*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

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**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)

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