2022-2023 General Catalog
Please note the following:

- Complete galley instructions are **here**.
- Track Changes are locked on, so editing is the same as always; type your changes right into this file.
- **Programs.** The Office of the University Registrar (OUR) reviewed and updated (as needed) program sub-total units & total units to represent the courses listed. Please review all sub-total units & total units and contact me if the changes made by OUR need revision.
- **Courses** displaying discontinued or non-existent should be removed. If the program then requires an update, follow your college's program update/approval policies & procedures. Approvals from your college for updates should be copied to me in order to support any changes.
- *Course lists are not included in galleys*; they are data-base driven, so whatever is approved in ICMS appears in the catalog. You can review your course lists at any time and make any changes through ICMS.
- Each major (A.B or B.S) needs a separate description section. They can be the same, but now is the time to customize them; the same holds true for minors and any other degree types (M.A., Ph.D., etc.).
- When adding a course in the Requirements sections, *there's no need to enter the course title*; the ICMS system will do that when I enter the course.
- Campus-wide, "adviser" is "advisor."

Let me know if you need help.

Randall Larson-Maynard; Senior Editor
RLLarsonMaynard@UCDavis.edu; 530-752-6141
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The following text appears at https://ucdavis.pubs.curricunet.com/Catalog/phy-courses-sc:

PHY 001 is a two-quarter sequence requiring some mathematics (trigonometry). Either PHY 001A alone or both quarters may be taken. The sequence is not intended to satisfy entrance requirements of a year of physics for professional schools, but will satisfy requirements of 3 or 6 units of physics.

PHY 007 is a one-year (three-quarter) introductory physics course with laboratory intended for students majoring in the biological sciences. It has a calculus prerequisite. If you don't want a full year of introductory physics, you should take one or two quarters of PHY 001, instead. Read the following information carefully if you are using PHY 007 to complete an introductory course you have already begun.

The sequence of material in PHY 007 is different from that in most traditionally taught introductory physics courses. PHY 007B is most like the first quarter or semester of traditionally taught courses which treat classical mechanics. PHY 007C is most like the last quarter or semester which, in traditionally taught courses, treats optics, electricity and magnetism, and modern physics. The content and sequence of PHY 007A is unlike that of most other traditionally taught courses.

If you have completed one introductory quarter or semester of a traditionally taught physics course and want to continue with PHY 007, you will probably have full or partial credit for PHY 007B. You should first take (and will receive full credit for) PHY 007A. Then, if you have received partial credit for PHY 007B, you can take the remainder of the course using PHY 049 (please see the department for details), or take PHY 007B and receive reduced credit. Finally, take PHY 007C for full credit.

If you have taken two quarters of a year-long introductory physics course and have not had extensive work in optics, electricity and magnetism, and modern physics, you should take PHY 007C. In no case should you take PHY 007B without first taking PHY 007A. All other situations should be discussed directly with a PHY 007 instructor.

Students not intending to take the entire sequence should instead take PHY 001.

PHY 009 is a four-quarter sequence using calculus throughout and including laboratory work as an integral component. The course is primarily for students in the physical sciences and engineering.

PHY 009H is a ~~five~~four-quarter honors physics sequence, which may be taken instead of PHY 009. It is intended primarily for first-year students with a strong interest in physics and with advanced placement in mathematics to MAT 021B. Students who plan to major in physics, and also motivated non-majors, should take PHY 009H instead of PHY 009 if they are ready to begin MAT 021B in fall quarter. In course requirements and prerequisites, PHY 009HA-009HD~~E~~ can be substituted for PHY 009A-009D. Students may not switch between the PHY 009H and PHY 009 series beyond PHY 009HA or PHY 009A.

PHY 010 is primarily a concept-oriented one-quarter lecture/discussion course requiring relatively little mathematical background.

Physics | Information

(College of Letters & Science)

Rena Zieve, Ph.D., Chairperson of the Department

Michael Mulhearn, Ph.D., Vice Chairperson of the Department (Administration & Undergraduate Matters)

Rajiv Singh, Ph.D., Vice Chairperson of the Department (Graduate Matters)

Department Office. 174 Physics Building; 530-752-1500; http://www.physics.ucdavis.edu

Faculty. http://physics.ucdavis.edu/people/faculty

Physics | A.B.

