Refer to graduation requirements listed previously in the catalog. See index.

All majors must meet the Upper-division Writing Expectation by successfully completing PHSX 330 (PHYS 330) or another upper division writing course from the approved list.

Bachelor of Arts with a major in Physics

Forty-three credits in physics must be earned for the Bachelor of Arts degree with a major in physics. Required courses in physics are: PHSX 215-216N-217N-218N (PHYS 211N-212N-213N-214N) or PHSX 205N-206N-207N-208N (PHYS 111N-113N-112N-114N), PHSX 215-216N-217N-218N (PHYS 211N-212N-213N-214N) strongly recommended, PHSX 301, 311, 322, 327, 343, 320, 423 (PHYS 301, 311, 321, 325, 341, 375, 414), PHSX 425 (PHYS 415) strongly recommended), PHSX 444, 461, and 499 (PHYS 444, 461, 480). M 171, 172, 273, 311 (M ATH 152, 153, 251, 311) also must be taken.

Physics majors must satisfy successfully the general education requirements. An additional requirement is in the completion of at least one computer science language course: PSHX 333 (PHYS 331) (strongly recommended), or CSCI 100 or 135 (CS 101, 131). Recommended courses in other departments include M 317, 412, 418 (MATH 317, 412, 418).

Bachelor of Arts with a major in Physics: Astronomy Option

During their first two years, students in the astronomy option should take ASTR 142N (or 132N and 135N), PHSX 215N-216N-217N-218N (PHYS 211N-212N-213N-214N), or 205N-206N-207N-208N (PHYS 111N-113N-112N-114N), PHSX 343 (PHYS 341), and M 171, 172, 273 (MATH 152, 153, and 251), M 151 (MATH 121), if necessary). Forty-seven credits in astronomy and physics courses are required for the B.A. degree in physics with astronomy option. Required courses in physics are: PHSX 215N-216N-217N-218N, 301, 311, 343, 461, 499 (PHYS 211N-212N or 213N-214N, 301, 311, 341, 461, 480) plus at least three courses from the following: PHSX 327, 320, 423, 425, 446 and 462 (PHYS 325, 375, 414, 415, 446, and 462). Required astronomy courses are: 142N (or 132N and 135N), 353, 363, and 365 (351 and 362 recommended). At least one lab course must be taken from ASTR 362, PHSX 322 or 444 (PHYS 321 or 444). M 171, 172, 273, and 311 (MATH 152, 153, 231, 311) also must be taken. Physics with Astronomy option majors must satisfy successfully the general education requirements. An additional requirement is in the completion of at least one computer science language course: PSHX 333 (PHYS 331) (strongly recommended), or CSCI 100 or 135 (CS 101, 131).

Bachelor of Arts with a major in Physics: Computational Physics Option:

The purpose of the computational physics option is to provide a thorough background in both physics and computer science and to inculcate a deeper understanding of their goals and methods. A student earns the computational physics option by completing at least 50 credits in the two disciplines, 30 of these credits in physics courses and 20 of these in computer science courses. The following courses are required: Physics 215N-216N-217N-218N (PHYS 211N-212N-213N-214N), or 205N-206N-207N-208N (PHYS 111N-113N-112N-114N), PHSX 301, 311, 333,343,320,423, and 499 (PHYS 301, 311, 331, 341, 375, 414, and 480) (PHSX 322, 444 and 423 (PHYS 321, 444, and 415) are highly recommended); Computer Science 135-136, 232, 332 (CS 131-132, 241, 332), and seven credits of computer science electives selected from courses numbered 200 and above CSCI 205, 361, 415, and 477 (CS 242, 281, 315E and 477) recommended); M 171, 172, 273, 311 and 325 (MATH 152, 153, 251,311, 325) M 307, STAT 458 and STAT 341 (Math 305, 448 and 341) recommended). Physics with Computational Physics option majors must satisfy successfully the general education requirements.

Teacher Preparation in Physics

Major Teaching Field of Physics: For an endorsement in the major teaching field of Physics, a student must complete the following course requirements: 35 credits in Physics including Physics 205N-206N-207N-208N or 215N-216N-217N-218N (PHYS 111N-113N-112N-114N or 211N-214N) and PHSX 301, 327, 330, 343, 320, 423, 461, and 499 (301, 325, 330, 341, 375, 414, 461, and 480). Also required are Astronomy 131N-132N; M 171, 172, 273, 311, STAT 216 or 341

(MATH 152, 153, 251, 311, 241 or 341); Computer Science 100 or 135 (CS 101 or 131); EDU 497 (C&I 426); CHMY 121N and 485 (CHEM 151N and 485); BIOB 170N or 160N (BIOL 108N or 110N) or BIOO 105N (BIOL120N) or BIOE 172N (BIOL 221N); GEO 101N-102N (GEOS 100N-101N); and EVST 101 or Science 350 or GEO 105 (GEOS 105) Or GEO 108 (GEOS 108). Students also must gain admission to Teacher Education Program and meet the requirements for teaching licensure (see the College of Education section of this catalog).

Minor Teaching Field of Physics: For an endorsement in the minor teaching field of Physics, a student must complete Physics 205N-206N-207N-208N or 215N-216N-217N-218N (111N-113N-112N-114N or 211N-212N-213N-214N), PHSX 327, 330, 343 and 320 (PHYS 325, 330, 341 and 375). Also required are Astronomy 131N or 132N; BIOB 170N or 160N (BIOL 108N or 110N) or BIOO 105N (BIOL120N) or BIOE 172N (BIOL 121N); CHMY 121N, 485 (CHEM 151N, 485); M 171, 172, 273, 311, STAT 216 or 341 (MATH 152, 153, 251, 311, 241 or 341); CSCI 100 135, (CS 101, 131); and EDU 497 (C&I 426). Students also must gain admission to Teacher Education Program and meet the requirements for teaching licensure (see the College of Education section of this catalog).

Suggested Course of Study

Bachelor of Arts with a Major in Physics

For physics majors with four years of college preparatory mathematics or exemption from M 151 (MATH 121) by examination:

First Year	A	S
PHSX 101 Freshman Physics Experience	1	-
*WRIT 101 (ENEX 101) College Writing I	3	-
M 171-172 (MATH 152-153) Calculus I, II	4	4
PHSX 215N-216N, 217N-218N (PHYS 211N-212N, 213N-214N) Fundamentals of Physics	5	5
Electives and General Education	2	6
Total	15	15

*Semester of enrollment depends on beginning letter of student's last name.

Second Year	A	S
M 273 (MATH 251) Multivariable Calculus	4	-
PHSX 301 (PHYS 301)Introduction to Theoretical Physics	-	3
PHSX 311 (PHYS 311) Oscillations and Waves	2	-
PHSX 327 (PHYS 325) Optics	-	3
PHSX 343 (PHYS 341) Modern Physics	3	-
Foreign Language*	5	5
Electives and General Education	1	4
Total	15	15

*Can be waived with appropriate testing through MCLL.

Third Year	A	S
M 311, 412 (MATH 311, 412) Ordinary Differential Equations/Systems, Partial Differential Equations	3	3
PHSX 322 (PHYS 321) Electronics for Scientists	3	-
PHSX 330 (PHYS 330) Communicating Physics	-	3
PHSX 320 (PHYS 375) Classical Mechanics	-	3
PHSX 423-425 (PHYS 414-415) Electromagnetism	3	3
PHSX 446 (PHYS 446) Thermodynamics and Statistical Mechanics *	3	-
Electives and General Education	3	3
* PHSX 446 (PHYS 446) and PHSX 330 (PHYS 330) are offered every other year and may be taken in the third or fourth year.		
Total	15	15

Fourth Year	A	S
PHSX 333 (PHYS 331) Computational Physics*	3	-
PHSX 444 (PHYS 444) Advanced Physics Laboratory	-	3
PHSX 461-462 (PHYS 461-462) Quantum Mechanics I & II	3	3
PHSX 491 (PHYS 463) Selected Topics or PHSX 462 (PHYS 462) Quantum Mechanics II	-	3
PHSX 499 (PHYS 480) Senior Capstone Seminar	1	-
Electives and General Education	8	9
* PHSX 446 (PHYS 446) and PHSX 333 (PHYS 330) are offered every other year and may be taken in the third or fourth year.		
Total	15	15

Physics majors with fewer than four years of college preparatory mathematics (students who begin M 171 (MATH 152) in the second semester) can use this suggested course of study for physics courses:

First Year	A	S
PHSX 101 Freshman Physics Experience	1	-

PHSX 141N (PHYS 141N) Relativity: From Galileo to Einstein and Beyond	-	3
CSCI 100 (CS 101) or CSCI 135 (CS 131) Fundamentals of Computer Science	-	3
*WRIT 101 (ENEX 101) College Writing I	3	-
M 151 (MATH 121) Precalculus	4	-
M 171 (MATH 152) Calculus I	-	4
Foreign language+	5	5
Electives and General Education	2	-
Total	15	15

* Semester of enrollment depends on beginning letter of students last name.
+Can be waived with appropriate testing through MCLL.

