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!

Example Sequence of Courses for the CCS Physics Major

Freshman year

Fall	Winter	Spring
Physics CS31	Physics CS32	Physics CS33
Math 4A	Physics CS40	Math 6A
Chem 1A	Math 4B	(elective)
(elective)	Chem 1B	(elective)

Sophomore year

Fall	Winter	Spring
Physics CS34	Physics CS35	Physics CS36
Physics CS15A	Physics CS15B	Physics CS15C
Physics 103	Physics 104	(elective)
Math 6B	(elective)	(elective)

Junior year Fall

Fall	Winter	Spring
Physics 102	Physics 101	Physics 127A
Physics 115A	Physics 115B	Physics 115C
Physics 110A	Physics 110B	(elective)
Physics 119A	(elective)	(elective)

Senior year

Fall	Winter	Spring
Physics 128A	Physics 128B (127B,129,134)	(elective)
(elective)	(elective)	(elective)
(elective)	(elective)	(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 at least 14 additional 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)
- 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.

UCSB College Of Creative Studies Requirements for Physics Majors B.S. (rev. 06/17)

Math and Chemistry Requirements	Units 34
Must be taken for letter grade, unless taken in CCS	
Chem 1A-B or 2A-B	6
Math 3A-B, 4A-B, 6A-B	24
Math 8 or UD Math class	4,5

Introductory Physics Courses	Max Units 32
Must earn minimum of 3 units per CS31-36 courses	
PHYS CS40	2
PHYS CS31	5
PHYS CS32	5
PHYS CS33	5
PHYS CS34	5
PHYS CS35	5
PHYS CS36	5

Sophomore Physics Lab Courses	Max Units 9
Must earn minimum of 2 units	
Phys CS15A	3
Phys CS15B	3
Phys CS15C	3

Upper Division Physics Core	Units 44
Must be taken for letter grade	
PHYS 101	4
PHYS 102	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 127A	4

Senior Labs	Units 8
Must be taken for letter grade	
PHYS 128AL	4
PHYS 128BL or 127BL or 129L or 134L	4
Advisor approval required to substitute these classes with the senior thesis	

Upper Division Physics Electives	Units 14

Minimum 3 units. Must be taken for letter grade, unless taken in CCS
Four courses must be chosen from this list or approved by advisor

PHYS CS 140	PHYS 125	PHYS 133
PHYS 106	PHYS 127BL	PHYS 134L
PHYS 119B	PHYS 131	PHYS 135
PHYS 120	PHYS 132	PHYS 141
PHYS 123A-B	PHYS 129L	

Math, Science, Engineering Electives (Two nonphysics classes)	Units 6

Minimum 3 units. Must be taken for letter grade, unless taken in CCS
Courses subject to advisor approval

GE: Breadth Requirements (see instructions)	Units 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 by CCS physics advisor

US History&Institutions:
Ethnicity:
Writing:

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

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 series 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.