students will be able to view and formulate problems in classical physics in ways of calculus and differential equations; Students will be able to solve certain categories of differential equations, and interpret the results in the context of classical physics; Students will build up their own basis and framework of classical theories with mathematical rigor, and get prepared for other advanced physics courses

Lecture Time and Location

Monday Wednesday 9:35am ~ 10:55am, CNS 213

Instructor

Jiantao Kong, email: jk1729@rutgers.edu, or message on Canvas (preferred)

Office Hours

CNS 216G, Wednesday 2pm ~ 5pm, or by appointment

Textbook

Classical Mechanics by John R. Taylor, University Science Books. Digital or print copies can be found online, and there is one hard copy reserved in the Robson Library

Supplementary Reading

(1) Mechanics 3rd edition by K. R. Symon, (2) Analytical Mechanics 7th edition by G. R. Fowles and G. L. Cassiday, (3) Classical Mechanics 3rd edition by H. Goldstein et al

Homework Assignments

Problems will be selected from the textbook and other sources, approximately weekly posted on Canvas-Assignments; Due date will be specified each time; Students solve the problems on their own paper sheets, make into pictures or PDFs, and upload to the Canvas link as submission

Two Midterm Exams

In-class, first in mid-October covering book chapters 1~5, second in late November before Thanksgiving covering book chapters 6, 7 and 13, closed-book closed-notes but a self-prepared hand-written one-sided A4 equation sheet is allowed (and expected)

Final Exam

In the final exam week, comprehensive, covering book chapters 1~5, 6, 7, 13, 8 and 9, closed-book closed-notes but a two-sided hand-written A4 equation sheet is allowed (and expected)

Grades

midterm1 (20%) + midterm2 (20%) + homework (20%) + final (30%) + attendance (10%)

>90.0	>86.0	>80.0	>76.0	>70.0	>60.0	
A	B+	B	C+	C	D	F

Academic Integrity (click to read the [University Policy](#))

Discussions and group studies for homework assignments are allowed and encouraged, but the work you submit should be absolutely your own, NO COPYING

Accommodations

Please feel free to talk to me and to the Office of the Dean of Students, and it will be offered upon University authorization

This syllabus might be updated on Canvas without further notice

THE END