Why Major in Physics or Biophysics at USD?

Considering Physics as your major?
What is Physics?
What is Physics?

Modern Technology

Alternative Energy Sources

Intelligence & the Brain

Economics & Finance

Molecular & Cellular processes

Engineering
Physics Bachelor’s: 1 Year Later

5760 Bachelor’s Degrees

Employment 44%
- 10 - Private Sector
- 80 - College and University
- 40 - High School Teaching
- 60 - Active Military
- 30 - Government
- 60 - Other
- 40 - Seeking employment

Grad School 56%
- 1890 - Physics and Astronomy
- 630 - Engineering
- 320 - Other Science and Math
- 140 - Medicine and Law
- 140 - Education
- 100 - Other
What You Do with a Physics Degree

Initial employment sectors of physics bachelor’s, classes of 2006 & 2007.

- Private Sector: 59%
- Colleges & Universities: 10%
- High School: 13%
- Civilian Government, FFR&DC*: 6%
- Active Military: 5%
- Other: 7%

Note: Figure includes only bachelor’s in full-time, newly accepted positions.
*Federally funded research and development centers.

Field of employment for physics bachelor’s in the private sector, classes of 2006 & 2007.

- Engineering: 32%
- Computer Science or Information Technology: 16%
- Other Technology: 9%
- Other Natural Sciences: 5%
- Physics or Astronomy: 7%
- Non-STEM: 29%
- Math: 1%
- Science Education: 1%

STEM: Natural Science, Technology, Engineering and Math.
How much $$ can you make?

What’s a Bachelor’s Degree Worth?
Typical Salary Offers by Campus Recruiters, AY 2008-09

 Bachelor's Field
Chemical Engineering
Computer Science
Electrical Engineering
**Physics**
Mechanical Engineering
Mathematics
Civil Engineering
Finance
Nursing
Accounting
Marketing
Chemistry
Secondary Education
Psychology
Biology / Lifescience

Starting Salary in Thousands

0 10 20 30 40 50 60 70 80
You Can Get Paid to go to School!

**Typical Stipends**

**First-Year Physics Graduate Students**

<table>
<thead>
<tr>
<th>PhD Students</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Assistant</td>
<td>[Bar Graph]</td>
</tr>
<tr>
<td>Research Assistant</td>
<td>[Bar Graph]</td>
</tr>
<tr>
<td>Fellowship</td>
<td>[Bar Graph]</td>
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</table>

<table>
<thead>
<tr>
<th>Students in Master's Departments</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Assistant</td>
<td>[Bar Graph]</td>
</tr>
</tbody>
</table>
And Then Get Paid More…

Starting Salaries in the Private Sector

Physics Degree Recipients, Classes of 2007 & 2008

- Physics PhDs
- Physics Master's
- Physics Bachelor's in STEM Jobs
- Physics Bachelor's in non-STEM Jobs

Typical Salaries in Thousands of Dollars
Thinking about Med or Law School?

### Average MCAT Scores by Selected Majors, 2009.

<table>
<thead>
<tr>
<th>Major</th>
<th>Physical Sciences</th>
<th>Biological Sciences</th>
<th>Verbal Reasoning</th>
<th>Number of Applicants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Engineering</td>
<td>10.9</td>
<td>10.7</td>
<td>9.6</td>
<td>1,005</td>
</tr>
<tr>
<td>Physics</td>
<td>11.1</td>
<td>10.3</td>
<td>9.6</td>
<td>207</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>10.9</td>
<td>10.5</td>
<td>9.4</td>
<td>195</td>
</tr>
<tr>
<td>Economics</td>
<td>10.4</td>
<td>10.5</td>
<td>9.7</td>
<td>566</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>9.9</td>
<td>10.6</td>
<td>9.5</td>
<td>1,066</td>
</tr>
<tr>
<td>Mathematics</td>
<td>10.3</td>
<td>10.1</td>
<td>9.6</td>
<td>374</td>
</tr>
<tr>
<td>English</td>
<td>9.4</td>
<td>9.9</td>
<td>10.3</td>
<td>434</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>9.9</td>
<td>10.3</td>
<td>9.1</td>
<td>2,594</td>
</tr>
<tr>
<td>Chemistry</td>
<td>9.8</td>
<td>9.9</td>
<td>9.0</td>
<td>2,091</td>
</tr>
<tr>
<td>Microbiology (or Bacteriology)</td>
<td>9.0</td>
<td>9.9</td>
<td>8.7</td>
<td>775</td>
</tr>
<tr>
<td>Psychology</td>
<td>8.8</td>
<td>9.4</td>
<td>9.1</td>
<td>2,421</td>
</tr>
<tr>
<td>Biology</td>
<td>8.7</td>
<td>9.5</td>
<td>8.7</td>
<td>12,705</td>
</tr>
<tr>
<td>Premedical</td>
<td>8.3</td>
<td>9.0</td>
<td>8.4</td>
<td>663</td>
</tr>
<tr>
<td>All Majors</td>
<td>9.2</td>
<td>9.8</td>
<td>9.0</td>
<td>41,487</td>
</tr>
</tbody>
</table>

