PHYSICS

CAREER INFORMATION

Physicists explore and identify basic principles governing the structure and behavior of matter, the generation and transfer of energy, and the interaction of matter and energy. Physicists design and perform experiments with lasers, cyclotrons, telescopes, mass spectrometers, and other equipment. Most physicists work in research and development or design research equipment. Physicists generally specialize in one of many subfields – elementary particle physics, nuclear physics, atomic and molecular physics, physics of condensed matter (solid-state physics), optics, acoustics, space physics, plasma physics, or the physics of fluids. Ph.D. holders usually teach at the college or university level. Master’s degree holders qualify for many kinds of jobs requiring a physics background, including positions in manufacturing and applied research and development as well as teaching jobs in 2-year colleges. Bachelor’s degrees are qualified to work in engineering-related areas, software development and other scientific fields, to work as technicians, or to assist in setting up computer networks and sophisticated laboratory equipment. Some qualify for applied research jobs in private industry or non-research positions in the Federal Government. The Bachelor of Science (B.S.) degree is designed for students interested in immediate employment in industry as well as those who wish to continue on to a Master’s or Ph.D. degree in physics or a related field. The Bachelor of Arts (B.A.) degree is appropriate for those preparing for teaching careers in the physical sciences at the secondary level as well as those whose goal is a liberal education with an emphasis on physics. Physicists often work regular hours in laboratories and office. Most physicists work in areas in which universities, large research and development laboratories, or observatories are located.

Annual Salary Range: $41,830 - $113,800.

GENERAL INFORMATION

Not all universities with physics major are listed below. The lower division core preparation is listed for universities with which LBCC has established articulation agreements. The first course listed is the LBCC course; the course in parentheses immediately after is the university equivalent. It is generally recommended to take as many lower-division major courses as possible prior to transfer. Please check www.assist.org for the most current articulation information and information regarding minimum grade for each course, impacted major recommendations, application procedures, etc. Moreover, you must see a counselor to develop an accurate educational plan to ensure your competitiveness for admissions for your school(s) of choice. To thoroughly understand admissions and general education requirements please check the catalog of the transfer university. CSU/UC admissions and general education requirements are outlined on a separate curriculum guide.

*** Schools are listed in alphabetical order ***

CAL POLY POMONA

• B.S. Degree – Physics
  Chem 1A (Chem 121 & 121L & 122L), 1B (122 & 123 & 123L); Engr 54 (CS 125); Math 60 & 70 (Mat 114 & 115 & 116), 80 (214 & 215); Physics 3A & 3B & 3C (Phy 131 & 131L & 132 & 132L & 133 & 133L & 234 & 234L & 235 & 235L)

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CAL POLY SAN LUIS OBISPO

- **B.A. Degree – Physics**
  Chem 1A & 1B (Chem 127 & 128); Math 60 & 70 & 80 (Math 141 & 142 & 143 & 241), 84 (242); Phys 3A & 3B & 3C (Phys 131 & 132 & 133)
  (No LBCC equivalents to the following Cal Poly SLO courses: Phil 230, 231; Phys 206, 211, 212, 256)

- **B.S. Degree – Physics**
  Chem 1A & 1B (Chem 127 & 128); Math 60 & 70 & 80 (Math 141 & 142 & 143 & 241), 84 (242); Phys 3A & 3B & 3C (Phys 131 & 132 & 133)
  (No LBCC equivalents to the following Cal Poly SLO courses: Phys 202, 206, 211, 212, 256)

CSU CHICO

- **B.S. Degree – Physics**
  **Core Requirements:** Chem 1A (Chem 37), 1B (38); Math 60 (Math 7A), 70 (7B), 80 (7C); Phys 3A (Phys 4A), 3B (4B), 3C (4C)
  (No LBCC equivalents to the following CSUC courses: Math 7D; ME 45; Phys 50)

  **Options:** General; Professional Physics: Advanced Study Pattern; Professional Physics: Applied Optics Pattern

  **Option Requirements:**
  General: Bio 1A (Biol 6A), 1B (6B); Geol 1 or 1H or 2 & 2L (Geos 2)
  Professional Physics: Advanced Study Pattern: No lower-division LBCC equivalents
  Professional Physics: Applied Optics Pattern: No lower-division LBCC equivalents