Second Year	**A**	**S**
M 172 (MATH 153) Calculus II	4	-
M 273 (MATH 251) Calculus III	-	4
PHSX 215N-216N, 217N-218N (PHYS 211N-212N, 213N-214N) Fundamentals of Physics	5	5
Electives and General Education	6	6
Total	15	15

Third Year	**A**	**S**
M 311, 412 (MATH 311, 412) Ordinary Differential Equations/Systems, Partial Differential Equations	3	3
PHSX 311 (PHYS 311) Oscillations and Waves	2	-
PHSX 322 (PHYS 321) Electronics for Scientists	3	-
PHSX 327 (PHYS 325) Optics	-	3
PHSX 330 (PHYS 330) Communicating Physics	-	3
PHSX 343 (PHYS 341) Modern Physics	3	-
PHSX 301 (PHYS 301) Mathematical Methods for Physical Scientists	-	3
Electives and General Education	3	-
* PHSX 330 (PHYS 330) is offered every other year and may be taken in the third or fourth year.	4	3
Total	15	15

Fourth Year	**A**	**S**
PHSX 320 (PHYS 375) Classical Mechanics	-	3
PHSX 423-425 (PHYS 414-415) Electromagnetism	3	3
PHSX 444 (PHYS 444) Advanced Physics Laboratory	-	3
PHSX 446 (PHYS 446) Thermodynamics and Statistical Mechanics *	3	-
PHSX 461-462 (PHYS 461-462) Quantum Mechanics I, II	3	3
PHSX 499 (PHYS 480) Senior Capstone Seminar	1	-
Electives and General Education	5	3
Total	15	16

* PHSX 446 (PHYS 446) is offered every other year and may be taken in the third or fourth year.

Bachelor of Arts with a Major in Physics and an Option in Astronomy

For physics with astronomy option majors with four years of college preparatory mathematics or exemption from M 151 (MATH 121) by examination:

First Year	**A**	**S**
ASTR 142N The Evolving Universe	-	4
PHSX 101 Freshman Physics Experience	1	-
PHSX 215N-216N, 217N-218N (PHYS 211N-212N, 213N-214N) Fundamentals of Physics	5	5
WRIT 101 (ENEX 101) Composition*	3	-
M 171-172 (MATH 152-153) Calculus I, II	4	4
Electives and General Education	2	2
Total	15	15

* WRIT 101 (ENEX 101) is required unless exempted by testing. Semester of enrollment depends on beginning letter of student's last name.

Second Year	**A**	**S**
PHSX 311 (PHYS 311) Oscillations and Waves	2	-
PHSX 343 (PHYS 341) Modern Physics	3	-
PHSX 301 (PHYS 301) Introduction to Theoretical Physics	-	3
PHSX 327 (PHSX 325) Optics	-	3
M 273 (MATH 251) Multivariable Calculus	4	-
Foreign language+	5	5
General Education	7	5
Total	15	15

*+Can be waived with appropriate testing through MCLL.

Third Year	**A**	**S**
ASTR 362 Observational Astronomy*	3	-
ASTR 363-365 Stellar Astronomy and Astrophysics*	3	3
M 311, 412 (MATH 311, 412) Ordinary Differential Equations/Systems, Partial Differential Equations	3	3
PHSX 330 (PHYS 330) Communicating Physics*	-	3
Physics electives, chosen from PHSX 320 (PHYS 375), PHSX 327 (PHYS 320), PHSX 423-425 (PHYS 414-415), or PHSX 446 (PHYS 446)	3	3

General Education or electives	3	3
Total	15	15

Fourth Year	A	S
ASTR 351 Planetary Science*	3	-
ASTR 353 Galactic Astrophysics and Cosmology*	-	3
PHSX 333 (PHYS 331) Computational Physics+	3	-
PHSX 461 (PHYS 461) Quantum Mechanics I	3	-
Physics electives, chosen from PHSX 320 (PHYS 375), PHSX 327 (PHYS 320), PHSX 423-425 (PHYS 414-415), PHSX 446 (PHYS 446)	-	3
PHSX 499 (PHYS 480) Senior Capstone Seminar	1	-
General Education or electives	8	9
Total	15	15

*Upper-division astronomy courses can be taken in a different order, as they are offered only in alternate years.
+PHSX 333 (PHYS 330) is offered every other year and may be taken in the third or fourth year.

Physics with astronomy option majors with fewer than four years of college preparatory mathematics (students who begin M 171 (MATH 152) in the second semester) can use this suggested course of study for physics courses:

First Year	A	S
ASTR 142N The Evolving Universe	-	4
PHSX 101 Freshman Physics Experience	1	-
CSCI 100 or 135 (CS 101or 131) Intro to Programming or Fundamentals of Computer Science I	3	-
WRIT 101 (ENEX 101) Composition*	3	-
M 151 (MATH 121) Precalculus	4	-
M 171 (MATH 152) Calculus I	-	4
Electives and General Education	2	2
Total	15	15

* WRIT 101 (ENEX 101) is required unless exempted by testing. Semester of enrollment depends on beginning letter of student's last name.

Second Year	A	S
M 172, 273 (MATH 153, 251) Calculus II, Multivariable Calculus	4	4
PHSX 215N-216N, 217N-218N (PHYS 211N-212N, 213N-214N) Fundamentals of Physics with Calculus	5	5
Foreign language+	5	5
Electives and General Education	1	1
Total	15	15

+Can be waived with appropriate testing through MCLL.

Third Year	A	S
ASTR 351 Planetary Science or *	3	-
ASTR 353 Galactic Astrophysics and Cosmology*	-	3
ASTR 362 Observational Astronomy*	3	-
M 311 (MATH 311) Ordinary Differential Equations/ Systems	3	-
PHSX 301 (PHYS 301) Introduction to Theoretical Physics	-	3
PHSX 327 (PHYS 325) Optics	-	3
PHSX 311 (PHYS 311) Oscillations and Waves	2	-
PHSX 330 (PHYS 330) Communicating Physics*	-	3
PHSX 343 (PHYS 341) Modern Physics	3	-
Electives and General Education	1	3
Total	15	15

Fourth Year	A	S
ASTR 363-365 Stellar Astronomy and Astrophysics*	3	3
PHSX 461 (PHYS 461) Quantum Mechanics I	3	-
Physics electives, chosen from PHSX 320 (PHYS 375), PHSX 327 (PHYS 320), PHSX 423-425 (PHYS 414-415), PHSX 446 (PHYS 446) and PHSX 462 (PHYS 461)	3	3
PHSX 499 (PHYS 480) Senior Capstone Seminar	1	-
General Education or electives	5	9
Total	15	15

*Upper-division astronomy courses can be taken in a different order, as they are offered only in alternate years.

Bachelor of Arts with a Major in Physics with an Option in Computational Physics

For physics with computational physics option majors with four years of college preparatory mathematics or exemption from M 151 (MATH 121) by examination:

First Year	A	S
CSCI 135-136 (CS 131-132) Fundamentals of Computer Science I, II	3	3
WRIT 101 (ENEX 101) College Writing I*	-	3
M 171, 172 (MATH 152-153) Calculus I, II	4	4
PHSX 101 Freshman Physics Experience	1	-
PHSX 215N-216N, 217N-218N (PHYS 211N-212N, 213N-214N) Fundamentals of Physics with Calculus*	5	5
Electives and General Education	2	-

Total	15 15

* Semester of enrollment depends on beginning letter of student's last name.

Second Year	A	S
CSCI 232 (CS 241) Data Structure and Algorithms	4	-
M 225 (MATH 225) Introduction to Discrete Math	3	-
M 273 (MATH 251) Multivariable Calculus	-	4
PHSX 301 (PHYS 301) Introduction to Theoretical Physics	-	3
PHSX 343 (PHYS 341) Fundamentals of Modern Physics	3	-
Foreign language+	5	5
Electives and General Education	-	3
Total	15	15

+Can be waived with appropriate testing through MCLL.

Third Year	A	S
CSCI 205 (CS 242) Programming Languages w/C/C++	-	4
CSCI 361 (CS 281) Computer Architecture	3	-
M 311 (MATH 311) Ordinary Differential Equations/Systems	3	-
M 325 (MATH 325) Discrete Mathematics	-	3
PHSX 311 (PHYS 311) Oscillations and Waves	2	-
PHSX 322 (PHYS 321) Electronics for Scientists	3	-
PHSX 333 (PHYS 331) Computational Physics #	3	-
PHSX 320 (PHYS 375) Classical Mechanics	-	3
PHSX 330 (PHYS 330) Methods of Communicating Physics#	-	3
Electives and General Education	3	2
Total	15	15

PHSX 333 (PHYS 331) and PHSX 330 (PHYS 330) are offered every other year and may be taken in the third or fourth year.

Fourth Year	A	S
CSCI 332 (CS 332) Design/Analysis of Algorithms	3	-
CSCI 415 (CS 415E) Computers, Ethics, and Society*	-	3
PHSX 423-425 (PHYS 414-415) Electricity & Magnetism I, II *	3	3
PHSX 499 (PHYS 480) Senior Capstone Seminar	1	-
Electives and General Education	8	9
Total	15	15

* CSCI and PHSX courses marked with * are recommended. Other courses in physics and computer science can be substituted for them.

Physics with computational physics option majors with fewer than four years of college preparatory mathematics (students who begin M 171 (MATH 152) in the second semester) can use this suggested course of study for physics courses:

First Year	A	S
CSCI 135-136 (CS 131-132) Fundamentals of Computer Science I, II	3	3
WRIT 101 (ENEX 101) College Writing I*	-	3
M 151 (MATH 121) Precalculus	4	-
M 171 (MATH 152) Calculus I	-	4
PHSX 101 Freshman Physics Experience	1	-
Foreign Language+	5	5
Electives and General Education	2	-
Total	15	15

* Semester of enrollment depends on beginning letter of student's last name.

