

College of Creative Studies

Physics

Overview of CCS Physics

The physics program in the College of Creative Studies provides a rigorous physics education at one of the premiere research universities in the country. Our small class sizes and close student-faculty interaction create an intimate environment where students can think deeply and critically about physics. At the same time, students are encouraged to take advantage of the many research opportunities that are available at UCSB. Students develop a wide and deep understanding of physics and are well-prepared for graduate work in physics or related fields. As in other fields of study in CCS, students enjoy unparalleled academic freedom in working with faculty advisors to design their course of study.

CCS Physics is a joint program between the College of Creative Studies and the UCSB Physics Department. Students take their core first- and second-year courses in CCS, and complete upper-division courses within CCS and the Physics Department. The two-year CCS sequence gives students a thorough introduction to basic physics with an emphasis on problem solving, communication, and collaboration. As part of the course, students attend problem sessions in which they present their work to each other. In addition, special topics physics courses are offered each year through CCS to explore topics usually not covered in the undergraduate physics curriculum. Some of the CCS special topics classes count as upper division courses.

Second-year students will also take a three-quarter laboratory course designed to prepare them for participation in modern physics research. Here students develop the mindset and many of the skills required of an experimentalist. Students spend the first quarter investigating several “simple” systems, devising their own experiments, collecting and analyzing data, and writing professionally formatted scientific articles about their results. During the second quarter, they tackle computer interfacing, mechanical design, machining, control systems, and additional topics relevant to modern physics experiments. This helps prepare them for the third quarter, during which the students work in small groups to independently design, build, test, and perform an original physics experiment of their choosing. The skills learned in this sequence prepare students to join research groups in physics and related fields and make significant contributions during their undergraduate careers. Summer research fellowships are available to help make this possible. Many CCS physics students prepare an honors thesis based on the research in which they have been involved.

CCS students begin taking upper-division physics courses through the Physics Department in their sophomore year, and continue during their third and fourth years. CCS students tend to excel at these upper division courses, and often take advanced courses of study (including graduate-level classes) in physics and related departments.

To find out more about the CCS Physics program, please contact either Dr. Sathya Guruswamy (sathya.guruswamy@ccs.ucsb.edu) or Dr. Tengiz .Bibilashvili (tbib@physics.ucsb.edu) to arrange a visit!

UCSB College Of Creative Studies Requirements for Physics Majors B.S.

For students who join CCS Physics Program I fall 2021 or later

	Min Units
Math and Chemistry Requirements	36
Must be taken for letter grade, unless taken in CCS	
Chem 1A, 1B or 2A, 2B (*)	6
(*) Covered by AP Chemistry with score 4, or 5	
Math 3A-B, 4A-B, 6A-B	24
Math 8 or Math Elective	4
PHYS 29 (**)	2
(**) Covered by AP Computer Science with score 4, or 5	

	Max Units
Introductory Physics Courses	32
Must earn minimum of 3 units per CS31-36 courses	
PHYS CS140VA	2
PHYS CS31	5
PHYS CS32	5
PHYS CS33	5
PHYS CS34	5
PHYS CS35	5
PHYS CS36	5

	Max Units
Sophomore Physics Lab Courses	12
Must earn minimum of 2 units	
Phys CS15A	4
Phys CS15B	4
Phys CS15C	4

	Units
Upper Division Physics Core	54
Must be taken for letter grade	
PHYS 100A	4
PHYS 100B	4
PHYS 103	4
PHYS 104	4
PHYS 110A	4
PHYS 110B	4
PHYS 115A	4
PHYS 115B	4
PHYS 115C	4
PHYS 119A	4
PHYS 119B	4
PHYS 127AL	4
PHYS 128AL (***)	4
PHYS 128BL, 127BL, 129L, 134L (***)	4
(***) Advisor approval required to substitute these two classes with the senior thesis	

	Min Units	
Upper Division Physics Electives	10	
Minimum 3 units. Must be taken for letter grade, unless taken in CCS		
Three courses must be chosen from this list or approved by advisor		
PHYS CS 140	PHYS 131	PHYS 127BL
PHYS 106	PHYS 132	PHYS 129L
PHYS 120	PHYS 133	PHYS 134L
PHYS 123A-B	PHYS 135	
PHYS 125	PHYS 141	

	Units
Math, Science, Engineering Electives (Two nonphysics classes)	6
Minimum 3 units. Must be taken for letter grade, unless taken in CCS	
Courses subject to advisor approval	
1	
2	