CSU DOMINGUEZ HILLS

- **B.S. Degree – Physics**
  **Core Requirements:** Chem 1A (Che 110); Math 60 (Mat 191), 70 (193), 80 (211); Physics 3A (Phy 130), 3B (132), 3C (134)
  (No LBCC equivalents to the following CSUDH courses: Csc 101, 111, 121)

  **Options:** General; Physical Science

  **Option Requirements:**
  General: No lower-division LBCC equivalents
  Physical Science: Chem 1B (Che 112); Geol 1 or 1H or 2 & 2L (Ear 100 & 101), 3 (200 & 201)

CSU FRESNO

- **B.S. Degree – Physics**
  Chem 1A (Chem 1A), 1B (1B); Math 60 (Math 75), 70 (76), 80 (77), 84 (81); Phys 3A & 3B & 3C (Phys 4A & 4AL & 4B & 4BL & 4C)
  (No LBCC equivalents to the following CSUF courses: Csci 15, 40; Ece 70; IT 52, 53)

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CSU Fresno (continued)

**B.A. Degree – Natural Sciences (Physics Option)**
Bio 1A (Biosc 1A), 1B (1B); Chem 1A (Chem 1A), 1B (1B); Math 60 (Math 75), 70 (76), 80 (77), 84 (81);
Phys 3A & 3B & 3C (Phys 4A & 4AL & 4B & 4BL & 4C)
(No LBCC equivalents to the following CSUF courses: Geol 1, 3, 15)

CSU FULLERTON

- **B.S. Degree – Physics**
  Chem 1A (Chem 120A), 1B (125); Math 60 (Math 150A), 70 (150B), 80 (250A); Phys 3A & 3B & 3C
  (Phys 225 & 225L & 226 & 226L & 227 & 227L)

CSU HAYWARD

- **B.S. Degree – Physics**
  Chem 1A & 1B (Chem 1101 & 1102 & 1103); Math 60 & 70 & 80 (Math 1304 & 1305 & 2304); Physics
  3A, 3B, 3C (Phys 1001 & 1002 & 1003)

CSU LONG BEACH

- **B.A./B.S. Degree – Physics**
  Bio 1A (Biol 211A); Chem 1A (Chem 111A), 1B (111B); Math 60 (Math 122), 70 (123), 80 (224);
  Phys 3A (151), 3B (152), 3C (154 & 155)
  (No LBCC equivalents to the following CSULB courses: Biol 200)

CSU LOS ANGELES

- **B.A./B.S. Degree – Physics**
  Engl 3 or 3H (Engl 102); Chem 1A & 1B (Chem 101 & 102 & 103); Math 60, 70, 80 (Math 206 & 207 &
  208 & 209); Phys 3A & 3B & 3C (Phys 201 & 202 & 203 & 204 & 205)

CSU SACRAMENTO

- **B.A./B.S. Degree – Physics**
  Chem 1A (Chem 1A), 1B (1B); Math 60 (Math 30), 70 (31), 80 (32), 84 or 85 (45); Phys 3A (Phys 11A),
  3B (11B), 3C (11C)

CSU SAN BERNARDINO

- **B.A./B.S. Degree - Physics**
  Chem 1A (Chem 215), 1B (216); Math 60 & 70 (Math 211 & 212 & 213), 80 (252), 84 (251); Phys 3A &
  3B & 3C (Phys 221 & 222 & 223 & 224 & 228); CBIS 12 (for B.S. degree) (Csci 201)

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HUMBOLDT STATE UNIVERSITY

- **B.A. Degree – Physics**
  Chem 1A (Chem 109), 1B (110); Math 60 (Math 109), 70 (110), 80 (210), 84 (241); Phys 3A (Phyx 109), 3B (110), 3C (111)

- **B.S. Degree – Physics**
  **Core Requirements:** Chem 1A (Chem 109) 1B (110); Math 60 (Math 109), 70 (110), 80 (210), 84 (241); Phys 3A (Phyx 109), 3B (110), 3C (111)
  **Options:** Biology Physics; Geology Physics & Physics Oceanography; Oceanography Physics
  **Option Requirements:**
  Biology Physics: Bio 1A & 1B (Biol 105)
  Geology Physics Option & Physics Oceanography: Bio 1A & 1B (Biol 105); Geol 1 or 1H or 2 & 2L (Geol 109)
  Oceanography Physics: Bio 1A & 1B (Biol 105); Geol 1 or 1H or 2 & 2L (Geol 109)
  (No LBCC equivalent to the following Humboldt State course: OCN 109)