+ Can be waived with appropriate testing through MCLL.

Second Year	A	S
CSCI 232 (CS 241) Data Structure and Algorithms	4	-
CSCI 205 (CS 242) Programming Languages w/C/C++	-	4
M 225 (MATH 225) Introduction to Discrete Math	3	-
M 172 (MATH 153) Calculus II	4	-
M 273 (MATH 251) Multivariable Calculus	-	4
PHSX 215N-216N, 217N-218N (PHYS 211N-212N, 213N-214N) Fundamentals of Physics with Calculus*	5	5
Electives and General Education	-	2
Total	16	15

Third Year	A	S
CSCI 332 (CS 332) Design/Analysis of Algorithms	3	-
M 311 (MATH 311) Ordinary Differential Equations/Systems	3	-
M 325 (MATH 325) Discrete Mathematics	-	3
PHSX 311 (PHYS 311) Oscillations and Waves	2	-
PHSX 343 (PHYS 341) Fundamentals of Modern Physics	3	-
PHSX 333 (PHYS 331) Computational Physics #	3	-
PHSX 301 (PHYS 301) Introduction to Theoretical Physics	-	3
PHSX 330 (PHYS 330) Methods of Communicating Physics#	-	3
Electives and General Education	1	6
Total	15	15

PHSX 333 (PHYS 331) and PHSX 330 (PHYS 330) are offered every other year and may be taken in the third or fourth year.

Fourth Year	A	S
CSCI 415 (CS 415E) Computers, Ethics, and Society*	-	3
PHSX 322 (PHYS 321) Electronics for Scientists	3	-
PHSX 320 (PHYS 375) Classical Mechanics	-	3
PHSX 423-425 (PHYS 414-415) Electricity & Magnetism I, II*	3	3
PHSX 499 (PHYS 480) Senior Capstone Seminar	1	-
Electives and General Education	8	6
Total	15	15

* CSCI and PHSX courses marked with * are recommended. Other courses in physics and computer science can be substituted for them.

Requirements for a Minor in Astronomy

To earn a minor in astronomy the student must complete PHSX 205N-206N-207N-208N or 215N-216N-217N-218N (PHYS 111N-113N-112N-114N or 211N-212N-213N-214N); ASTR 131N- 132N (ASTR 134N-135N strongly recommended); and eight credits from ASTR 351, 353, 362, or 363-364. (Mathematics prerequisites for the astronomy minor are M171, 172, and 273 (MATH 152, 153, and 251)).

Requirements for a Minor in Physics

1) To earn a minor in physics the student must complete PHSX 215N-216N-217N-218N (PHYS 211N-212N-213N-214N) (or PHSX 205N-206N-207N-208N (PHYS 111N-112N-113N-114N)); PHSX 301 (PHYS 301);

2) Eleven additional physics credits, at least eight of which must be upper division. (Mathematics prerequisites for the physics minor are M 171, 172, 273, and 311 (MATH 152, 153, 251, and 311). Possible concentrations for the eleven additional physics credits include:

Classical Physics:

- PHSX 311 (PHYS 311) Oscillations and Waves 2 cr
- PHSX 327 (PHYS 325) Optics 3 cr
- PHSX 320 (PHYS 375) Classical Mechanics 3 cr
- PHSX 423 (PHYS 414) Electricity and Magnetism I 3 cr

Quantum Physics

- PHSX 311 (PHYS 311) Oscillations and Waves 2 cr
- PHSX 343 (PHYS 341) Fundamentals of Modern Physics 3 cr
- PHSX 461 (PHYS 461) Quantum Mechanics I 3 cr
- PHSX 462 (PHYS 462) Quantum Mechanics II 3 cr

Experimental Physics

- PHSX 322 (PHYS 321) Electronics for Scientists 3 cr
- PHSX 327 (PHYS 325) Optics 3 cr
- PHSX 343 (PHYS 341) Modern Physics 3 cr
- PHSX 444 (PHYS 444) Advanced Physics Lab 3 cr

Electrical and Computational Physics

- PHSX 322 (PHYS 321) Electronics for Scientists 3 cr
- PHSX 330 (PHYS 330) Communicating Physics 3 cr
- PHSX 333 (PHYS 331) Computational Physics 3 cr
- PHSX 423 (PHYS 414) Electricity and Magnetism I 3 cr

Engineering Physics

- PHSX 291 (PHYS 295) Engineering Mechanics - Statics 3 cr
- PHSX 311 (PHYS 311) Oscillations and Waves 2 cr

- PHSX 322 (PHYS 321) Electronics for Scientists 3 cr
- PHSX 446 (PHYS 446) Thermodynamics & Stat. Mechanics 3 cr

These concentrations are meant to be suggestive only. All meet the Minor in Physics requirements of eleven additional credits with at least eight of these being upper-division. For additional possibilities, a student can consult with a physics advisor.

Courses

U=for undergraduate credit only, UG=for undergraduate or graduate credit, G=for graduate credit. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R. Credits beyond this maximum do not count toward a degree.

Astronomy (ASTR)

U 131N Elementary Astronomy I 3 cr. Offered autumn. Prereq., high school algebra and geometry. An introduction to historical and solar system astronomy.

U 132N Elementary Astronomy II 3 cr. Offered spring. Prereq., high school algebra and geometry. An introduction to stars, stellar evolution, galaxies, and the universe.

U 134N Elementary Astronomy Laboratory I 1 cr. Offered autumn. Prereq. or coreq., ASTR 131N Laboratory exercises in observational and solar system astronomy.

U 135N Elementary Astronomy Laboratory II 1 cr. Offered spring. Prereq. or coreq., ASTR 132N. Laboratory exercises in stellar and galactic astronomy.

U 142N The Evolving Universe: Theories and Observations in Modern Astronomy 4 cr. Offered spring. Prereq., M 151 (MATH 121) or equiv. Overview of recent developments in planetary system formation, stars, galaxies, and cosmology. Some astronomical observing required outside of normal class hours.

U 191 (ASTR 195) Special Topics Variable cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses or one-time offerings of current topics.

U 198 Internship Variable cr. (R-6) Offered intermittently. Prereq., consent of department. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

U 351 Planetary Science 3 cr. Offered autumn even-numbered years. Prereq., PHSX 215N-216N or 205N-206N (PHYS 211N-213N or 111N-113N) and M 162 or 171 (MATH 150 or 152). Same as GEO 317 (GEOS 309). Physical and geological characteristics of planets, satellites, asteroids, comets, and meteoroids, with an emphasis on comparative planetology.

U 353 Galactic Astrophysics and Cosmology 3 cr. Offered spring odd-numbered years. Prereq., ASTR 132N, PHSX 217N-218N (PHYS 212N-214N), M 273 (MATH 251). The nature of the Milky Way galaxy and other galaxies, galactic evolution, the large scale structure of the universe, active galaxies and quasars, and cosmology, including the early universe.

U 362 Observational Astronomy 3 cr. Offered autumn even-numbered years. Prereq., ASTR 132N or 142N, PHXS 217N-218N (PHYS 212N-214N). Laboratory study of the probabilistic behavior of light, data acquisition with telescopes, digital imaging and spectroscopy. Emphasis on fundamental statistical tools, scientific computer programming, and written and oral presentation of scientific results.

U 363 Stellar Astronomy and Astrophysics I 3 cr. Offered autumn odd-numbered years. Prereq., ASTR 132N, M 273 (MATH 251), and PHSX 217N-218N (PHYS 212N-214N); PHSX 343 (PHYS 341) recommended. Detailed application of

physical laws to determine the nature of the stars; analysis of stellar spectra and atmospheres; solar astrophysics; structure of stars and their evolution.

U 365 (ASTR 364) Stellar Astronomy and Astrophysics II 3 cr. Offered spring even-numbered years. Prereq., ASTR 363. Continuation of ASTR 363.

U 391 (ASTR 395) Special Topics Variable cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 392 (ASTR 396) Independent Study Variable cr.

U 398 (PHYS 398) Internship Variable cr. (R-6) Offered intermittently. Prereq., consent of department. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

UG 499 (ASTR 480) Seminar/Workshop 1 cr. Offered autumn. Prereq., junior or senior standing in physics. Each student will present a seminar on research performed prior to or during their senior year.

Physics (PHSX)

U 101 (PHYS 180) Freshman Physics Experience 1 cr. Offered autumn. Prereq., freshman standing (fewer than 30-credits towards degree) or consent of instructor. This course is intended for all incoming students either majoring in physics or considering majoring in physics. This seminar course presents an overview of the undergraduate experience as a physics major. Seminars on recent developments in physics and astronomy and opportunities for undergraduate involvement in research and instruction are included.

U 141N (PHYS 141N) Einstein Relativity 3 cr. Offered spring. Prereq., working knowledge of high school physics and high school calculus, or consent of instr. Modern theoretical study of space, time, the principle of relativity, and its implications. Analysis of apparent paradoxes, and applications to particle physics.

