

*Required Courses – 17 credits

**Electives – 17 credits

Doctoral Thesis – 26 credits

†Can be taken in years 2 or 3 depending on when offered.

‡Offered Spring and Fall semesters

Example Course Curriculum for Astrophysics

Year 1

Fall semester

- PHSX 501 - Mathematical Methods and Their Applications in Classical Mechanics (3)*
- PHSX 506 - Quantum Mechanics I (3)*
- PHSX 594-001 - Teaching Seminar (1)*

Spring semester

- PHSX 519 - Mathematical Methods and Their Applications in Electromagnetic Theory (3)*
- PHSX 535 - Statistical Mechanics (3)*
- PHSX 594-015 - Introduction to Research (1)*

Year 2

Fall semester

- ASTR 475 - Observational Astronomy (4)**
- Elective (3)**
- PHSX 594 - Intro to Python (1)**

Spring semester

- ASTR 550 - Radiative Processes in Astrophysics (3)*†
- Elective (3)**
- PHSX 594 - Astro Journal Club (1)**

Year 3

Fall semester

- ASTR 560 - Stellar Astrophysics (3)** †
- PHSX 590/690 - Master's/Doctoral Thesis

Spring semester

- ASTR 561 - Astrophysics of Galaxies (3)** †
- PHSX 590/690 - Master's/Doctoral Thesis

Year 4

- PHSX 690 - Doctoral Thesis

Year 5/6

- PHSX 690 - Doctoral Thesis

†Can be taken in years 2 or 3 depending on when offered.

*Required courses

**Electives

Example Course Curriculum for Condensed Matter Theory

Year 1

Updated 1/30/24

Fall semester

- PHSX 501 - Mathematical Methods and Their Applications in Classical Mechanics (3)*
- PHSX 506 - Quantum Mechanics I (3)*
- PHSX 594-001 - Teaching Seminar (1)*

Spring semester

- PHSX 519 - Mathematical Methods and Their Applications in Electromagnetic Theory (3)*
- PHSX 535 - Statistical Mechanics (3)*
- PHSX 594-015 - Introduction to Research (1)*

Year 2

Fall semester

- PHSX 520 – Electromagnetic Theory II (3)*
- PHSX 544 – Condensed Matter Physics I (3)**
- Elective (3)88

Spring semester

- PHSX 507 – Quantum Mechanics II (3)**
- PHSX 545 – Condensed Matter Physics II (3)**
- Elective (3)**

Year 3

Fall semester

- PHSX 566 – Math Methods for Theoretical Physics (3)**
- PHSX 590/690 - Master's/Doctoral Thesis

Spring semester

- PHSX 555 – Quantum Field Theory (3)**
- PHSX 590/690 - Master's/Doctoral Thesis

Year 4

- PHSX 690 - Doctoral Thesis

Year 5/6

- PHSX 690 - Doctoral Thesis

Example Course Curriculum for Physics

Year 1

Fall semester

- PHSX 501 - Mathematical Methods and Their Applications in Classical Mechanics (3)*
- PHSX 506 - Quantum Mechanics I (3)*
- PHSX 594-001 - Teaching Seminar (1)*

Spring semester

- PHSX 519 - Mathematical Methods and Their Applications in Electromagnetic Theory (3)*
- PHSX 535 - Statistical Mechanics (3)*
- PHSX 594-015 - Introduction to Research (1)*

Year 2

Fall semester

- PHSX 520 - Electromagnetic Theory II (3)*

- PHSX 566 - *Math Methods for Theoretical Physics (3)** †

Spring semester

- PHSX 507 - Quantum Mechanics II (3)**
- PHSX 516 - **Experimental Physics (3)** ‡

Year 3

Fall semester

- Electives (4)**
- PHSX 590/690 - Master's/Doctoral Thesis

Spring semester

- Electives (4)**
- PHSX 590/690 - Master's/Doctoral Thesis

Year 4

- PHSX 690 - Doctoral Thesis

Year 5/6

- PHSX 690 - Doctoral Thesis

Example Course Curriculum including Foundational Undergraduate Classes

Year 1

Fall semester

- PHSX 320 - Undergraduate Classical Mechanics (3)
- PHSX 461 - Undergraduate Quantum Mechanics I (3)
- PHSX 592 - Independent Study (3)
- PHSX 594-001 - Teaching Seminar (1)*

Spring semester

- PHSX 462 - Undergraduate Quantum Mechanics II (3)
- PHSX 423 - Undergraduate Electricity and Magnetism I (3)
- PHSX 592 - Independent Study (3)
- PHSX 594-015 - Introduction to Research (1)**

Year 2

Fall semester

- PHSX 425 - Undergraduate Electricity and Magnetism II (3)
- PHSX 501 - Mathematical Methods and Their Applications in Classical Mechanics (3)**
- PHSX 506 - Quantum Mechanics I (3)**

Spring semester

- PHSX 519 - Mathematical Methods and Their Applications in Electromagnetic Theory (3)*
- PHSX 535 - Statistical Mechanics (3)*

Year 3

Fall semester

- PHSX 520 - Electromagnetic Theory II (3) **or** ASTR 550 - Radiative Processes in Astrophysics (offered Spring even years)*
- 500-level Elective (3)

Spring

- 500-level Elective (3)

Updated 1/30/24

- PHSX 590/690 - Master's/Doctoral Thesis

Year 4

- PHSX 690 - Doctoral Thesis

Year 5/6

- PHSX 690 - Doctoral Thesis

Examples of graduate physics/astro courses at the 500 level:

ASTR 550 - Radiative Processes in Astrophysics
ASTR 560 - Stellar Astrophysics
ASTR 561 - Astrophysics of Galaxies
PHSX 507 - Quantum Mechanics II
PHSX 516 - Experimental Physics
PHSX 523 - Introduction to General Relativity
PHSX 525 - Gravitational Waves and Cosmology (a.k.a. GR III)
PHSX 531 - Nonlinear Optics/Laser Spectroscopy
PHSX 544 - Condensed Matter Physics I
PHSX 545 - Condensed Matter Physics II
PHSX 555 - Quantum Field Theory
PHSX 565 - Astrophysical Plasma Physics
PHSX 566 - Math Methods for Theoretical Physics (formerly called Math Phys I)
PHSX 567 - Computational Physics (formerly called Math Phys II)

Examples of relevant math, computer science, engineering, courses (up to 7 credits):

EELE 581 Fourier Optics
EELE 582 Optical Design
EELE 583 Remote Sensing Systems
M 508 Mathematics of machine learning
CSCI 447 Machine Learning
CSCI 547 Machine Learning
CSCI 550 Advanced Data Mining
Hale COLLAGE Courses (e.g., Helio and Asteroseismology)

Undergrad astro/physics courses at the 400 level (up to 7 credits)

PHSX 591 - Special Topics (repeatable up to 12 credits)

PHSX/ASTR 592 - Independent Study (up to 6 credits)

Non-required seminars (up to 2 credits)