	Units
GE: Breadth Requirements (see instructions)	24
Minimum of 8 courses required	
Courses subject to advisor approval	
Includes ABC sequence (see instructions)	
A	5
B	6
C	7
4	8

Requirements
Research requirement:
* Senior Thesis or other research experience as approved <input style="width: 40px; height: 15px;" type="text"/>
by CCS physics advisor
US History&Institutions: <input style="width: 40px; height: 15px;" type="text"/>
Ethnicity: <input style="width: 40px; height: 15px;" type="text"/>
Writing: <input style="width: 40px; height: 15px;" type="text"/>
US H&I is covered by AP US History or Government with score 3, 4, or 5

Total units required for graduation	180
Minimum grade for all required non-CCS courses: C-	
Minimum GPA for upper-division Physics courses: 2.0	

Example Sequence of Courses for the CCS Physics Major

Freshman year

Fall

Physics CS31
Math 4A
Chem 1A
(elective)

Winter

Physics CS32
Physics CS140VA
Math 4B
Chem 1B

Spring

Physics CS33
Math 6A
Physics 29
(elective)

Sophomore year

Fall

Physics CS34
Physics CS15A
Physics 103
Math 6B

Winter

Physics CS35
Physics CS15B
Physics 104
(elective)

Spring

Physics CS36
Physics CS15C
Physics 100A
(elective)

Junior year Fall

Fall

Physics 115A
Physics 110A
Physics 119A
(elective)

Winter

Physics 115B
Physics 110B
Physics 119B
(elective)

Spring

Physics 115C
Physics 127AL
Physics 100B
(elective)

Senior year

Fall

Physics 128A
(elective)
(elective)
(elective)

Winter

Physics 128B (127B,129,134)
(elective)
(elective)
(elective)

Spring

(elective)
(elective)
(elective)
(elective)

Additional requirements (included in above schedule as "(elective)"):

- In addition to the physics courses listed here by number, you are required to take three or more physics electives and earn at least 10 units of upper-division physics courses (3 or 4 units)
- Chem 1A and 1B are required, unless you took AP Chemistry in high school and passed the AP exam with 4 or 5. You do not have to take the associated laboratory courses (Chemistry 1AL and 1BL)
- Physics 29 is required, unless you took AP Computer Science in high school and passed AP exam with 4 or 5.
- A Senior Thesis can replace two Senior Lab classes. CCS faculty advisor approves the Senior Thesis proposal.
- Math 8 or Math upper-division class is required.
- Eight (8) courses broadly distributed in fields unrelated to physics are required These are to be determined in consultation with your CCS advisor. These may be selected from courses offered by the College of Creative Studies, and the College of Letters and Science. Of these eight courses:
 - Three courses must form a unified (ABC) sequence.
 - One course must satisfy the UCSB ethnicity requirement.
 - One course must satisfy the UCSB American history and institutions requirement. This requirement is waived if you have passed the AP US History or the AP US Government. A list of courses that satisfy this requirement can be found in the UCSB Catalog. It is possible to satisfy both the ethnicity requirement and the American history and institutions requirement with a single UCSB course. See the UCSB Catalog for details.
- Two additional science, engineering, computer science or math related courses (non-physics) are required.
- Research involvement approved by the faculty advisor is required.
- Grad courses may be taken as the student reaches the appropriate level of preparation.

CCS Physics Breadth Requirement Details

- A minimum of 8 courses which are not science, math, or engineering related must be taken to satisfy the breadth requirement. These courses must be broadly distributed, as described below.
- High school AP courses cannot be used to satisfy the breadth requirement.
- 3 of these courses must form a series (ABC sequence) from the following list:
 - Art History 6A-B-C
 - Comparative Literature 30A-B-C
 - History 2A-B-C
 - History 2AH-BH-CH
 - History 4A-B-C
 - History 106A-B-C
 - Philosophy 20A-B-C
 - Religious Studies 80A-B-C
 - Another set approved by advisor
- Other than the A-B-C sequence requirement, no more than 2 courses can be from the same field of study.
- One of the courses must satisfy the UCSB Ethnicity requirement. A list of courses that satisfy this requirement can be found in the UCSB catalog.
- One of the courses must satisfy the UCSB American History and Institutions requirement. This requirement is waived if you have passed the AP U.S. History or AP U.S. Government Exam with a score of 3, 4, or 5, or if you received a score of 650 or higher on the SAT II subject test in U.S. History. A list of courses that satisfy this requirement can be found in the UCSB catalog. There are a number of courses that satisfy both the Ethnicity and American History requirements.
- Foreign language courses may fulfill a maximum of 2 breadth requirement courses.