(College of Letters & Science)

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The Major Program

From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Knowledge gained using atomic-scale microscopes and high-energy particle accelerators and nuclear reactors teaches us not only what holds the atomic nucleus together but also how proteins function and why stars shine.

The Program. The Department of Physics & Astronomy offers a Bachelor of Arts in Physics and two Bachelor of Science degree programs: in Physics (which also offers an emphasis in Astrophysics), and in Applied Physics. The A.B. degree provides a broad coverage of classical and modern physics while permitting a broader liberal arts education than is possible with the other two programs. The B.S. degree in either Physics or Applied Physics should be followed by the student who plans to enter physics as a profession, and also provides excellent training for a wide variety of technical career options. The B.S. in Applied Physics provides the student with a solid introduction to a particular applied physics specialty. For the student who plans to enter the job market upon completing a B.S. degree, the applied physics orientation would be an asset. Either B.S. program provides a solid foundation in physics for the student interested in graduate work in either pure or applied physics.

Career Alternatives. Careers in physics and applied physics include research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geophysics and environmental physics, astrophysics and astronomy, computer science, and materials science.

Program Variance. Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

Graduate Study. The Department of Physics & Astronomy offers programs of study and research leading to the M.S. and Ph.D. degrees. Further information regarding requirements for these degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

Astronomy. In addition to the introductory Astronomy courses listed, upper division and graduate courses in Astronomy, Astrophysics, and Cosmology are listed under Physics.

Physics		**Units: 80-83**
Preparatory Subject Matter		**Units: 48-515~~-51~~**

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Physics		263-279
Choose a series:		19-205
PHY 009A		5
PHY 009B		5
PHY 009C		5
PHY 009D		4
PHY 009HA		5
PHY 009HB		5
PHY 009HC		5
PHY 009HD		5
~~PHY 009HE~~		~~5~~
PHY 040		3
PHY 080		4
Mathematics		22-24
MAT 021A		4
MAT 021B		4
MAT 021C		4
MAT 021D		4
Choose one:		3-4
MAT 022A		3
MAT 027A		4
MAT 067		4
Choose one:		3-4
MAT 022B		3
MAT 027B		4
Depth Subject Matter		**Units: 3235-37**
Physics		325-37
PHY 104A		4
PHY 105A		4
PHY 110A		4
PHY 110B		4
PHY 112		4
PHY 115A		4
Choose one:		4
PHY 122A		4
PHY 122B		4
Choose at least one:		4
PHY 129A		4
PHY 130A		4
PHY 140A		4
PHY 151		4
PHY 152		4
PHY 153		4
~~PHY 102~~		~~0-1~~
~~PHY 102 waived if PHY 104B taken.~~		
~~Choose at least one additional fixed-unit upper division Physics~~		~~3-4~~

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~~course; excluding PHY 160.~~		
		Total: 80~~-88~~

Physics | B.S.

(College of Letters & Science)

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Physics		**Units: ~~102-131~~109-118**
Preparatory Subject Matter		**52-55~~49-55~~**
Physics		30-31~~27-33~~
Choose a series:		19-2~~05~~
PHY 009A		5
PHY 009B		5
PHY 009C		5
PHY 009D		4
PHY 009HA		5

