PHYSICS/COMPUTER SCIENCE

This major is intended for students with dual interests in physics and computer science who wish to complete the essential courses for both majors within four years. It prepares students for a career in a computer-related field and/or science research.

Opportunities for Students

- **Senior Project:** Students construct an original project applying computer technology (in either hardware or software) to produce a result useful in the physics classroom or laboratory.

- **Women in Physics at USC:** WIP organizes a two-day conference for undergraduate women in physics to promote an increased awareness of current research and career options in physics, greater familiarity with the graduate school experience, and resources for applying to and being successful in graduate school.

- **Society of Physics Students:** SPS seeks to create a tight-knit community of those interested in physics & astronomy and to provide opportunities for students to attend lectures and take field trips to sites including the NASA Jet Propulsion Laboratory.

- **Study Abroad:** Earn credit while studying at noted universities in an array of locations including the United Kingdom, France, Chile, or Australia.

Notable Courses

- **CSCI 303: Design and Analysis of Algorithms** — Upper and lower bounds on sorting and order median. Deterministic and random computation, data structures, NP-completeness, cryptography, Turing machines and undecidability.


- **PHYS 304: Mechanics** — Dynamics of particles, kinematics of rotations, rigid body motion, Lagrangian and Hamiltonian formalism, theory of small vibrations.

- **PHYS 438ab: Introduction to Quantum Mechanics and its Applications** — A: Concepts and techniques of quantum mechanics; free and bound states, the hydrogen atom. B: Relativity, atomic spectra, quantum statistics, nuclear models, nuclear reactions, elementary particles.
Bachelor of Science (BS) Requirements

Lower Division Course Requirements*

- CSCI 103: Introduction to Programming
- CSCI 104: Data Structures and Object Oriented Design
- CSCI 170: Discrete Methods in Computer Science
- CSCI 201: Principals of Software Development
- CSCI 270: Introduction to Algorithms and Theory of Computing
- MATH 125: Calculus I
- MATH 126: Calculus II
- MATH 225: Linear Algebra and Linear Differential Equations
- MATH 226: Calculus III
- MATH 245: Mathematics of Physics and Engineering I
- PHYS 151: Fundamentals of Physics I — Mechanics and Thermodynamics
  or PHYS 161: Advanced Principles of Physics I
- PHYS 152: Fundamentals of Physics II — Electricity and Magnetism
  or PHYS 162: Advanced Principles of Physics II
- PHYS 190: Physics Discovery Series

Upper Division Course Requirements*

- CSCI 350: Introduction to Operating Systems
- EE 352: Computer Organization and Architecture
- MATH 445: Mathematics of Physics and Engineering II
- PHYS 304: Mechanics
- PHYS 408: Electricity and Magnetism A & B
- PHYS 438: Introduction to Quantum Mechanics A & B
- PHYS 495: Senior Project

*This information is offered as a partial overview only. For additional information, including all major requirements, please consult the USC Catalogue or http://dornsife.usc.edu/physics/physics-computer-science/. Updated as of August 2015.

**This does not represent all options in this category. For a complete list, please consult the USC Catalogue.