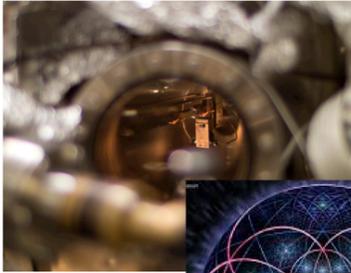




## Bachelor of Science in Physics



The faculty and students of the Department of Physics and Astronomy are engaged in explaining and predicting the behavior of the physical world around us, including everything from subatomic particles to supernovas.



Our department combines the best features of a small liberal arts college and a major research university. We are a moderately sized department with accessible faculty dedicated to excellence in teaching.

The BS degree is an intensive program of study providing stronger preparation for graduate school in physics, or a closely related science, than does the BA. Students planning to pursue graduate study normally elect the BS program.

### Concentration Requirements for BS degree in Physics

- PHY 217, 218, 227, 235, 237, 246 or their close equivalents; PHY 243W or 244W; an additional 4 credit hours in an approved 200-300 level physics and/or astronomy course.
- Two courses in advanced mathematics: MTH 281 is required and MTH 282 or OPT 287 is recommended.
- Computer literacy course
- One course in Astronomy or a course in a natural science other than Physics and Astronomy.
- At least a 2.0 (C) average in astronomy, physics and mathematics courses must be maintained.
- All choices must be approved by the undergraduate physics advisor.

The computer literacy requirement can be satisfied by receiving a passing grade in PHY 256 (Computational Physics, taken preferably in the 2nd year), an introductory college computing course (preferably CSC 161 taken in the 1st year, but CSC 171 is also acceptable), or by completing a computing-based problem approved by the department's undergraduate physics advisor (possibly one associated with a previous class) or by having a faculty member familiar with the student's work certify the computer literacy.

**Note:** Equivalent graduate level courses may be substituted when appropriate. Well-prepared students might consider taking the graduate quantum mechanics sequence PHY 407/408 in their senior year, in place of PHY 246.



## Four-Year Worksheet: Bachelor of Science in Physics

### Physics Pre-Concentration Regular Sequence

First Year	
Fall	Spring
MTH 161: Calculus I	PHY 121: Mechanics
WRT 105: College Writing	MTH 162: Calculus II
Elective or Cluster course	Elective or Cluster course
Elective or Cluster course	Elective or Cluster course
Second Year	
Fall	Spring
PHY 122: Electromagnetism	PHY 123: Modern Physics
MTH 164: Multidimensional Calc.	MTH 165: Linear Algebra & Diff. Eqs
Elective or Cluster course	Elective or Cluster course
Elective or Cluster course	Elective or Cluster course

### Physics Pre-Concentration Honors Sequence<sup>1</sup>

First Year	
Fall	Spring
PHY 141: Honors Mechanics	PHY 143: Honors Modern Physics <sup>2</sup>
MTH 161/171: Honors Calculus I	MTH 162/172: Honors Calculus II
WRT 105: College Writing	Elective or Cluster course <sup>3</sup>
Elective or Cluster course	Elective or Cluster course
Second Year	
Fall	Spring
PHY 142 -- Honors Electromagnetism	PHY 237-- Quantum Mech. of Physical Systems
MTH 164/173 -- Analysis IIIA	MTH 165/174 -- Honors Calculus IV
Elective or Cluster course	Elective or Cluster course
Elective or Cluster course	Elective or Cluster course

Third Year	
Fall	Spring
PHY 217 -- Electricity & Magnetism I	PHY 218 -- Electricity & Magnetism II
PHY 235W -- Classical Mechanics	PHY 237 -- Quantum Mech. of Physical Systems <sup>4</sup>
MTH 281 -- Fourier Series	PHY 227 -- Thermo. & Statistical Mechanics <sup>5</sup>
Elective	Elective
Fourth Year	
Fall	Spring
PHY 243W -- Advanced Experimental Techniques I	PHY 246 -- Quantum Theory
PHY or AST Elective <sup>6</sup>	MTH 282 -- Intro. Complex Variables
Elective	PHY or AST Elective
Elective	Elective

<sup>1</sup> Students who are intending to major in physics or related fields are encouraged to pursue the honors sequence.

<sup>2</sup> PHY 143 is open to freshmen only, except with permission of the instructor.

<sup>3</sup> Students are encouraged to take a course in computer programming during their first or second years in order to satisfy the major's computer literacy requirement. Such courses include CSC 161, 171, ECE 114, and PHY 256.

<sup>4</sup> Students who have taken PHY 237 in their sophomore year should consider taking PHY 246 in either their junior or senior years.

<sup>5</sup> Students continuing to graduate school in physics or in astronomy, generally take the GRE Physics Exam during the Fall of their senior year. Before taking the GREs, it is strongly recommended that you have taken PHY 227, Thermodynamics and Statistical Mechanics, and that you review old copies of GRE exams available in the Physics/Optics/Astronomy Library, located on the 3rd floor of Bausch & Lomb Hall, room 374.

<sup>6</sup> Depending on what is offered in any given semester, this can typically be PHY 251 (Condensed Matter Physics), PHY 253 (Biological Physics), PHY 254 (20<sup>th</sup> Century Particle Physics), PHY 256 (Computational Physics), PHY 258 (Energy and the Environment), PHY 391 (Independent Study), PHY 393W (Senior Thesis), AST 231 (Relativity and Gravitation), AST 241 or AST 242 (Astrophysics) or AST 232 (Dynamics and Statistics of Star Systems), AST 393W (Senior Thesis), or any other 200 level standard physics or astronomy course. Note that the Advanced Experimental Techniques courses PHY 243W and PHY 244W and PHY245W Advanced Nuclear Science Education Laboratory (ANSEL) are independent; two out of the three can be taken since each course offers a different set of experiments.

Please contact our Undergraduate Coordinator with any questions: [UGCoordinator@UR.Rochester.edu](mailto:UGCoordinator@UR.Rochester.edu)