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PHY 009HB		5
PHY 009HC		5
PHY 009HD		5
~~PHY 009HE~~		~~5~~
PHY 040		3~~4~~
PHY 045		4
PHY 080		4
Mathematics		22-~~24~~
MAT 021A		4
MAT 021B		4
MAT 021C		4
MAT 021D		4
Choose one:		3-4
MAT 022A		3
MAT 027A		4
MAT 067		4
Choose one:		3-4
MAT 022B		3
MAT 027B		4
Depth Subject Matter		~~53-76~~57-~~63~~
Physics		3~~57-40~~
PHY 104A		4
PHY 105A		4
PHY 105B		4
PHY 110A		4
PHY 110B		4
PHY 110L~~C~~		1~~4~~
PHY 112		4
PHY 112L		1
PHY 115A		4
PHY 115B		4
PHY 115L		1
~~*Choose one:*~~		~~1-4~~
~~PHY 102~~		~~1~~
~~(1 unit)~~		
~~PHY 104B~~		~~4~~
Laboratory Requirement; choose PHY 122A or 122B or (both 117 and 118)~~116 series~~:		4-8~~12~~
PHY 122A		4
OR		
PHY 122B		4
OR		
PHY 11~~76A~~		4
PHY 11~~86B~~		4
~~PHY 116C~~		~~4~~
Concentration Courses; choose two courses from one specialty and one course from a different specialty:		12
General Relativity/Astrophysical Applications		
PHY 154		4

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PHY 155		4
Condensed Matter		
PHY 140A		4
PHY 140B		4
Nuclear/Particle Physics		
PHY 129A		4
PHY 130A		4
PHY 130B		4
Additional upper division Physics courses excluding PHY 160, for a total of 14~~5~~ upper-division Physics courses of 3 or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one from:		6-8~~0 12~~
PHY 194H series:		8
PHY 194HA	4	
PHY 194HB	4	
PHY 195		5
PHY 198 Must be taken for at least 3 units to count as an elective.		1-5
PHY 199 Must be taken for at least 3 units to count as an elective.		1-5
Astrophysics Emphasis		**Units: 106-115~~108-123~~**
Preparatory Subject Matter		~~48-51~~49-~~55~~
Physics		26-27~~27-33~~
Choose a series:		19-20~~5~~
PHY 009A	5	
PHY 009B	5	
PHY 009C	5	
PHY 009D	4	
PHY 009HA	5	
PHY 009HB	5	
PHY 009HC	5	
PHY 009HD	5	
~~PHY 009HE~~	~~5~~	
PHY 040		3~~4~~
PHY 080		4
Mathematics		22-24
MAT 021A	4	
MAT 021B	4	
MAT 021C	4	
MAT 021D	4	
Choose one:		3-4
MAT 022A	3	
MAT 027A	4	
MAT 067	4	
Choose one:		3-4
MAT 022B	3	
MAT 027B	4	
Depth Subject Matter		~~58-64~~59-~~68~~

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Physics		4849-52
PHY 104A		4
PHY 105A		4
PHY 108		3
PHY 108L		1
PHY 110A		4
PHY 110B		4
PHY 112		4
PHY 115A		4
PHY 115B		4
~~*Choose one:*~~		~~1 4~~
~~PHY 102~~		~~1~~
~~PHY 104B~~		~~4~~
Choose four:		16
PHY 151		4
PHY 152		4
PHY 153		4
PHY 156		4
PHY 158		4
Laboratory Requirement; choose one:		4
PHY 122A		4
PHY 122B		4
PHY 157		4
Electives; choose two:		6-12
PHY 105B		4
~~PHY 110C~~		~~4~~
PHY 116A		4
PHY 129A		4
PHY 130A		4
PHY 130B		4
PHY 150 (must be an astrophysics topic and requires prior department approval)		4
PHY 154		4
PHY 155		4
GEL 163		3
May include only one from:		3-8
PHY 194H series:		8
PHY 194HA	4	
PHY 194HB	4	
PHY 195		5
PHY 198 Must be taken for at least 3 units to count as an elective.		1-5
PHY 199 Must be taken for at least 3 units to count as an elective.		1-5
Recommended		4
AST 025		4
		~~**Total: 102-132**~~

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Physics | Ph.D.

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Physics | Minor

(College of Letters & Science)

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All courses in the minor have prerequisites equivalent to MAT 021A-021B-021C-021D and 022A-022B and PHY 009A-009B-009C-009D. Students considering the possibility of a minor should consult with a Physics major advisor before beginning course work in the minor program.

Physics		**Units: 24**
Choose at least six upper division courses in Physics; excluding:		24
PHY 160 Same as ENG 160.		3
PHY 197T		1-5
PHY 199		1-5
		Total: 24