U 191 (PHYS 195) Special Topics Variable cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 198 (PHYS 198) Internship Variable cr. (R-6) Offered intermittently. Prereq., consent of department. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

U 205N (PHYS 111N) College Physics I 4 cr. Offered autumn and spring. Prereq., M 122 or 151 (MATH 112 or 121) or equivalent, and prereq. or coreq. PHSX 206N (PHYS 113N). Mechanics, sound, and heat. For non-physical science majors. This course satisfies the lecture portion of medical school requirements in general physics. Credit not allowed for both PHSX 205N-207N and 215N-217N (PHYS 111N-112N and 211N-212N).

U 206N (PHYS 113N) College Physics I Laboratory I 1 cr. Offered autumn and spring. Prereq. or coreq., PHSX 205N (PHYS 111N). Mechanics, sound, and heat. For non-physical science majors. This course satisfies the laboratory portion of medical school requirements in general physics. Credit not allowed for both PHSX 206N-208N and 216N-218N (PHYS 113N-114N and 213N-214N).

U 207N (PHYS 112N) College Physics II 4 cr. Offered autumn and spring. Prereq. PHSX 205N (PHYS 111N) and prereq. or coreq., PHSX 208N (PHYS 114N). Electricity, magnetism, light, and modern physics. For non-physical science majors. This course satisfies the lecture portion of medical school requirements in general physics. Credit not allowed for both PHSX 205N-207N and 215N-217N (PHYS 111N-112N and 211N-212N).

U 208N (PHYS 114N) College Physics Laboratory II 1 cr. Offered autumn and spring. Prereq., PHSX 206N (PHYS 113N), prereq, or coreq., PHSX 207N (PHYS 112N). Electricity, magnetism, light and modern physics. For non-physical

science majors. This course satisfies the laboratory portion of medical school requirements in general physics. Credit not allowed for both PHSX 206N-208N and 216N-218N (PHYS 113N-114N and 213N-214N).

U 215N (PHYS 211N) Fundamentals of Physics with Calculus I 4 cr. Offered autumn. Prereq. or coreq., PHSX 216N (PHYS 213N) and M 171 (MATH 152) or equiv. This course satisfies the lecture portion of medical and technical school requirements in general physics. Mechanics, fluids, waves and sound. Credit not allowed for both PHSX 215N-216N-217N-218N and 205N-206N-207N-208N (PHYS 211N-214N and 111N-113N-112N-114N).

U 216N (PHYS 213N) Physics Laboratory I with Calculus 1 cr. Offered autumn. Coreq., PHSX 215N (PHYS 211N). This course satisfies the laboratory portion of medical and technical school requirements in general physics. Mechanics, fluids, waves, and sound. Credit not allowed for both PHSX 215N-216N-217N-218N and 205N-206N-207N-208N (PHYS 211N-214N and 111N-113N-112N-114N).

U 217N (PHYS 212N) Fundamentals of Physics with Calculus II 4 cr. Offered spring. Prereq., PHSX 215N (PHYS 211N), and prereq. or coreq. PHSX 218 (PHYS 214N), and prereq. or coreq., M 172 (MATH 153) or equivalent. This course satisfies the lecture portion of medical and technical school requirements in general physics. Heat, electricity, magnetism, and light. Credit not allowed for both PHSX 215N-216N-217N-218N and 205N-206N-207N-208N (PHYS 211N-214N and 111N-113N-112N-114N).

U 218N (PHYS 214N) Physics Laboratory II with Calculus 1 cr. Offered spring. Prereq., PHSX 215N (PHYS 211N), coreq., PHSX 217N (PHYS 212N). This course satisfies the laboratory portion of medical and technical school requirements in general physics. Heat, electricity, magnetism, and light. Credit not allowed for both PHSX 215N-216N-217N-218N and 205N-206N-207N-208N (PHYS 211N- 214N and 111N-113N-112N-114N).

U 251 (PHYS 251) Laboratory Arts 1 cr. (R-2) Offered intermittently. Prereq., PHSX 217N-218N (PHYS 212N-214N) and upper-division standing in physics. Elements of glass blowing, machine shop practice and electronic construction techniques.

U 291 (PHYS 295) Special Topics Variable cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 292 (PHYS 293) Independent Study

U 301 (PHYS 301) Introduction to Theoretical Physics 3 cr. Offered spring. Prereq., M 273 (MATH 251); coreq., PHSX 217N-218N (PHYS 212N-214N). Selected topics from applied linear algebra, ordinary and partial differential equations, vector analysis, complex variables, and Fourier series. Applications to classical mechanics, electromagnetism, and quantum mechanics.

U 311 (PHYS 311) Oscillations and Waves 2 cr. Offered fall. Prereq., PHSX 217N-218N or 207N-208N (PHYS 212N-214N or 112N-114N); Prereq. or coreq. M 273 (MATH 251). Detailed study of oscillations and waves at the intermediate level, to develop physical intuition and mathematical skills needed for analyzing a wide range of periodic phenomena encountered in physics.

U 320 (PHYS 375) Classical Mechanics 3 cr. Offered spring. Prereq., PHSX 301 (PHYS 301), M 311 (MATH 311). Topics in classical mechanics at the intermediate level, emphasizing Lagrangian and Hamiltonian dynamics.

U 322 (PHYS 321) Electronics for Scientists 3 cr. Offered autumn. Prereq., PHSX 217N-218N or PHSX 207N-208N (PHYS 212N-214N or PHYS 112N-114N). Laboratory exercises in the techniques of analog and digital electronics, including circuit design, construction, and measurement. Recommended for student who perform laboratory work in any experimental science.

U 327 (PHYS 325) Optics 3 cr. Offered spring. Prereq., PHSX 311 (PHYS 311). Intermediate level study of light and optics, including geometrical optics, wave optics, optical instruments, coherence, polarization, and special topics.

U 330 (PHYS 330) Communicating Physics 3 cr. Offered spring even-numbered years. Prereq., PHSX 217N-218N or

PHSX 207N-208N (PHYS 212N-214N or PHYS 112N-114N). Oral and written communication skills in physics, to include teaching high school and college physics, presenting seminars, and writing technical and non-technical physics articles.

U 333 (PHYS 331) Computational Physics 3 cr. Offered autumn even-numbered years. Prereq., PHSX 217N-218N (PHYS 212N-214N); coreq., any upper-division PHXS course (301 or higher). Solution of advanced problems in physics using computational methods. Students will learn a variety of numerical methods, including FORTRAN programming techniques.

U 343 (PHYS 341) Modern Physics 3 cr. Offered autumn. Prereq., one year of college physics; coreq., M 273 (MATH 251). Includes historical background for development of modern physics and an introduction to quantum mechanics, atomic and nuclear physics. Credit not allowed for graduate degree in physics.

U 391 (PHYS 395) Special Topics Variable cr. (R-9) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 392 (PHYS 396) Honors Physics Variable cr. (R-6) Offered intermittently. Prereq., consent of instr. Independent research in topics of current interest in physics.

UG 423 (PHYS 414) Electricity & Magnetism I 3 cr. Offered autumn. Prereq, PHSx 301 (PHYS 301). Electricity and magnetism at the intermediate level.

UG 425 (PHYS 415) Electricity & Magnetism II 3 cr. Offered spring. Prereq., PHSX 423 (PHYS 414). Continuation of PHSX 423 (PHYS 414). Electricity and magnetism at the intermediate level.

U 444 (PHYS 444) Advanced Physics Laboratory 3 cr. Offered spring. Prereq., PHSX 343 (PHYS 341) or equiv., PHSX 327 (PHYS 325) or equiv.; PHSX 322 (PHYS 321) suggested but not required. Advanced experiments in classical and modern physics, including optics, spectroscopy, laser science, atomic, nuclear, and particle physics, Data analysis techniques for experimental scientists. Recommended for students entering graduate school in any experimental science.

UG 446 (PHYS 446) Thermodynamics and Statistical Mechanics 3 cr. Offered autumn odd-numbered years. Prereq., PHSX 343 (PHYS 341); coreq., M 311 (MATH 311). Topics in thermodynamics and statistical mechanics.

UG 461 (PHYS 461) Quantum Mechanics I 3 cr. Offered autumn. Prereq., PHSX 311 (PHYS 311), PHSX 343 (PHYS 341); prereq. or coreq., M 311 (MATH 311). Introduction to quantum mechanics. Topics include Schroedinger equation, piecewise constant potential, harmonic oscillator, hydrogen atom, angular momentum theory, electron spin.

UG 462 (PHYS 462) Quantum Mechanics II 3 cr. Offered spring. Prereq., PHSX 461 (PHYS 461) or consent of instr. Advanced topics in quantum mechanics including linear vector spaces and Dirac notation, quantum dynamics, time-dependent perturbation theory, and scattering theory.

UG 491 (PHYS 463/495) Special Topics 3 cr. (R-6) Offered intermittently. Prereq., PHSX 461 (PHYS 461) or consent of instr. Studies of a topic in advanced modern physics including nuclear physics, solid state physics, and quantum optics. The topic chosen will vary according to instructor.

UG 499 (PHYS 480) Senior Capstone Seminar 1 cr. Offered autumn. Prereq., junior or senior standing in physics. Each student will present a seminar on research performed prior to or during their senior year.

G 595 (PHYS 595) Special Topics Variable cr. (R-9) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

G 597 (PHYS 597) Research 1-6 cr. (R-9) Offered intermittently. Prereq., consent of instr. Research in selected physics topics.

