

CLASS LIST

Mechanics Courses

Physics 1250H: Honors Mechanics and Conservation Laws; Special Relativity AU 2022

Instructor(s): Roland Kawakami and Richard Leonard 5 cr.

- Topics: *Study of classical mechanics including Newton's laws, conservation laws, and introduction to special relativity.*
- Textbook: *Six Ideas that Shaped Physics: Unit C, Unit N, Unit R* by Thomas A. Moore.

Physics 2300: Intermediate Mechanics I AU 2023

Instructor(s): Michael Lisa and Andrew Dougherty 4 cr.

- Topics: *Vectors and kinematics; foundations of Newtonian mechanics; momentum, work, and energy; conservative and nonconservative forces; potentials; angular momentum; rotation about a fixed axis; rigid body motion. Introduction to Mathematica.*
- Textbook: *Introduction to Classical Mechanics* by David Morin, *Basic Training in Mathematics: A Fitness Program for Science Students* by Ramamurti Shankar.

Physics 2301: Intermediate Mechanics II SP 2024

Instructor(s): Antonio Boveia 4 cr.

- Topics: *Generalized angular momentum; inertia tensors; precession; fictitious forces. The special theory of relativity; relativistic kinematics; relativistic momentum and energy. Introduction to general relativity. More rigorous use of Mathematica.*
- Textbook: *Introduction to Classical Mechanics* by David Morin, *Basic Training in Mathematics: A Fitness Program for Science Students* by Ramamurti Shankar.

Electricity and Magnetism Courses

Physics 1251H: Honors E&M; Thermal Physics, Waves, and Quantum Physics SP 2023

Instructor(s): Samir Mathur and Richard Leonard 5 cr.

- Topics: *Electricity and magnetism including Maxwell's equations, thermodynamics, quantum mechanics.*
- Textbook: *Six Ideas that Shaped Physics: Unit E, Unit Q, Unit T* by Thomas A. Moore.

Physics 5400H: Honors Intermediate Electricity and Magnetism I AU 2024

Instructor(s): To Be Announced 4 cr.

- Topics: *Electrostatic fields; dielectrics; boundary-value problems; magnetic fields of steady currents; induction; Maxwell's equations; plane waves.*
- Textbook: *To Be Announced*

Quantum Courses

Physics 5500H: Honors Quantum Mechanics I AU 2024

Instructor(s): To Be Announced 4 cr.

- Topics: *Quantum mechanics and its history; the Schrödinger equation; solutions of one-dimensional scattering; Bound state problems; Dirac notation.*
- Textbook: *To Be Announced*

Lab Courses

Physics 3700: Experimental Physics Instrumentation and Data Analysis SP 2024

Instructor(s): K. K. Gan and Richard Leonard 3 cr.

- Topics: *Construction, simulation and statistical analysis of data from advanced experiments in nuclear processes. Introduction to advanced instrumentation and computer controlled data acquisition.*
- Lab Topics: *Uncertainties and propagation of errors; Radioactive liquids and solids with NaI Calorimeter; Spectroscopy; Probability Distributions; Statistical analysis of collected data; Experiment through computer simulation.*
- Textbook: *An Introduction to Error Analysis* by John Taylor. Various lecture notes: <https://www.asc.ohio-state.edu/gan.1/teaching/spring24/3700.html>

Physics 5680: Big Data Analytics in Physics AU 2024

Instructor(s): To Be Announced 3 cr.

- Topics: *Introduction to machine learning and advanced algorithms. Emphasis on practical physics-based applications, using publicly available data sets.*
- Lab Topics: *To Be Announced*
- Textbook: *To Be Announced*