### Average LSAT Scores* by Selected Majors, 2009.

<table>
<thead>
<tr>
<th>Major</th>
<th>Mean Score</th>
<th>Number of Applicants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>161.5</td>
<td>180</td>
</tr>
<tr>
<td>Mathematics</td>
<td>159.7</td>
<td>336</td>
</tr>
<tr>
<td>Economics</td>
<td>157.4</td>
<td>3,047</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>156.3</td>
<td>546</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>156.0</td>
<td>427</td>
</tr>
<tr>
<td>Chemistry</td>
<td>155.7</td>
<td>355</td>
</tr>
<tr>
<td>English</td>
<td>154.7</td>
<td>5,120</td>
</tr>
<tr>
<td>Biology</td>
<td>154.5</td>
<td>1,055</td>
</tr>
<tr>
<td>Computer Science</td>
<td>154.0</td>
<td>682</td>
</tr>
<tr>
<td>Political Science</td>
<td>153.0</td>
<td>14,964</td>
</tr>
<tr>
<td>Psychology</td>
<td>152.5</td>
<td>4,355</td>
</tr>
<tr>
<td>Pre Law</td>
<td>148.3</td>
<td>1,078</td>
</tr>
<tr>
<td>Criminal Justice</td>
<td>145.5</td>
<td>3,306</td>
</tr>
<tr>
<td>All Majors</td>
<td>152.6</td>
<td>81,530</td>
</tr>
</tbody>
</table>
What do you learn in physics?

- Classical Mechanics
- Electromagnetism
- Thermal & statistical mechanics
- Optics
- Relativity
- Quantum Mechanics
What Do You Learn in Physics?

**Preparation for the Major (32 units):**
- PHYS 270: Intro to Mechanics, Wave Motion & Thermodynamics (4)
- PHYS 271: Intro to Electricity & Magnetism (4)
- PHYS 272, 272L: Introduction to Modern Physics (4)
- MATH 150, 151, 250: Calculus I, II, III (12)
- CHEM 151, 151L, 152, 152L: General Chemistry I, II (8)

**Major Requirements (33 units):**
- PHYS 314: Analytical Mechanics (3)
- PHYS 324: Electromagnetism (3)
- PHYS 330: Quantum Mechanics (3)
- PHYS 480W: Experimental Physics (4)
- PHYS 493: Seminar I (1 – 2)
- PHYS 495: Seminar II (1 – 2)
- PHYS 496: Research (1 – 4)
- Any 2 upper-division mathematics courses

*12 units of the following:*
- PHYS 307: Astrophysics (3)
- PHYS 319: Thermal and Statistical Physics (3)
- PHYS 331: Advanced Topics in Quantum Physics (3)
- PHYS 340: Biological Physics (3)
- PHYS 467: Energy and the Environment (3)
- PHYS 477, 477L: Introduction to Fluids (4)
- PHYS 487: Techniques in Physics (1-3)
What Do You Learn in Physics?
### What Do You Learn in Physics?

#### Preparation for the Major (38 Units):
- PHYS 270, 270L (or 136, 136L): Intro to Mechanics, Wave Motion & Thermodynamics/Lab (4)
- PHYS 271, 271L (or 137, 137L): Intro to Electricity & Magnetism/Lab (4)
- PHYS 272, 272L: Introduction to Modern Physics (4)
- MATH 150, 151, 250: Calculus I, II, III (12)
- CHEM 151, 151L, 152, 152L: General Chemistry I, II (8)
- BIO 190, 225: Intro. to Genetics, Ecology & Evolution, Intro. to Cellular Processes (6)

#### Major Requirements (33 Units):
- PHYS 340: Biological Physics (3)
- PHYS 481W: Experimental Biophysics (4)
- PHYS 493: Seminar I (1 – 2)
- PHYS 495: Seminar II (1 – 2)
- PHYS 496: Research (1 – 4)
- PHYS 330: Quantum Mechanics (3) OR
  - CHEM 311: Physical Chemistry (3)
- CHEM 301, 301L: Organic Chemistry I/Lab (4)
- CHEM 302, 302L: Organic Chemistry II/Lab (4)
- CHEM 331: Biochemistry (3)
- BIOL 300: Genetics (3)

#### 2 upper-division electives from
- PHYS, BIOL, CHEM or MARS

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*subject to advisor approval

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### suggested upper-division electives:
- PHYS 319: Thermal and Statistical Physics
- PHYS 301: Energy and the Environment
- PHYS 324: Electromagnetism
- BIOL 382: Techniques in Molecular Biology
- BIOL 342: Microbiology
- BIOL 374: Neurobiology
- BIOL 432: Electron Microscopy
- BIOL 480: Cell Physiology
- BIOL 482: Molecular Biology
- CHEM 314: Biophysical Chemistry
- CHEM 335: Biochemistry Lab
- MARS 452: Physical & Chemical Oceanography
- MARS 468: Marine Ecology
- MARS 473: Climatology
- MARS 478: Boundary Layer Flow
What Do Physicists Do?

High Energy Physics

Astrophysics

Condensed Matter

Fluid Mechanics

Geophysics

Atomic, Molecular & Optical Physics