G 598 (PHYS 598) Internship Variable cr. (R-9) Offered intermittently. Prereq., consent of department. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office.

G 599 (PHYS 599) Thesis Variable cr. (R-9) Offered intermittently. Thesis preparation and execution.

Faculty

Professors

Eijiro Uchimoto, Ph.D., University of Wisconsin, 1988

Andrew S. Ware, Ph.D., University of California, San Diego, 1992 (Chair)

Associate Professors

Daniel B. Reisenfeld, Ph.D., Harvard University, 1998

Michael L. Schneider, Ph.D., University of Wisconsin, 2003

Assistant Professor

Nate McCrady, Ph.D., University of California - Berkeley, 2005

Adjunct Associate Professors

David E. Andrews, Ph.D., Cornell University 1972

Bradford L. Halfpap, Ph.D., Arizona State University, 1987

Adjunct Assistant Professors

Alexander P. Bulmahn, Ph.D., University of Iowa, 2010

Benjamin N. Grossman, Ph.D., Oklahoma State University, 2010

Lecturer/Research Assistant Professor

Diane S. Friend, M.S., The University of Montana, 2000

Research Assistant Professor

Paul H. Janzen, Ph.D., Harvard University, 2002

Emeritus Professors

Richard J. Hayden, Ph.D., University of Chicago, 1948

James P. Jacobs, Ph.D., University of Washington, 1991

Mark J. Jakobson, Ph.D., University of California, Berkeley, 1951

Randolph H. Jeppesen, Ph.D., New Mexico State University, 1980

Department of Political Science

- Special Degree Requirements
- Suggested Course of Study
- Courses
- Faculty

Paul L. Haber, Chair

This section of the catalog was edited after the catalog was published. Updated August 9, 2012, August 20, 2012.

From the time of Plato and Aristotle, the study of politics has been concerned with how human communities use power to shape the lives of individuals. Students of politics observe the world's political institutions, from local governments to

international organizations. They are interested in the quality of political leadership, the values which underlie public affairs, the political and legal processes used to make governmental decisions, and the wisdom of policies. Politics is the continuing dialogue about the best way for communities to govern themselves.

The department offers a varied undergraduate curriculum covering domestic, foreign, and international politics. By meeting requirements outlined below, a student may earn a bachelor degree in political science or in political science-history; a minor in political science or global public health; or a bachelor degree in political science with an option in American politics, international relations and comparative politics, public administration, non-profit administration, international development studies, or public law. A Master of Arts degree in political science and a Master of Public Administration degree are also offered.

The scope of the faculty's interest and research is wide. They bring special insights gained through study and residence in Europe, Russia, Africa, Central Asia, India, the Far East and Latin America, as well as in Montana and Washington, D.C. All members of the department teach introductory and advanced courses.

Courses offered in the department are designed to: (1) assist students to secure a broad liberal education and to equip them with the foundations for American citizenship; (2) provide undergraduate preparation for those students who propose to continue study at the graduate level with the ultimate goal of college teaching and research; (3) offer a broad program of training for those students who plan careers in government or politics; 4) assist in preparing students for careers in teaching at both the elementary and secondary levels; (5) provide a sound background for those students who intend to enroll in law and other professional schools.

The major fields of political science are (1) American government and politics with national, state and local government, politics, and public law as sub-fields; (2) public administration; (3) political theory; (4) comparative government; (5) international relations, organization and law. Majors are eligible for membership in Pi Sigma Alpha, the national political science honorary and are active in student political activities. The Department of Political Science secures a number of legislative and administrative internships in state and local government each year. Internships and other learning opportunities in Washington, D.C., are also available.

Special Degree Requirements

Refer to graduation requirements listed previously in the catalog. See index.

All majors must meet the Upper-division Writing Expectation by successfully completing PSCI 400.

Political Science Major: Students majoring in political science must take a minimum of 37 credits of political science, including PSCI 210S (PSC 100S), 220S (PSC 120S), 230X (PSC 130E), 250E (PSC 150E); and one 300-400 level course in four of the five major fields listed above. Twenty-one of the 37 credits must be in upper-division courses. No more than 7 credits of independent study (PSCI 492 (PSC 496)) and internship (PSCI 498 (PSC 498)) combined may count toward the 37 required credits. In addition, no more than 15 total credits in special topics courses (e.g., PSCI 320 (PSC 381), 391 (PSC 395)) may count toward the 37 required credits.

Political Science Major with an Option in American Politics: A student may earn a major in political science with an option in American politics by completing 40 credits in political science, including: PSCI 210S (PSC 100S), 220S (PSC 120S), 230X (PSC 130E), 250E (PSC 150E); one 300-400 level course in four of the five major fields of political science listed previously; and five of the following courses: PSCI 340 (PSC 383), 341, 342, 343, (PSC 341, 342, 343) 344 (PSC 364), 346 (PSC 366), 347 (PSC 387), 348, 352 (PSC 352), PSCI 365 (PSC 365), 370, 440 (PSC 483), 444, 445, 468. Courses used to complete the upper-division requirement of this option also fulfill the 300-400 level requirement in the respective major fields of political science.

Political Science Major with an Option in International Relations and Comparative Politics: A student may earn a major in political science with an option in international relations and comparative politics by completing 40 credits in political science, including: PSCI 210S (PSC 100S), 220S (PSC 120S), 230X (PSC 130E), 250E (PSC 150E); one 300-400 level course in four of the five major fields of political science listed previously; and three courses from each of the

following groups: a) PSCI 320 (PSC 381), 321 (PSC 321), 322 (PSC 321H), 324, 325, 326, 327, 328, 329 (PSC 324, 325, 326, 327, 328, 329), 420 (PSC 481) 421 (PSC 420), 422; and b) PSCI 330 (PSC 382), 332, 334, 335 (PSC 334, 335), 336, 337 (PSC 337), 430 (PSC 482), 431, 433 (PSC 431, 433), 432 (PSC 430), 463 (PSC 463), Strongly recommended are: a) minimum of two years of foreign language study; b) internship/study-abroad program. Courses used to complete the upper-division requirement of this option also fulfill the 300-400 level requirement in the respective major fields of political science.

Political Science Major with an Option in Public Administration: A student may earn a major in political science with an option in public administration by completing a minimum of 40 credits in political science, including: PSCI 210S (PSC 100S), 220 (PSC 120S), 230X (PSC 130E), 250E (PSC 150E); one 300-400 level course in four of the five major fields of political science listed previously; 361, and three of the following courses: PSCI 344 (PSC 364), 360 (PSC 385), 462 (PSC 460), 461, 463, 466, 467, 468, 460 (PSC 485). A legislative or administrative internship is strongly recommended. Courses used to complete the upper division requirement of this option also fulfill the 300-400 level requirement in the respective major fields of political science.

Political Science Major with an Option in Public Law: A student may earn a major in political science with an option in public law by completing a minimum of 40 credits in political science, including PSCI 210S (PSC 100S), 220 (PSC 120S), 230X (130E), 250E (PSC 150E); one 300-400 level course in four of the five major fields of political science listed previously; PSCI 370, and four of the following courses: 352, 421 (PSC 420), 433, 462 (PSC 460), 461, 471, 474 (PSC 472). Courses used to complete the upper-division requirement of this option also fulfill the 300-400 level requirement in the respective major fields of political science.

Political Science Teaching Major

Students may earn a teaching major in political science (government) by completing the requirements for the BA in political science, to include the following: PSCI 210, 220, 230, 250, 400; one 300-400 level course in four of the major fields listed above; four upper-division elective courses; and EDU 497 (C&I 428). All requirements for the political science major apply. Students with a teaching major in political science must also complete a teaching major or minor in a second field. For the political science teaching major, students must be formally admitted to the Teacher Education Program and complete all of the professional education licensure requirements. Students may also earn a teaching minor in political science. See the Department of Curriculum & Instruction for more information.

Political Science/History Combined Major

This major is intended solely for students who want to be licensed to teach government, history, and one additional social science at the middle and high school levels. Requirements for the combined political science/history major are as follows: in political science, a minimum of 30 credits, including: PSCI 210, 220, 230, 250, three upper-division elective courses in American government or public law, and three government upper-division elective courses in comparative or international relations; in history, a minimum of 31 credits, including: HSTR 101 or 102, HSTA 101 and 102, HSTR 200, HSTA 255, one elective course in world history, three upper-division elective courses to include at least one American and one European course, and one HSTA/HSTR 400-level approved writing course; in one additional social science, a minimum of 9 elective credits in economics or geography or psychology or sociology; and EDU 497 (C&I 428). Students must be formally admitted to the Teacher Education Program and complete all of the professional education licensure requirements. Students are eligible for a teaching license in social studies broadfield. See the Department of Curriculum & Instruction for more information.