SAN DIEGO STATE UNIVERSITY

- **B.A. Degree – Liberal Arts & Sciences: Physics Major**
  Chem 1A (Chem 200) 1B (201); Math 60 & 70 (Math 150 & 151), 80 (252); Phys 3A (Phys 195 & 195L), 3B (196 & 196L), 3C (197 & 197L); one level 3 foreign language course
  One course from: Engr 54 or Math 54 (CS 106) or Cbis 11 (CompE 160)

- **B.S. Degree – Applied Arts & Sciences: Physics Major**
  Chem 1A (Chem 200), 1B (201); (CS 106); Math 60 & 70 (Math 150 & 151), 80 (252); Phys 3A (Phys 195 & 195L), 3B (196 & 196L), 3C (197 & 197L)
  One course from: Engr 54 or Math 54 (CS 106) or Cbis 11 (CompE 160)

- **B.S. Degree – Applied Arts & Sciences: Chemical Physics Major**
  Chem 1A (Chem 200), 1B (201), 12A (231); Math 60 & 70 (Math 150 & 151), 80 (252); Phys 3A (Phys 195 & 195L), 3B (196 & 196L), 3C (197 & 197L)
  Recommended: One course in computer programming
  (No LBCC equivalent to the following SJSU course: Chem 251)

SAN JOSE STATE UNIVERSITY

- **B.A. Degree – Physics (preparation for teaching)**
  Bio 60 & 60L (Biol 21); Chem 1A (Chem 1A), 1B (1B); Math 60 (Math 30), 70 (31), 80 (32); Phys 3A (Phys 50), 3B (51), 3C (52)
  (No LBCC equivalents to the following SJSU courses: Biol 20; Geol 10; Math 133A; Phys 53)

- **B.S. Degree – Physics**
  Chem 1A (Chem 1A), 1B (1B); Math 60 (Math 30), 70 (31), 80 (32); Phys 3A (Phys 50), 3B (51), 3C (52)
UC BERKELEY

- **B.A. Degree – Physics**
  This major is offered by the College of Letters and Science (L&S). Students must complete either (1) the L&S Essential Skills Requirements (Reading & Composition, Foreign Language, and Quantitative Reasoning) or (2) IGETC by the end of the spring term that precedes fall enrollment at Berkeley. Complete as many lower division major requirements as possible before transfer. In general, strength of academic preparation and GPA are the primary selection criteria for admission.

**Requirements:** Math 60 (Math 1A) 70 (1B), 80 (53), 84 (54); Phys 3A (7A), 3B (7B), 3C (7C)

**Recommended:** Chem 1A (Chem 1A), 1B (1B)

**Note:** Students who are not familiar with a computer programming language are urged to include an introductory course in computer science.

UC DAVIS

Transfer students are strongly advised to complete as many preparatory courses as possible for their major before enrolling at UC Davis. In particular, it is highly recommended that students complete chemistry courses before transferring.

- **A.B. Degree – Physics**
  Math 60 (Math 21A), 70 (21B), 80 (21C or 21D), 84 (22A); Phys 3A (Physics 9A) 3B (9B), 3C (9C)
  (No LBCC equivalent for the following UCD course: Math 22B; Physics 9D)

- **B.S. Degree – Physics**
  Chem 1A (Chem 2A), 1B; Engr 54 or Math 64; Math 60 (Math 21A), 70 (21B), 80 (21C or 21D), 84 (22A); Phys 3A (Physics 9A), 3B (9B), 3C (9C)
  Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
  (No LBCC equivalent for the following UCD course: Engin 5; Math 22B; Physics 9D)

- **B.S. Degree – Applied Physics**
  **Core Requirements:** Math 60 (Math 21A), 70 (21B), 80 (21C or 21D), 84 (22A); Phys 3A (Physics 9A), 3B (9B), 3C (9C)
  (No LBCC equivalent for the following UCD course: Math 22B; Physics 9D)

