

Minors in Physics & Astronomy

Requirements for the Minor.

Minors in the College of Liberal Arts and Sciences are constructed with the following basic requirements: 18 hours in the minor field, with 12 of those hours required to be at a junior/senior level. The specific requirements for the physics minor and the astronomy minor follow:

The physics minor

PHSX 211 (or PHSX 213) General Physics I.....	4
PHSX 212 (or PHSX 214) General Physics II	4
PHSX 313 General Physics III	3
PHSX 316 Intermediate Physics Laboratory	1
PHSX 521 Mechanics I.....	3
PHSX 531 Electricity and Magnetism.....	3
Any PHSX course numbered 500 or above	3

21 credit hours, of which 13 are at the junior/senior level of work.

The astronomy minor

PHSX 211 (or PHSX 213) General Physics I.....	4
PHSX 212 (or PHSX 214) General Physics II	4
PHSX 313 General Physics III	3
PHSX 316 Intermediate Physics Laboratory	1
Astronomy and related field electives at the jr/sr level	8 or more

Students are strongly advised to take Astronomy 391 as their introductory course in astronomy; if students have already taken Astronomy 191 as an introductory astronomy course, they should inquire about taking 3 credit hours of Astronomy 390 instead. Be aware that Astronomy 591 and 592 are only taught in alternate years (Fall odd / Spring even semesters)

School of Business, concentration in physics

Students in the school of business may obtain a business degree with a concentration in physics as follows:

PHSX 211 (or PHSX 213) General Physics I.....	4
PHSX 212 (or PHSX 214) General Physics II	4
PHSX 313 General Physics III	3
PHSX 316 Intermediate Physics Laboratory	1
Junior/senior courses numbered 300 and above	11
for a total of 23 credits. Additional courses (18 credit hours) in mathematics are required:	
Math 121 or 141, Calculus I	5
Math 122 or 142, Calculus II	5
Math 223, Vector Calculus	3
Math 290, Linear Algebra	2
Math 320, Elementary Differential Equations	3

Planned Schedule of Courses

Courses Normally Offered Both Fall and Spring Semesters

Course Number and Title

ASTR 191 Contemporary Astronomy
ASTR 196 Introductory Astronomy Laboratory
ASTR 390 Undergraduate Problems
ASTR 503 Undergraduate Research
ASTR 597 Analysis in Astrophysics

PHSX 111 Introductory Physics
PHSX 114 College Physics I
PHSX 115 College Physics II
PHSX 116 Introductory Physics Lab
PHSX 211 General Physics I
PHSX 212 General Physics II
PHSX 213 General Physics I Honors
PHSX 313 General Physics III

PHSX 316 Intermediate Physics Laboratory
PHSX 500 Special Problems
PHSX/EPHX 501 Honors Research
PHSX/EPHX 503 Undergraduate Research
PHSX 700 Colloquium
PHSX/ASTR 791 Seminar in Astrophysics
PHSX 800 Graduate Problems
PHSX/ASTR 897 Seminar in Plasma and Space Physics
PHSX 899 Master's Research/Thesis
PHSX 917 Seminar in Theoretical Physics
PHSX 947 Seminar in Nuclear Physics
PHSX 967 Seminar in Particle Physics
PHSX 987 Seminar in Solid State Physics
PHSX 999 Ph.D. Dissertation Research

Prerequisites

High School alg. and geom.
ASTR 191 or 391 (Co.)
Permission
Permission
ASTR 592 or ASTR 692
Eligibility for MATH 104
MATH 104
PHSX 114
PHSX 111 (Co.)
MATH 121 or 116
PHSX 211, MATH 122 (Co.)
MATH 121 and permission
PHSX 212/214 or EECS 220
MATH 220/320 (Co.)
PHSX 313 (pre- or co-requisite)
Permission, see catalog
Permission, see catalog
Permission, see catalog
None
Permission, see catalog
Permission, see catalog
Permission, see catalog
Permission, see catalog
Permission, see catalog
Permission, see catalog
Permission, see catalog
Permission, see catalog
Permission, see catalog

Courses Normally Offered in Summer

Course Number and Title

ASTR 390 Undergraduate Problems
ASTR 503 Undergraduate Research
ASTR 597 Analysis in Astrophysics

PHSX 114 College Physics I
PHSX 115 College Physics II
PHSX 500 Special Problems
PHSX/EPHX 501 Honors Research
PHSX/EPHX 503 Undergraduate Research
PHSX 559 Topics in Modern Physics
PHSX 800 Graduate Problems
PHSX 899 Master's Research/Thesis
PHSX 999 Ph.D. Dissertation Research

Prerequisites

Permission
Permission
ASTR 592 or ASTR 692
MATH 104
PHSX 114
Permission, see catalog
Permission, see catalog
Permission, see catalog
MATH 116, PHSX 115 or 313
Permission, see catalog
Permission, see catalog
Permission, see catalog

Courses Normally Offered Each Fall Semester

Course Number and Title	Prerequisites
PHSX 214 General Physics II Honors	PHSX 211/213, MATH 122 (Co.)
PHSX/EPHX 516 Physical Measurements PHSX/EPHX 521 Mechanics I	PHSX 313, 316, 521 (coreq) PHSX 211/213, MATH 223, 290, 220/320
PHSX/EPHX 531 Electricity & Magnetism	PHSX 212/214, MATH 223, 290, 220/320, PHSX 521/permis.
PHSX 557 Topics in Mechanics, Materials, Thermo.	MATH 116, PHSX 114 or 211
PHSX 559 Topics in Modern Physics	MATH 116, PHSX 115 or 313
PHSX/EPHX 671 Thermal Physics	PHSX 611
PHSX 711 Quantum Mechanics I	PHSX 611, MATH 320
PHSX 717 Graduate Seminar	First year graduate student
PHSX/CHEM 718 Mathematical Methods in Physical Sciences	2 semesters jr.-sr. MATH
PHSX 821 Classical Mechanics	12 hrs jr.-sr. PHSX