Certificate in Nonprofit Administration (Online)

The certificate in nonprofit administration is designed for students wishing to develop professional competencies relating to nonprofit management. To earn a certificate the student must complete a minimum of 16 credits as follows:

a) 12 credits from among the following online courses:

- PSCI 401 Nonprofit Human Resource Management – 2 credits

- PSCI 402 Nonprofit Volunteer Management – 2 credits
- PSCI 403 Nonprofit Program Planning and Evaluation – 2 credits
- PSCI 405 Nonprofit Advocacy and Public Policy – 2 credits
- PSCI 406 Nonprofit Board Management – 2 credits
- PSCI 407 Nonprofit Grant Writing – 2 credits
- PSC 408 Nonprofit Fundraising – 2 credits
- PSCI 409 Nonprofit Financial Management – 2 credits
- PSCI 410 Nonprofit Strategic Planning – 2 credits

b) 4 credits of PSCI 498 or 598 Internship. The internship component includes at least 350 hours of volunteer or paid hours working directly with a nonprofit organization. If the student works at a nonprofit organization, professional work that is aligned with the program focus will qualify as internship credit. Students will complete various reflection activities, including a formal, 10-page paper documenting their learning throughout the internship experience. For questions about the internship, contact the Office for Civic Engagement.

All courses taken in pursuit of the certificate must be taken for graded credit, and a grade of C or above must be achieved in order to receive credit for any course.

This program is offered on a self-supporting basis. To learn about fee schedules and how to register, visit the web site for UMOnline.

Suggested Course of Study

Political Science Major:

First Year	**A**	**S**
PSCI 210S (PSC 100S) Introduction to American Government	3	-
PSCI 220S (PSC 120S) Introduction to Comparative Government	-	3
Seven General Education courses	12	9
One elective	-	3
	15	15
Second Year	**A**	**S**
PSCI 230X (PSC 130E) Introduction to International Relations	3	-
PSCI 250E (PSC 150E) Introduction to Political Theory	-	3
Seven General Education courses	12	9
One elective	-	3
	15	15
Third Year	**A**	**S**
Four PSCI 300-400-level courses	6	6
Six electives	9	9
	15	15
Fourth Year	**A**	**S**
Four PSCI 300-400-level courses	6	6
Six electives	9	9
	15	15

Political Science with American Politics Option:

First /Second Year: Same as for PSCI major above

Third Year	**A**	**S**
Three 300-400-level American Politics courses	6	3
Two other 300-400-level PSCI courses	3	3
Five electives	6	9
	15	15
Fourth Year	**A**	**S**
Two 300-400-level American Politics courses	3	3
Two other 300-400-level PSCI courses	3	3
Six electives	9	9
	15	15

Political Science with International Relations and Comparative Politics Option:

First/Second Year: Same as for PSCI major above

Recommend beginning foreign language study as part of General Education courses.

Third Year	A	S
Three 300-400-level International and Comparative courses	6	3
Two other 300-400-level PSCI courses	3	3
Five electives	6	9
	15	15
Fourth Year	**A**	**S**
Three 300-400-level International and Comparative courses	6	3
One other 300-400-level PSCI course	3	-
Six electives	6	12
	15	15

Political Science with Public Administration Option:

First/Second Year: Same as for PSCI major above

Third Year	A	S
PSCI 361 Public Administration	3	-
One 300-400-level public administration course	-	3
Two other 300-400-level PSCI courses	3	3
Six electives	9	9
	15	15
Fourth Year	**A**	**S**
One 300-400-level public administration course	3	-
PSCI 462 (PSC 460) Human Resource Management	-	3
Three other 300-400-level PSCI courses	6	3
Five electives	6	9
	15	15

Political Science with Public Law Option:

First/Second Year: Same as for PSCI major above

Third Year	A	S
PSCI 370 Courts and Judicial Politics	-	3
Two 300-400-level Public Law courses	3	3
Two other 300-400-level PSCI courses	3	3
Five electives	9	6
	15	15
Fourth Year	**A**	**S**
Two 300-400-level Public Law courses	3	3
Two other 300-400-level PSCI courses	3	3
Six electives	9	9
	15	15

Requirements for a Minor

To earn a minor in political science the student must complete a minimum of 21 credits of political science, including PSCI 210S (PSC 100S), 220S (PSC 120S), 230X (PSC 130E), 250E (PSC 150E); and three additional 300-400-level courses in three of the five major fields of political science listed previously. Nine of the 21 credits must be in 300-400-level courses.

To earn a minor in Global Public Health, the student must complete PSCI 227, Issues in Global Public Health, with a grade of C- or higher and must complete 3 core courses, two of which can be PSCI 431, Politics of Global Migration, and PSCI 463, Development Administration, with a grade of C- or higher.

To earn a minor in International Development Studies, the student must complete 3 core courses, two of which can be PSCI 431, Politics of Global Migration, and PSCI 463, Development Administration, with a grade of C- or higher.

Courses

U = for undergraduate credit only, UG = for undergraduate or graduate credit, G = for graduate credit. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R. Credits beyond this maximum do not count toward a degree.

Political Science (PSCI)

U 191 (PSC 195) Special Topics Variable cr. (R-6) Offered intermittently. Experimental offerings of visiting professors,

experimental offerings of new courses, or one-time offerings of current topics.

U 192 (PSC 196) Independent Study 1-6 cr. (R-6) Offered intermittently.

U 210S (PSC 100S) Introduction to American Government 3 cr. Offered every term. Not open to senior level political science majors except with consent of instructor. Constitutional principles, structures, and the political processes of the national government.

U 220S (PSC 120S) Introduction to Comparative Government 3 cr. Offered every term. Not open to senior level political science majors except with consent of instr. Introduction to the basic political concepts, themes, values and dilemmas as they apply to the world's diverse societies and cultures.

U 227 Issues in Global Public Health 3 cr. Offered spring. Treats current public-health challenges in industrialized and low-income countries, including chronic and infectious illnesses. In comparative perspective, the course explores the individual, environmental, resource, and governance context of public-health policy, interventions, and outcomes and address questions of human rights and ethics, health equity and justice, regional problems and contributors, and the concerns of vulnerable populations along with possibilities for health advocacy.

U 230X (PSC 130E) Introduction to International Relations 3 cr. Offered every term. Not open to senior level political science majors except with consent of instr. Review of the evolution of the nation-state system and survey of contemporary international actors, issues and forces for stability and change.

U 250E (PSC 150E) Introduction to Political Theory 3 cr. Offered spring. Analysis of the various attempts (from Plato to Marx) to explain, instruct, and justify the distribution of political power in society. Emphasis is placed upon those theories whose primary concern is to define the nature of the "good" society.

U 320 (PSC 381) Special Topics: Comparative Politics Variable cr. (R- 6) Offered intermittently. Experimental or one-time offerings in the subfield of comparative politics.

U 321 Post-Communist Politics 3 cr. Offered spring. Prereq junior standing or consent of instructor. Historical and contemporary analysis of politics in post-communist states with an emphasis on Eastern Europe and Russia.

U 322 (PSC 321H) Politics of Europe 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Comparative analysis of parliamentary forms of government and politics with emphasis on Great Britain, France and Germany.

U 324 Sustainable Climate Policies: China and USA 3 cr. Offered every other year. Prereq., CCS 203 or consent of instructor. Explores historic, current, and future greenhouse-gas emissions of the United States and China, reasons why both are the two largest C02 emitters, and prevailing national and subnational government policies and nongovernmental actions that affect emissions mitigation and adaptation.

U 325 (PSC 325) Politics of Latin America 3 cr. Offered autumn. Latin American politics from both historical and contemporary perspectives.

U 326 (PSC 326) Politics of Africa 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Development of the political systems of sub-Saharan Africa. Analysis of the interaction between African and Western social, political, and economic forces. Consideration of African political thought.

U 327 (PSC 327) Politics of Mexico 3 cr. Offered spring. Prereq., junior standing or consent of instr. A review of contemporary politics of Mexico from the Revolution to the present.

U 328 (PSC 328) Politics of China 3 cr. Prereq., junior standing or consent of instr. Institutions and political development in China.

U 329 (PSC 329) Politics of Japan 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Institutions and political development in Japan.

U 330 (PSC 382) Special Topics: International Relations Variable cr. (R-6) Offered intermittently. Experimental or one-time offerings in the subfield of international relations.

U 332 Global Environmental Politics 3 cr. Offered spring. Prereq. junior standing or consent of instructor. Comparative analysis of green political thought, green political parties and social movements, and environmental policy-making with an emphasis on advanced democracies.

U 334 (PSC 333) International Security 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Theories about the causes, conduct, and consequences of war. The historical record of war from World War I to the present. Contemporary security issues, including terrorism, proliferation, disarmament, and the rise and fall of great powers

U 335 (PSC 335) American Foreign Policy 3 cr. Prereq., PSCI 230X (PSC 130E) and junior standing or consent of instr. American diplomatic, economic and defense policies since World War II and their significance in international politics.

U 336 European Union 3 cr. Offered spring. Prereq junior standing or consent of instructor. Historical and contemporary analysis of political and economic integration in Europe with a focus on the political system of the European Union.

U 337 (PSC 337) Model United Nations 3 cr. Offered autumn. Prereq., junior standing or consent of instr. History and structure of the UN. Contemporary global problems, and the UN's role in addressing them. Class has both active learning and service learning dimensions. Students plan, organize and run the annual Montana Model UN high school conference.

U 340 (PSC 383) Special Topics: American Government Variable cr. (R-6) Offered intermittently. Experimental or one-time offerings in the subfield of American government.

U 341 (PSC 341) Political Parties and Elections 3 cr. Offered spring even-numbered years. Prereq., PSCI 210S (PSC 100S). Political party organization, nominations, campaigns and elections in the United States.