  **Concentrations:** Atmospheric Physics; Chemical Physics; Computational Physics; Geophysics; Materials Science; Physical Oceanography; Quantum Optics

  **Concentration Requirements:**
  Atmospheric Physics: CBIS 11 (Eng Cs 30) or lower-division course at UCD; Chem 1A (Chem 1A)
  Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
  (No LBCC equivalents to the following UCD courses: Atm Sci 60; Engin 5)

  Chemical Physics: CBIS 11 (Eng Cs 30) or lower-division course at UCD; Chem 1A (Chem 2A), 12A & 12B (128A & 128B)
  Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
  (No LBCC equivalents to the following UCD courses: Engin 5)

  Computational Physics: CBIS 11 (Eng Cs 30), 12 (40)
  (No LBCC equivalent to the following UCD course: Eng Cs 20)

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UC Davis (continued)

Geophysics: CBIS 11 (Eng Cs 30) or lower-division course at UCD; Chem 1A (Chem 1A); Geol 1 or 1H or 2 & 2L (Geology 50 & 50L)
Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
(No LBCC equivalents to the following UCD courses: Engin 5)

Materials Science: CBIS 11 (Eng Cs 30) or lower-division course at UCD; Chem 1A (Chem 1A)
Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
(No LBCC equivalents to the following UCD courses: Engin 5)

Physical Oceanography: CBIS 11 (Eng Cs 30) or lower-division course at UCD; Chem 1A (Chem 1A)
Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
(No LBCC equivalents to the following UCD courses: Atm Sci 60; Engin 5)

Quantum Optics: CBIS 11 (Eng Cs 30) or lower-division course at UCD; Chem 1A (Chem 1A)
Highly recommended: Chem 1A & 1B (Chem 2B & 2C)
(No LBCC equivalents to the following UCD courses: Engin 5)

UC IRVINE

• **B.S. Degree - Physics**
  
  **Core Requirements:** CBIS 11 (Physics 53); Math 60 & 70 & 80 (Math 2A & 2B & 2D), 84 (3D);
  Phys 3A & 3B & 3C (Physics 7A & 7LA & 7B & 7L & 7D & 7LD & 7E)
  (No LBCC equivalents to the following UCI courses: Math 2E; Physics 50, 51A, 51B, 52C)

  **Concentrations:** Applied Physics; Biomedical Physics; Computational Physics; Philosophy of Physics;
  Physics Education

  **Specialization:** Astrophysics

  **Concentration Requirements:**
  Applied Physics: Must be approved by the Department of Physics and Astronomy
  Biomedical Physics: Chem 1A & 1B (Chem 1A & 1B & 1C & 1LB & 1LC), 12A & 12B (Chem 51A &
  51B & 51LA & 51LB)
  (No LBCC equivalents to the following UCI courses: Bio Sci 97, 98, 99, Chem 52A, 52B)

  Computational Physics: Must be approved by the Department of Physics and Astronomy
  Philosophy of Physics: All upper division courses at UCI
  Physics Education: Chem 1A & 1B (Chem 1A & 1B & 1C & 1LB & 1LC) or other lower and upper
  division courses at UCI

  **Specialization in Astrophysics Requirements:** All upper division courses at UC Irvine

UC LOS ANGELES

• **B.S Degree – Physics**
  
  Chem 1A (Chem 20A); Math 60 (Math 31A), 70 (31B), 80 (32A & 32B), 84 (33A); Phys 3A & 3B & 3C
  (Physics 1A & 1B & 1C & 4AL & 4BL)
  (No LBCC equivalents to the following UCLA courses: Physics 17, 18L)

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UC RIVERSIDE

• **B.A./B.S. Degree – Physics** (IGETC Not Acceptable!)
  Students selected for this major will need to present an overall GPA of at least 2.70 in all UC transferable course work. Students are advised to complete as many lower division major requirements as possible.

  Chem 1A & 1B (Chem 1A & 1B & 1C); Math 60 & 70 (Math 9A & 9B & 9C), 80 (10A); Phys 3A & 3B (Phys 40A & 40B & 40C), 3C (40D)
  (No LBCC equivalent to the following UCR course: Math 46)