Major in Physics, B.S.

**Major Course Requirements**

A minimum of 106 hours (36 upper-division hours)

- **Required Core Courses (96 hours):**
  - ASTR 115 Astronomy 5
  - CHEM 111+112+113 General Chemistry 5+5+5
  - ENGR 216 Circuit Analysis 4
  - INFS 115 Intro. to Computer Programming 4
  - MATH 131+132+133 Calculus I,II,III 4+4+4
  - MATH 265 Elementary Linear Algebra 4
  - MATH 267 Vector Calculus 4
  - MATH 269 Elementary Differential Equations 4
  - PHYS 211+212+213 Physics with Calculus 4+4+4
  - PHYS 314 Elementary Modern Physics 4
  - PHYS 341+342 Classical Dynamics 3+3
  - PHYS 361+362+363 Electromagnetic Theory 3+3+3
  - PHYS 389L Experimental Physics 1
  - PHYS 396 Seminar (2 quarters) .5+.5
  - PHYS 445 Thermal Physics 4
  - PHYS 461+462 Quantum Physics 3+3
  - PHYS 489L Advanced Experimental Physics 1

- **Required Core Electives (10 hours)**
  - At least 4 hours from the following: 4
  - Additional upper-division PHYS courses laboratory, project and/or independent research
  - At least 6 hours from the following: 6
  - Additional non-service PHYS courses

**Recommended Proficiency:**

Modern-language proficiency comparable to a one-year college course in French or German.

**Student Learning Outcomes**

**Students can:**

- Demonstrate proficiency in the basic subfields of physics (classical mechanics, electricity and magnetism, relativity, quantum mechanics and thermodynamics) and mathematics.
- Identify career options appropriate to their degree program, both within and outside the physics field.
- Demonstrate the ability to effectively communicate scientific information and concepts in both written and verbal form.
- Apply physical principles to novel situations, both in the classroom and in laboratory settings, through critical thinking, problem solving, mathematical and computer modeling, and laboratory experimentation.
- Construct and assemble experimental apparatuses, conduct and analyze measurements of physical phenomena, assess experimental uncertainty, and make meaningful comparisons between experiment and theory.

**Occupational Information**

**What can I do with this major?**

This major is the first step to doing research in the various branches of physics, teaching or science-related professions such as health sciences and engineering. The B.S. graduate is qualified for entrance into many professional schools for science-related professions including engineering.

**Additional Education Required?**

A person with a B.S. or M.S. degree may expect employment as an engineer or research assistant in industrial research and development. A Ph.D. degree is usually needed for a career in research or in college/university teaching.

**Public Sector vs. Denominational**

Most positions are in the public sector. There are a limited number of positions teaching physics in denominational colleges and universities with very few applicants.

**Job Outlook**

Although the number of positions for physicists is not high, there always seem to be positions for high achieving students. Employment in the medical field is strong.

**Undergraduate Research Opportunities**

Since 2008, PUC students have participated in world-class physics research, most of which has been funded through National Science Foundation grants. As a result, students have traveled to many national laboratories and international conferences; some are currently in the process of publishing the results of their research in peer-reviewed journals.
General Education Requirements

To view general education requirements for this major, please refer to page A-01, Summary of General Education Requirements: B.S. Degree.

How to Construct Your Own Program

1. Counsel with your advisor.
2. Consider your aptitudes, interests, and available courses.
3. Schedule major courses and cognates first.
4. Fill the rest of your schedule with G.E. requirements.
5. For the freshman year include English, Religion, and PE courses. Also include Basic Algebra I+II unless waived by previous work.

What the Degree Includes

A total of 192 quarter hours including:
1. A minimum of 60 upper division hours.
2. General Education requirements.
3. Major requirements.
4. Minimum 2.0 GPA, overall and major.

For More Information

Physics & Engineering Department
Pacific Union College
One Angwin Avenue
Angwin, CA 94508
(707) 965-6684

Website: www.puc.edu/physics
E-mail: physics@puc.edu

American Institute of Physics: www.aip.org

Sample Four-Year Program

This sample curriculum is designed to show you how a program may be constructed and to help you select a proper sequence of courses in the major. It is not likely that these courses can always be taken in the order given. Your advisor will help you design a personalized program of studies.

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<th>First Year</th>
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<tbody>
<tr>
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<td>Astronomy</td>
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<tr>
<td>Calculus I,II,III</td>
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<td>Computer Programming</td>
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<th>Second Year</th>
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<tr>
<td>Physics with Calculus</td>
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<td>Circuit Analysis</td>
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<td>Elem. Linear Algebra</td>
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<th>Third and Fourth Years</th>
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<tr>
<td>Elementary Modern Physics</td>
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<td>Electromagnetic Theory (odd)*</td>
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<td>Quantum Physics (odd)</td>
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<td>Classical Dynamics (even)</td>
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<td>Thermal Physics (even)</td>
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* Courses marked (even) or (odd) are taught in alternate years only.
2017-2018 is even, 2018-2019 is odd.