U 342 (PSC 342) Media and Public Opinion 3 cr. Offered intermittently. Prereq., PSCI 210S (PSC 100S). Study of the role played by mass media in shaping public opinion, policy agendas, and governmental institutions.

U 343 (PSC 343) Politics of Social Movements 3 cr. Offered intermittently. Prereq., junior standing or consent of instr. The role of social movements in shaping the politics of power, reflected in public policy, electoral politics, relations of class, race, and gender, and people's understanding of the world and their place in it.

U 344 (PSC 364) State and Local Government 3 cr. Offered intermittently. Prereq., PSCI 210S (PSC 100S) and junior standing. Analysis of American state and local government with emphasis on governmental organization, intergovernmental relations, local government powers, and self-government charters. Special attention to Montana.

U 346 (PSC 366) The American Presidency 3 cr. Offered autumn. Prereq., PSCI 210S (PSC 100S). The constitutional foundation and evolution of the executive branch, the structure of the office and executive functions and powers.

U 347 (PSC 387) US Congress 3 cr. Offered spring. Prereq., PSCI 210S (PSC 100S). Structure, processes, and politics of U.S. Congress and state legislatures. During legislative years, special emphasis will be devoted to the Montana Legislature.

U 348 Multicultural Politics 3 cr. Offered intermittently. Examines the politics of diversity in the U.S., including national community, identity, citizenship, immigration, assimilation, and racial issues such as voting rights, affirmative action, segregation and integration, and public opinion.

U 350 (PSC 384) Special Topics: Political Theory Variable cr. (R-6) Offered intermittently. Experimental or one-time offerings in the subfield of political theory.

U 352 (PSC 352) American Political Thought 3 cr. Offered spring. Prereq., PSCI 250X (PSC 150E) or consent of instr. The study of representative political thinkers is used to illustrate the theme of American democracy as a multifaceted experiment with self-government.

U 354 (PSC 354) Contemporary Issues in Political Theory 3 cr. (R-6) Offered intermittently in autumn. Prereq., PSCI 250X (PSC 150E) or consent of instr. Topics variable. Research and assessment of current political and social issues through the study of a representative text and related literature.

U 355 (PSC 355) Theories of Civil Violence 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Survey of the theoretical literature on civil violence, its causes and consequences. Analysis of violence as a political technique and of counter measures designed to prevent or control it.

U 360 (PSC 385) Special Topics: Public Administration or Policy Variable cr. (R-6) Offered intermittently. Experimental or onetime offerings in the subfield of public administration or policy.

U 361 (PSC 361) Public Administration 3 cr. Offered autumn. Prereq., PSCI 210S (PSC 100S). Legal and institutional setting of the administrative system; dynamics of organization and processes of public management.

U 365 (PSC 365) Public Policy Issues and Analysis 3 cr. Examines a variety of public policy issues including economic, social welfare, health care, environmental and criminal justice policy. Emphasis is placed on substantive policies and policy analysis.

U 370 (PSC 370) Courts and Judicial Politics 3 cr. Offered spring. Prereq., PSCI 210S (PSC 100S) and junior standing. Introduction to American courts with emphasis on judicial policy making.

U 391 (PSC 395) Special Topics Variable cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 400 (PSC 400) Advanced Writing in Political Science 1 cr. (R-3) Offered every term. Coreq., any upper-division political science course. Designed for political science students to satisfy their upper-division writing expectation for the major or for students desiring additional experience in writing.

UG 401 Nonprofit Human Resource Management 2 cr. On-line course offered every year. Addresses human resource needs specific to nonprofits, including payroll, employment law, and other legal issues.

UG 402 Nonprofit Volunteer Management 2 cr. On-line course offered every year. Addresses the process of recruiting and retaining volunteers at a nonprofit organization, including case studies and hands-on projects.

UG 403 Nonprofit Program Planning and Evaluation 2 cr. On-line course offered every year. Explores program planning for nonprofits from top-to-bottom, including needs assessment and evaluation.

UG 405 Nonprofit Advocacy and Public Policy 2 cr. On-line course offered every year. Explores and reviews the role of nonprofit organizations in advocacy.

UG 406 Nonprofit Board Management 2 cr. Online course offered every year. Explores policymaking and fundraising roles and responsibilities of the board; strategies for board recruitment, orientation, and evaluation; and executive director/board relationships.

UG 410 Nonprofit Strategic Planning 2 cr. Online course offered every year. This course explores the importance of visionary leadership and strategic planning to the success of nonprofit agencies.

UG 411 Nonprofit Grant Writing 2 cr. Online course offered every year. Students learn how to write the essential parts of a grant proposal and how to search for appropriate funding sources.

UG 412 Nonprofit Fundraising 2 cr. Online course offered every year. The course will cover all major aspects of a fundraising plan including: annual fund, major gifts, capital campaigns, planned giving, grants and special events. The course will also give students the foundation and tools needed to implement these plans into action.

UG 413 Nonprofit Financial Management 2 cr. Online course offered every year. This course explores special issues related to nonprofit financials including accounting basics, budgeting, financial statement ratios, management controls and

nonprofit income tax reporting processes.

UG 420 (PSC 481) Special Topics: Comparative Politics Variable cr. (R-9) Offered intermittently. Experimental or one-time offerings in the subfield of comparative politics.

UG 421 (PSC 420) Comparative Legal Systems 3 cr. Prereq., junior standing. Emphasis on non-western approaches to law, specifically Islamic law and the legal systems of East Asia. Focus on constitutional law, judicial process, civil liberties, and law enforcement and corrections.

UG 422 Revolution and Reform in China 3 cr. Offered fall. A history of the rise and fall of the Maoist regime and the complicated impact of the epochal post Mao reform movement.

UG 430 (PSC 482) Special Topics: International Relations Variable cr. (R-9) Offered intermittently. Experimental or one-time offerings in the subfield of international relations.

UG 431 Politics of Global Migration 3 cr. Prereq., junior standing or consent of instr. Exploration of the elective and forced migration of peoples within countries and across national boundaries. Geographical coverage includes Asia, North and Central America, Africa, and Europe. Attention to policy and gender issues surrounding economic and political migration.

UG 432 (PSC 430) Inter-American Relations 3 cr. Offered intermittently. Prereq., PSCI 325 or consent of instr. Examination of problems, issues and concepts in the international relations of nations of the western hemisphere.

UG 433 International Law and Organizations 3 cr. Offered spring. Prereq., junior standing or consent of instr. Introduction to classical principles and contemporary issues of the law of nations and the organizations created to facilitate international cooperation.

UG 440 (PSC 483) Special Topics: American Government Variable cr.(R-9) Offered intermittently. Experimental or one-time offerings in the subfield of American government.

UG 444 American Political Participation 3 cr. Offered intermittently. Prereq., PSCI 210S (PSC 100S). Examination of the individual and institutional factors affecting voter turnout, the influences on voter decision making, and non-electoral forms of participation in the United States.

UG 445 Political Psychology 3 cr. Offered intermittently. Applies psychological theories such as personality, emotion, cognition, and social influence to political attitudes and actions, including political opinion formation, conformity, prejudice, genocide, and political leadership.

UG 448 Heath Care Policy 3 cr. offered autumn. Focuses on sociopolitical environment influencing health policy in the United States including health politics and policy development, political structure and process, health care financing, public opinion and special interest groups, political leadership, policy reform and global health.

UG 449 Environmental Health Policy 3 cr. Offered spring. Focuses on environmental health policy in the U.S., its evolution, current status, and areas of change.

UG 450 (PSC 484) Special Topics: Political Theory Variable cr. (R-9) Offered intermittently. Experimental or one-time offerings in the subfield of political theory.

U 451E (PSC 357) Ancient & Medieval Political Philosophy 3 cr. Offered autumn. Prereq., PSCI 250E (PSC 150E) or consent of instr. The classical western tradition, beginning with the ancient Greeks, spanning the Christian era, and ending with the high Renaissance period. Examination of the political ideas/values of these different times, exploring broad questions concerning human nature, the origins of the state, and the meaning of legitimate authority.

UG 452 (PSC 450) Utopianism and Its Critics 3 cr. Offered intermittently. Examination of classic and contemporary utopias, from Plato's *Republic*to Barbara Goodwin's *Justice by Lottery* as well as their critics.

UG 453 Modern Political Theory 3 cr. Offered autumn. Prereq., PSCI 250E (PSC 150E) or consent of instr. Analysis of Hobbes, Locke, Rousseau, Burke, James and John Stuart Mill, Marx and Lenin with regard to their "modern" views of the purpose(s) of political inquiry, the nature of citizenship and popular sovereignty. Particular attention to contemporary implications of ideas.

UG 460 (PSC 485) Special Topics: Public Administration or Policy Variable cr. (R-9) Offered intermittently. Experimental or onetime offerings in the subfield of public administration or policy.

UG 461 Administrative Law 3 cr. Offered autumn. Prereq., PSCI 210S (PSC 100S) and junior standing. The legal foundations of public administration with emphasis on legislative delegation, administrative rulemaking and adjudication, judicial review, and public participation.

UG 462 (PSC 460) Human Resource Management 3 cr. Offered spring. Study of the essential elements of human resource management, including analysis and evaluation of work, and the selection, management, and evaluation of public employees.

UG 463 Development Administration 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Study of the functions and processes of public administration in the Third World. Focus on alleviating poverty and underdevelopment. Includes project design and development planning activities.

