Physics B.S. Curriculum for Students Entering up through 2014

CMU / MCS Science Core
All MCS students must complete these core courses by the end of their Junior year. Computing @ Carnegie Mellon must be completed in the first year.

- 99-101 / -102 / -103: Computing @ CMU
- 33-111: Physics I for Science Students
  33-131: Matter and Interactions I
- 33-112: Physics II for Science Students
  33-132: Matter and Interactions II
- 03-121: Modern Biology
- 09-105: Introduction to Modern Chemistry I
- 15-110: Principles of Computing
  15-112: Fund. of Programming & CS
- 21-120: Differential and Integral Calculus
- 21-122: Integration, Diff. Eq., and Approx.

MCS Distribution
All MCS students take both constrained and free electives outside MCS. Permissible electives are listed in the course catalog.

- 76-101: Interpretation and Argument
- Cognition, Choice, and Behavior Elective
- Economic, Political, and Social Institutions Elective
- Cultural Analysis Elective
- Non-Technical Elective
- Non-Technical Elective
- Non-Technical Elective
- Non-Technical Elective

Physics Core
All Physics majors take these Physics and Mathematics courses to prepare for individualized tracks of study, including four colloquium courses.

- 33-104: Experimental Physics
- 33-201: Physics Sophomore Colloquium I
- 33-202: Physics Sophomore Colloquium II
- 33-211: Physics III: Modern Essentials
- 33-228: Electronics I
- 33-231: Physical Analysis
- 33-232: Mathematical Methods of Physics
- 33-234: Quantum Physics
- 21-259: Calculus in Three Dimensions
- 33-301: Physics Upperclass Colloquium I
- 33-302: Physics Upperclass Colloquium II
- 33-331: Physical Mechanics I
- 33-338: Int. Electricity and Magnetism I
- 33-340: Modern Physics Laboratory
- 33-341: Thermal Physics I

Track
These Physics, Mathematics, Technical, and Free electives determine your track. The following pages have overviews of each track.

- Physics Breadth Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Mathematics Elective
- Technical Elective
- Technical Elective
- Technical Elective
- Free Elective
- Free Elective
- Free Elective

Note: Free electives are to satisfy the 360 unit requirement.

Key
: Required Course
: Select One Course
: Any Course

8/16

Physics Major Tracks, Page 1

Graduate School Preparation

Regardless of track, Physics majors planning to undertake graduate studies are strongly advised to take the following four courses.

- 33-332: Physical Mechanics II
- 33-339: Intermed. Electricity & Magnetism II
- 33-445: Advanced Quantum Physics I
- 33-446: Advanced Quantum Physics II

Note: These courses may be used as Qualifying Physics, Technical, or Free Electives.

No Track

Physics students wanting maximum freedom can opt not to select a track. While there is significant flexibility, there are breadth requirements.

- Physics Breadth Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Mathematics Elective
- Technical Elective
- Technical Elective
- Technical Elective
- Free Elective
- Free Elective
- Free Elective

Applied Physics Track

Students aiming for a career path in industrial or governmental laboratories can take this track to enhance computing and laboratory skills.

- 33-448: Introduction to Solid State Physics
- Computational Science Elective
- Applied Physics or Laboratory Elective
- Applied Physics or Laboratory Elective
- Applied Physics or Laboratory Elective
- Applied Physics or Laboratory Elective
- 33-350: Undergraduate Research 33-451: Senior Research related to applied physics
- Mathematics Elective
- Free Elective
- Free Elective
- Free Elective

Astrophysics Track

Students planning careers or postgraduate work in astronomy or astrophysics can follow this track to gain a strong background in the field.

- 33-224: Stars, Galaxies and the Universe
- 33-466: Extragalactic Astrophysics and Cosmology
- 33-467: Astrophysics of Stars and the Galaxy
- 33-350: Undergraduate Research 33-451: Senior Research related to astrophysics
- Mathematics Elective
- Technical Elective
- Technical Elective
- Technical Elective
- Free Elective
- Free Elective
- Free Elective

Key

- : Required Course
- : Select One Course
- : Recommended Course
- : Any Course

Physics Major Tracks, Page 2

Graduate School Preparation
Regardless of track, Physics majors planning to undertake graduate studies are strongly advised to take the following four courses.

- 33-332: Physical Mechanics II
- 33-339: Intermed. Electricity & Magnetism II
- 33-445: Advanced Quantum Physics I
- 33-446: Advanced Quantum Physics II

Note: These courses may be used as Qualifying Physics, Technical, or Free Electives.

Biological Physics Track
Students preparing for careers in biological or medical physics or graduate work in biophysics can broaden their major with this track.

- 33-441: Introduction to Biophysics
- Qualifying Physics Elective
- Mathematics Elective
- 03-231: Biochemistry I
- 09-217: Organic Chemistry I
- 09-218: Organic Chemistry II
- Biological Sciences Elective
- Biological Sciences Elective
- Free Elective
- Free Elective
- Free Elective

Chemical Physics
Students planning graduate studies with an emphasis on chemical physics or a health profession may be interested in this track.

- Physics Breadth Elective
- Mathematics Elective
- 09-106: Modern Chemistry II
- 09-344: Physical Chemistry (Quantum)
- 09-345: Physical Chemistry (Thermo)
- Chemistry Elective
- Chemistry Elective
- Chemistry Elective
- Free Elective
- Free Elective
- Free Elective

Computational Physics Track
Students can strengthen their grounding in the foundations and practice of computer use as applied to scientific problems with this track.

- 33-241: Introduction to Computational Physics
- 33-456: Advanced Computational Physics
- Physics Breadth Elective
- Qualifying Physics Elective
- 21-127: Concepts of Mathematics
- 21-369: Numerical Methods
- 15-122: Principles of Imperative Computation
- 15-150: Functional Programming
- Free Elective
- Free Elective
- Free Elective

Key

- : Required Course
- : Select One Course
- : Recommended Course
- : Any Course