**PHYSICS - PURE AND APPLIED PHYSICS OPTION, BS**

**Introduction**

Please click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/physics/) to see Physics department information.

The department of Physics at the University of Colorado Denver enriches understanding of how the world works by incorporating physics in every aspect of life. Good intuition about how things work has been, since the time of Galileo, a hallmark of physicists.

CU Denver’s faculty is committed to providing substantive applied research experiences for our undergraduate students by incorporating aspects of every day life into their classrooms and research. A major in physics is one of the few academic degree programs that prepares its students for an amazing array of careers including computer analyst, engineer, technical writer, industrial marketer, doctor, and lawyer.

Our faculty is committed to provide students with opportunities for laboratory experience in a research environment. Students work elbow-to-elbow with their professor mentors on such projects as:

- Applying chaos and complex systems theory to problems ranging from the onset of turbulence in fluid flows to the erratic motions of loads hanging from cranes aboard ships at sea
- Study of quasar jets and other associated dynamical properties, supernovae and nucleosynthesis
- Superconducting Quantum Interference Devices (SQUIDs) specifically the fabrication of microelectronic SQUIDs
- Applying non-linear dynamics and stochastic modeling to biological systems to understand how variations in genotype can lead to unique behavior
- Developing detection techniques in the search for the Dark Matter component of our Universe
- Applying physics to archaeology and historic preservation
- Developing ways to help students learn physics better

Those students intending to major in physics should have a high school background that includes trigonometry, advanced algebra, chemistry and physics, as well as a good preparation in the arts and humanities. Students have an option during their freshman year to overcome some deficiencies in these areas. Students preparing for employment in an interdisciplinary area (such as environmental, geophysical or energy study) can choose to add an appropriate minor or arrange a specific major program on an individual basis. Students interested in teaching physics in high school are encouraged to consider the CLAS educational studies minor in addition to their physics major.

Students are strongly encouraged to consult with the Physics advisor, meet physics faculty engaged in Pure & Applied Physics research, attend departmental seminars, and explore ways that Physics relates to research undertaken by faculty in other disciplines.

For more information, contact:

Michael “Bodhi” Rogers (Physics advisor)

---

**Email:** physics.chair@ucdenver.edu  
**Office:** North Classroom 3123B

These degree requirements are subject to periodic revision by the academic department, and the College reserves the right to make exceptions and substitutions as judged necessary in individual cases. Therefore, the College strongly urges students to consult regularly with their major advisor and CLAS advisor to confirm the best plans of study before finalizing them.

**Program Delivery**

- This is an on-campus program.

**Declaring This Major**

- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/records-registration/registration/declare-change-major-minor/) to go to information about declaring a major.

**General Requirements**

To earn a degree, students must satisfy all requirements in each of the three areas below, in addition to their individual major requirements.

- CU Denver General Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation/general-graduation-requirements/)
- CU Denver Core Curriculum (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation-undergraduate-core-requirements/)
- College of Liberal Arts & Sciences Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/graduationrequirementstext)
- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/academic-policies-procedures/) for information about Academic Policies

**Program Requirements**

1. Students must complete a total of 63 credits, including a minimum of 47 PHYS credit hours and 16 credit hours in ancillary coursework.

2. Students must complete a minimum of 16 PHYS upper-division (3000-level and above) credit hours in the major.

3. Students must earn a minimum grade of C- (1.7) in all major courses taken at CU Denver and must achieve a minimum cumulative major GPA of 2.0. All graded attempts in required and elective courses are calculated in the major GPA. Students cannot complete major or ancillary course requirements as pass/fail.

4. Students must complete a minimum of 12 PHYS credit hours with CU Denver faculty.

**Program Restrictions, Allowances and Recommendations**

1. Students must declare their intention to major in Physics by the time they have completed 60 semester hours
2. The introductory labs, PHYS 2351 Applied Physics Lab I and PHYS 2361 Applied Physics Lab II, are required for all physics majors. If the department is unable to offer one or both of these labs then PHYS 2321 Intro Experimental Phys Lab I may be substituted for PHYS 2351 Applied Physics Lab I and PHYS 2341 Intro Experimental Phys Lab II may be substituted for PHYS 2361 Applied Physics Lab II, upon prior advisor approval.

3. Students earning a Physics major cannot earn a Physics minor. A senior thesis is required for all students wishing to graduate with departmental honors. For all other students, the faculty encourages a senior thesis or project.

### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 2311</td>
<td>General Physics I: Calculus-Based</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 2351</td>
<td>Applied Physics Lab I</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 2331</td>
<td>General Physics II: Calculus-Based</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 2361</td>
<td>Applied Physics Lab II</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 2711</td>
<td>Vibrations and Waves</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 2811</td>
<td>Modern Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 3120</td>
<td>Methods of Mathematical Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 3711</td>
<td>Junior Laboratory I</td>
<td>2</td>
</tr>
</tbody>
</table>

### Pure and Applied Physics Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 3211</td>
<td>Analytical Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 3411</td>
<td>Thermal Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 3721</td>
<td>Junior Laboratory II</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 3811</td>
<td>Quantum Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 4331</td>
<td>Principles of Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 4711</td>
<td>Senior Laboratory I</td>
<td>2</td>
</tr>
</tbody>
</table>

### Electives

To learn more about the Student Learning Outcomes for this program, please visit our website ([https://clas.ucdenver.edu/physics/academics/program-learning-goals/](https://clas.ucdenver.edu/physics/academics/program-learning-goals/)).

To review the Degree Map for this program, please visit our website. ([https://www.ucdenver.edu/student/advising/undergraduate/degree-maps/clas/](https://www.ucdenver.edu/student/advising/undergraduate/degree-maps/clas/))