Courses Normally Offered Each Spring Semester

Course Number and Title	Prerequisites
ASTR 391, Physical Astronomy	MATH 121 & honors or permission
PHSX/EPHX 536 Electronic Circuits & Measurements	PHSX 212/214, MATH 223 and 290, PHSX 313 and 316 (rec.)
PHSX 558 Topics in Electricity and Magnetism and Optics	MATH 116, PHSX 115 or 212
PHSX/EPHX 601 Design of Physical and Electronic Systems one lab course	12 hrs jr./sr. PHSX/EPHX incl.
PHSX/EPHX 511 Introductory Quantum Mechanics	PHSX 313, MATH 290
PHSX/EPHX 621 Mechanics II	PHSX 521
PHSX/EPHX 631 Electromagnetic Theory	PHSX 531
PHSX 811 Quantum Mechanics II	PHSX 711
PHSX/ASTR 815 Computational Physics & Astronomy	6 hrs jr.-sr. PHSX/ASTR
PHSX 831 Electrodynamics I	PHSX 718, PHSX 821

Courses Normally Offered Every Other Fall Semester

Course Number and Title	Prerequisites
ASTR 591 ⁺ Stellar Astronomy	PHSX 212
ASTR 596 ⁺ Observational Astrophysics	ASTR 591 pre- or co-req.
ASTR/PHSX/EPHX 691 [†] Astrophysics I	PHSX 313 or consent
PHSX/EPHX 661 [†] Introduction to Elementary Particle Physics	PHSX 313
PHSX 761 [†] Elementary Particles I	PHSX 711
PHSX 781 ⁺ Solid State Physics I	PHSX 611, 671
PHSX 911 ⁺ Quantum Mechanics III	PHSX 811
PHSX 931 [†] Electrodynamics II	PHSX 831

Courses Normally Offered Every Other Spring Semester

Course Number and Title

ASTR 592[†] Galactic & Extragalactic Astronomy
 ASTR 692⁺ Astrophysics II

Prerequisite

ASTR 591 or consent
 ASTR 691 or consent

PHSX/EPHX 641[†] Introduction to Nuclear Physics
 PHSX/EPHX 693[†] Gravitation & Cosmology
 PHSX 721⁺ Chaotic Dynamics
 PHSX 741[†] Nuclear Physics I
 PHSX 793[†] Physical Cosmology
 PHSX/ASTR 795⁺ Space Plasma Physics
 PHSX 871[†] Statistical Physics I

PHSX 313 and 611
 PHSX 313, MATH 320
 MATH 320, PHSX 521
 PHSX 611
 MATH 718
 PHSX 621, 631 (coreq)
 PHSX 711, 821, 671 (rec.)

Courses Offered Occasionally

Course Number and Title

ASTR 293 Astronomy Bizarre
 ASTR 394 The Quest for Extraterrestrial Life

Prerequisites

Previous ASTR course
 introBIOL, GEOL or ASTR course

PHSX 112 Concepts in Physics, Honors
 PHSX 502 Seminar in Physics & Astronomy Instruction
 PHSX/EPHX 518 Mathematical Physics
 PHSX 594 Cosmology and Culture
 PHSX/EPHX 600 Special Topics in Physics and Astrophysics
 PHSX/EPHX 615 Numerical and Computational Methods in Physics
 138
 PHSX/EPHX 623 Physics of Fluids
 PHSX/EPHX 655 Optics
 PHSX/EPHX 681 Concepts in Solids
 PHSX 801 Advanced Topics
 PHSX 841 Nuclear Physics II
 PHSX 861 Elementary Particles II
 PHSX 881 Solid State Physics II
 PHSX 895 Plasma Physics
 PHSX 912 Quantum Field Theory
 PHSX 915 Relativity
 PHSX 971 Advanced Statistical Mechanics

Eligible for MATH 104
 Permission
 PHSX 313, MATH 320
 None
 Permission
 PHSX 313, MATH 320, EECS
 138
 MATH 223&290, PHSX 212/214
 PHSX 313 and 316
 PHSX 313 and 611
 Permission
 PHSX 741, 811
 PHSX 761, 911 (Coreq)
 PHSX 631, 711
 PHSX 795
 PHSX 911
 10 hrs. jr./sr. PHSX/MATH
 PHSX 871 or CHEM 917

Several courses cross-listed with Geology are not included.

⁺ These courses are taught in odd-numbered years.

[†] These courses are taught in even-numbered years.

Course Numbering System

- Courses 000–099** do not count toward graduation.
- Courses 100–299** are designed for freshman and sophomores.
- Courses 300–499** are designed for juniors and seniors.
- Courses 500–699** are designed primarily for juniors and seniors but may be taken by graduate students for graduate credit.
- Courses 700–799** are designed primarily for graduate students who have less than 30 hours of graduate credit but may be taken by undergraduates for undergraduate credit.
- Courses 800–999** are open only to graduate students except by special permission.

NOTE: There are no sublevels within these six categories; *e.g.*, a 600–level course is not necessarily more advanced than a 500–level course. See the University Timetable of Classes and the Bulletin of the Graduate School for a complete description.

Research and Graduate Programs

The Department offers graduate work leading to the Masters and Ph.D. degrees in Physics. It has ongoing experimental and theoretical programs of research in astrophysics, biophysics, chaos, condensed matter, cosmology, elementary particles, nuclear physics, and plasma and space physics. The directory, beginning on page 1, lists the faculty interests in these areas and their sub-field. These endeavors provide occasional opportunities for capable undergraduate students to become involved in research.