This major provides a solid foundation in the fundamental concepts of classical and quantum physics through a variety of tools that include abstract thought, experimentation & observation, data analysis, and mathematical modeling. The foundation provided prepares students for further study in graduate and professional schools and for careers as scientists or engineers who will participate in the creation of the science and technology of the future.

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.

- **Supplemental Instruction:** This academic support program provides regularly scheduled, peer-led study sessions for common Biology, Chemistry, Math, and Physics courses.

- **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

- **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.

- **PHYS 440: Introduction to Condensed Matter Physics** — Crystal structures, x-ray diffraction, thermal properties of solids, diamagnetism and paramagnetism, free-electron model of metals, semiconductors, ferromagnetism, super-conductivity, imperfections in crystals.

- **PHYS 493: Advanced Experimental Techniques** — Development of modern experimental techniques, including computer interface with data acquisition hardware and data analysis by software, applied specifically to experiments in modern physics. Emphasis on laboratory work with discussion of theoretical background.
Bachelor of Arts (BA) Requirements

Lower Division Course Requirements*
- CHEM 105: General Chemistry A & B
- MATH 125: Calculus I
- MATH 126: Calculus II
- MATH 226: Calculus III
- MATH 245: Mathematics of Physics and Engineering I
- PHYS 161: Advanced Principles of Physics I
- PHYS 162: Advanced Principles of Physics II
- PHYS 163: Advanced Principles of Physics III
- PHYS 190: Freshman Colloquium

Upper Division Course Requirements*
- MATH 445: Mathematics of Physics and Engineering II
- PHYS 304: Mechanics
- PHYS 316: Introduction to Thermodynamics and Statistical Physics
- PHYS 408: Electricity and Magnetism A
- PHYS 438: Introduction to Quantum Mechanics & its Applications A
- PHYS 492: Senior Laboratory

Elective Course Requirements (select one)*
- PHYS 408: Electricity and Magnetism B
- PHYS 438: Introduction to Quantum Mechanics & its Applications B
- PHYS 440: Introduction to Condensed Matter Physics
- PHYS 493: Advanced Experimental Techniques with Lab

Additional Bachelor of Science (BS) Course Requirements*
- PHYS 408: Electricity and Magnetism B
- PHYS 438: Introduction to Quantum Mechanics & its Applications B
- PHYS 440: Introduction to Condensed Matter
- PHYS 493: Advanced Experimental Techniques

*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/phys. Updated as of August 2015.

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