Physics Courses

Courses

PHYS 5195. Graduate Seminar.
Graduate Seminar: May be repeated three times for credit.
1 Credit Hour
1 Total Contact Hour
0 Lab Hour
1 Lecture Hour
0 Other Hour

PHYS 5196. Graduate Research in Physics.
Graduate Research in Physics: This course may be taken as often as needed, but no more than 3 semester credit hours may be applied to satisfy the requirements for the master's degree. A student will receive only a P or F grade, except when the student has filed a preliminary degree plan in which this course appears.
1 Credit Hour
1 Total Contact Hour
0 Lab Hour
0 Lecture Hour
1 Other Hour

PHYS 5320. Kinematics/Dynamics I.
Kinematics/Dynamics I: Students in this course will review vectors, kinematics (linear, 2, and 3-dimensional including uniform circular), Newton's laws of motion, and work. Each topic be considered both conceptually and mathematically from the dual perspectives of learner and teacher. These dual perspectives imply an emphasis on both content and pedagogical content knowledge. Hands-on, inquiry activities and pertinent educational research literature will be employed towards these ends.
3 Credit Hours
3 Total Contact Hours
1 Lab Hours
2 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 1403 w/C or better ) AND (PHYS 1404 w/C or better)

PHYS 5321. Mechanics.
Mechanics: Lagrange's equations, nonholonomic constraints, Hamilton's principles, two-body central force, rigid body dynamics, Lagrangian relativistic mechanics, Hamilton and Hamilton-Jacobi equations, canonical transformations.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 3352 w/C or better)

PHYS 5325. Mathematical Physics.
Mathematical Physics: Linear systems, special functions, complex variables, and tensor problems in physics. Offered Fall semester.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
PHYS 5330. Kinematics/Dynamics II.
Kinematics/Dynamics II: Students in this course will review the conservation laws (energy, linear and angular momentum), rotational dynamics, simple harmonic motion, equilibrium, and gravitation. Again the participating students will consider both teaching and learning these concepts through inquiry and use of the research literature.
3 Credit Hours
3 Total Contact Hours
1 Lab Hours
2 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 5320 w/C or better)

PHYS 5331. Introduction to Health Physics.
The course introduces the graduate students in Medical Physics to the basics of Radiation Physics (Structure of Matter and Radioactivity), Interactions of Radiation with Matter, Radiation Detection, and the Biological Effects of Radiation.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

PHYS 5332. Intro to Medical Physics.
The course introduces the graduate students in Medical Physics to the basics of Radiation Production in Clinic and Radiation Protection, as well as to the main topics of Medical Physics, Diagnostic Imaging and Radiation Therapy.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

PHYS 5333. Physics of Radiation Therapy.
The course introduces the graduate students in Medical Physics to the methods for measurement and calculation of the adsorbed dose, to the treatment planning for X-rays, electron beams and brachytherapy, as well as to methods for quality assurance in Radiation Therapy.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

PHYS 5334. Physics of Diagnostic Imaging.
The course introduces the graduate students in Medical Physics to the physics involved in the main method of Medical Imaging: Computed and Film Radiology, Mammography and Fluoroscopy, Computed Tomography and Magnetic Resonance Imaging.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

PHYS 5340. Electricity and Magnetism.
Electricity and Magnetism: Students will study and learn to effectively teach about electric charges and their interactions, electric fields, electric potential, capacitance, current and resistance, circuits, magnetic fields, induction magnetism of matter, and Maxwell's Equations.
3 Credit Hours
3 Total Contact Hours
1 Lab Hours
2 Lecture Hours
0 Other Hours

Major Restrictions:
Restricted to majors of MATS

Prerequisite(s): (PHYS 5330 w/C or better)
PHYS 5341. Electrodynamics.
Electrodynamics: Boundary value problems, polarization and stress tensor. Conservation laws and energy momentum tensor. Relativistic
electrodynamics. Covariant form of field equations. Potentials and gauge invariance.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 4342 w/C or better)

PHYS 5350. Wave Phenomena and Optics.
Wave Phenomena and Optics: Students will develop an understanding of and ability to teach wave phenomena including sound and light. Geometric
optics and wave/particle duality will also be included in this eclectic yet important course.

3 Credit Hours
3 Total Contact Hours
1 Lab Hours
2 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 5340 w/C or better)

PHYS 5361. Quantum Mechanics.
Quantum Mechanics: Solution of the Schroedinger wave equation for discrete and continuous energy eigenvalues; representation of physical variables
as operators and the matrix formulation of quantum mechanics; approximation methods.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 4356 w/C or better)

PHYS 5365. Advanced Statistical Mechanics.
Introduction to many body problems.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 3331 w/C or better)

Solid State Physics: Electromagnetic, elastic and particle waves in periodic lattices as applied to the electrical, magnetic and thermal properties of solids.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (PHYS 4356 w/C or better)

Research Problems in Physics: Required course for the 36-hour non-thesis option. Requires two copies of a type-written report. May be repeated for
credit; maximum credit allowed six hours. May not be counted as thesis research but may be taken one time as a preparatory investigation course prior
to the beginning of thesis research.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
0 Lecture Hours
3 Other Hours
PHYS 5393. Special Topics in Physics.
Special Topics in Physics: Topics to be announced. May be repeated for credit.
3 Credit Hours
3 Total Contact Hours
  0 Lab Hours
  3 Lecture Hours
  0 Other Hours

PHYS 5396. Graduate Research in Physics.
Graduate Research in Physics: This course may be taken as often as needed, but no more than 3 semester credit hours may be applied to satisfy the requirements for the master's degree. A student will receive only a pass/fail grade except when the student has filed a preliminary degree plan in which this course appears.
3 Credit Hours
3 Total Contact Hours
  0 Lab Hours
  3 Lecture Hours
  0 Other Hours

PHYS 5398. Thesis.
Thesis.
3 Credit Hours
3 Total Contact Hours
  0 Lab Hours
  0 Lecture Hours
  3 Other Hours

PHYS 5399. Thesis.
Thesis.
3 Credit Hours
3 Total Contact Hours
  0 Lab Hours
  0 Lecture Hours
  3 Other Hours

Prerequisite(s): (PHYS 5398 w/P or better)

PHYS 5696. Graduate Research in Physics.
Graduate Research in Physics (0-0-6) This course may be taken as often as needed, but no more than three semester hours may be applied to satisfy the requirements for the master's degree. A student will receive only a pass/fail grade except when the student has filed a preliminary degree plan in which this course appears.
6 Credit Hours
6 Total Contact Hours
  0 Lab Hours
  0 Lecture Hours
  6 Other Hours