

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)

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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

Code	Title	Hours
<i>Take all of the following required courses:</i>		26
PHYS 2311	General Physics I: Calculus-Based	4
PHYS 2351	Applied Physics Lab I	1
PHYS 2331	General Physics II: Calculus-Based	4
PHYS 2361	Applied Physics Lab II	1
PHYS 2711	Vibrations and Waves	3
PHYS 2811	Modern Physics I	4
PHYS 3120	Methods of Mathematical Physics	3
PHYS 3711	Junior Laboratory I	2

Pure and Applied Physics Courses

Code	Title	Hours
<i>Take all of the following Pure and Applied Physics courses:</i>		15
PHYS 3211	Analytical Mechanics	4
PHYS 3411	Thermal Physics	3
PHYS 3721	Junior Laboratory II	2
PHYS 3811	Quantum Mechanics	4
PHYS 4331	Principles of Electricity and Magnetism	4
PHYS 4711	Senior Laboratory I	2

Electives

Code	Title	Hours
<i>Take six 3000-level or above PHYS credit hours, including up to 3 semester hours of directed research or independent study.</i>		6
PHYS 3050	General Astronomy II	3
PHYS 3070	Physical Cosmology	3
PHYS 3082	Energy and the Environment	3
PHYS 3151	Biophysics Outlook I	1
PHYS 3161	Biophysics Outlook II	1
PHYS 3251	Biophysics of the Body	4
PHYS 3252	Biophysics of the Body NM	4
PHYS 3451	Biophysics of the Cell	4
PHYS 3452	Biophysics of the Cell NM	4
PHYS 3620	Sound and Music	3
PHYS 3840	Independent Study: PHYS	1-3
PHYS 3880	Directed Research	1-3
PHYS 3939	Internship	1-3
PHYS 4251	Physical Fluid Dynamics	3
PHYS 4351	Bioelectromagnetism	4

PHYS 4352	Bioelectromagnetism NM	4
PHYS 4400	Scientific Instrumentation	3
PHYS 4401	Special Topics	1-3
PHYS 4440	Electricity and Magnetism II	3
PHYS 4510	Optics	3
PHYS 4550	Astrophysics	3
PHYS 4611	Computational Physics	3
PHYS 4620	Computational Physics II	2
PHYS 4650	Solid State Physics	3
PHYS 4721	Senior Laboratory II	2
PHYS 4810	Atomic and Molecular Structure	3
PHYS 4820	Subatomic Physics	3
PHYS 4840	Independent Study: PHYS	1-3
PHYS 4880	Directed Research	1-6
PHYS 4920	Advanced Undergraduate Seminar	1
PHYS 4939	Internship	1-3
PHYS 4950	General Relativity	3
PHYS 4980	Advanced Physics Topics	1-3

Ancillary Courses

Code	Title	Hours
<i>Take all of the following ancillary courses:</i>		16-18
MATH 1401	Calculus I	4
MATH 2411	Calculus II	4
MATH 2421	Calculus III	4
MATH 3191 & MATH 3200	Applied Linear Algebra and Elementary Differential Equations or MATH 3195 Linear Algebra and Differential Equations	4-6

To learn more about the Student Learning Outcomes for this program, please visit our website (<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/>)