UG 466 Nonprofit Administration and Public Service 3 cr. Offered autumn. Investigation of the aspects involved in nonprofit management and public service and the complexity of the role of nonprofit organizations in society.

UG 467 Advanced Nonprofit Administration 3 cr. Offered spring. Prereq., PSCI 466. In-depth exploration of the special issues related to nonprofit management including fund raising, budgeting, and program planning.

UG 468 Public Policy Cycle 3 cr. Offered intermittently. Follows specific policy problem through each stage of the public policy cycle, including how policy is formulated in the legislative branch, implemented by the executive branch and reviewed by the judicial branch.

UG 471 American Constitutional Law 3 cr. Offered autumn. Prereq., junior standing or consent of instr. Survey of U.S. Supreme Court's interpretation of the U.S. Constitution's provisions on separation of powers, federalism, civil rights, and civil liberties.

UG 474 (PSC 472)) Civil Rights Seminar 3 cr. Offered spring. Prereq., PSCI 471 or consent of instr. Intensive analysis, discussion, and writing about key U.S. Supreme Court constitutional cases on expression, religion, privacy, criminal justice, and discrimination.

UG 475 Tribal Sovereignty 3 cr. Offered alternate years. An examination of the evolution of tribal governments from a historical and political perspective. Particular attention is devoted to the issues of tribal sovereignty and tribal state conflicts.

UG 479 Ethics and Government 3 cr. Offered spring. Focuses on the ethical challenges faced by public servants in government agencies.

UG 491 (PSC 495) Special Topics in Political Science 1-3 cr. (R-9) Offered intermittently. Prereq., consent of instr. Experimental offerings of new courses, or one-time offerings of current topics.

UG 492 (PSC 496) Independent Study in Political Science 1-3 cr. (R-6) Offered every term. Prereq., nine credits in political science courses numbered at the 300- or 400-level and consent of instr. Research in fields appropriate to the needs and objectives of the individual student.

U 498 Internship 1-6 cr. Offered every term. Prereq., sophomore standing and consent of instr. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. Offered credit/no credit only. A maximum of 6

credits of Internship (198, 298, 398, 498) may count toward graduation.

G 501 Public Administration 3 cr. Offered autumn. Advanced analysis of processes of public management; examination of public administrators' involvement in policy making.

G 503 Policy Analysis 3 cr. Offered spring. The role of public administrators in the policymaking process with emphasis on methods of policy analysis and program evaluation.

G 504 Organization Theory 3 cr. Offered spring. Concepts and theories relevant to the administration of complex organizations, including administrative structure, behavior, process and functions.

G 505 Budgeting and Finance 3 cr. Offered spring. Seminar focusing on principles of public finance and analysis of budgeting as a primary tool of public sector management.

G 520 Comparative Government 3 cr. Offered autumn. Prereq., consent of instr. Concentrated reading and examination of selected subject areas in the field of comparative government.

G 521 Globalization 3 cr. Offered spring. Prereq., senior or graduate standing or consent of instr. Critical examination of the politics of capitalism and democracy in Latin America from a variety of perspectives. Reading and discussion of key texts. Students present research that engages theoretical themes in contexts relative to their graduate work.

G 522 Human Resource Management 3 cr. Offered autumn. Study of the essential elements of human resource management, including analysis and evaluation of work, and the selection, management, and evaluation of public employees.

G 523 Administrative Law 3 cr. Offered autumn. The legal foundations of public administration with emphasis on legislative delegation, administrative rulemaking and adjudication, judicial review, and public participation.

G 524 Management Skills 3 cr. Offered spring. Focus on developing the skills required of managers in nonprofit and government organizations, such as competency in self-assessment, oral and written presentations, managing stress, communicating supportively, motivating, managing conflict, empowering and delegating, succeeding in multicultural contexts, and participating in interviews.

G 525 Strategic Planning and Leadership 3 cr. Focus on the means by which public and nonprofit agencies can carry out their missions effectively.

G 526 Issues in State Government 3 cr. Examination of the evolution and development of state governments since the founding period by focusing on the basic political institutions and a broad range of public policy issues that affect governing in the states.

G 527 Performance Measurement 3 cr. Offered intermittently. Focus on the process by which organizations routinely and systematically gather data to assess progress in achieving their goals.

G 528 Strategic Human Resource Management 3 cr. Offered online alternate summers. This course explores the value of strategic human resource management as a means for enhancing agency performance.

G 530 International Relations 3 cr. Offered autumn. Prereq., consent of instr. Concentrated reading and examination of selected subject areas in the field of international relations.

G 540 American Government 3 cr. Offered spring. Prereq., consent of instr. Concentrated reading and examination of selected subject areas in the field of American government.

G 547 Legislative Relations 3 cr. Online course offered every other year. Focuses on the methods and issues involved in establishing effective working relationships between agencies and the legislative process.

G 550 Political Theory 3 cr. Offered spring. Prereq., consent of instr. Concentrated reading and examination of selected subject areas in the field of political theory.

G 561 Ethics in Public Administration 3 cr. Online course offered every other year. Explores the role of ethics and integrity in public administration and the moral obligations of citizenship.

G 563 Improving Work Culture and Processes 3 cr. Online course offered every other year. Focuses on the complexity of the core components of strategic management: program culture and work process management and the considerations necessary to institutionalize positive change.

G 580 MA Research Design 1 cr. Selection of topic and development of research design for MA thesis.

G 586 MA Research Project 1-4 cr. (R-6) Offered every term. Prereq., consent of instructor. Offered as Credit/No Credit only.

G 594 Seminar Variable cr. (R-9) Offered intermittently. Topic varies.

G 595 Special Topics Variable cr. (R-9) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

G 596 Independent Study Variable cr. (R-6) Offered every term. Prereq., consent of instr.

G 598 Internship Variable cr. (R-6) Offered every term. Prereq., consent of instr. Offered credit/no credit only.

G 599 Thesis Variable cr. (R-6) Offered every term.

Faculty

Professors

Jeffrey D. Greene, Ph.D., University of South Carolina, 1992

Paul L. Haber, Ph.D., Columbia University, 1992

Peter Koehn, Ph.D., University of Colorado, 1973

James J. Lopach, Ph.D., University of Notre Dame, 1973

Jonathan R. Tompkins, Ph.D., University of Washington, 1981 (Associate Dean)

Associate Professors

Karen Adams, Ph.D., University of California, Berkeley, 2000

Ramona Grey, Ph.D., University of California, Riverside, 1991

Robert P. Saldin, Ph.D., University of Virginia, 2008

Assistant Professors

Christopher P. Muste, Ph.D., University of California, Berkeley, 2001

Abhishek Chatterjee, Ph.D., University of Virginia, 2010

Pre-Engineering

Eijiro Uchimoto (Professor, Dept . of Physics and Astronomy), Advisor

Andrew Ware (Professor, Dept. of Physics and Astronomy) Advisor

The pre-engineering curriculum is for students planning to transfer to and accredited engineering program. Since engineering curricula differ for the different divisions of engineering, the general curriculum listed below serves only as a guide. A student planning to transfer into a particular type of engineering should look for the appropriate program guide on the Pre-engineering web site and consult with his or her advisor.

First Year	A	S
COMM 111A Intro to Public Speaking	-	3
ECNS 201S or 202S (ECON 111S or 112S) Principles of Micro/Macroeconomics	3	-
WRIT 101 (ENEX 101) Composition	-	3
M 171, 172 (MATH 152-153) Calculus I, II	4	4
PHSX 215N-216N-217N-218N (PHYS 211N-212N-213N-214N) Fundamentals of Physics w/Calculus I, II & Lab	5	5
EGEN 101 (PHYS 175) Intro to Engineering	3	-
	17	17
Second Year	**A**	**S**
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I & II	5	5
M 273 (MATH 251) Multivariable Calculus	-	4
M 311 (MATH 311) Ordinary Differential Equations/Systems	3	-
PHSX 291 (PHYS 295) Engineering Statics	3	-
PHSX 322 (PHYS 321) Electronics for Scientists	3	-
PHSX 301 (PHYS 301) Introduction to Theoretical Physics	-	3
Electives	1	3
	15	15

Courses

U=for undergraduate credit only, UG=for undergraduate or graduate credit, G=for graduate credit. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R. Credits beyond this maximum do not count toward a degree.

General Engineering (EGEN)

U 101 (PHYS 175) Introduction to Engineering 3 cr. Offered autumn. Prereq. or coreq., M 151 (MATH 121) or equivalent. An introduction to engineering calculations, problem solving, and design. Students are taught to solve and present engineering problems on computers using spreadsheet and graphic software (AutoCAD). In addition, there will be discussions on engineering failures and engineering ethics.

Pre-Law

Soazig Le Bihan, Coordinator

Pre-law students are required to choose a degree major in which they will specialize. No one major best prepares students for law school and no particular course of study is a prerequisite for admission to law school. The Pre-Law Advising Committee suggests that the best preparation for law school is a broad education which ensures exposure to the varieties of thought about the social, political, economic, philosophical, and cultural forces which have shaped law and the societies it governs. Pre-law students must develop substantial skills in writing and be able to think critically and logically.

The Pre-Law Advising Committee urges students to see one of its members **as soon as they consider going to law school.** Advice on the specific character of each student's pre-law program, help in preparation for the LSAT examination, and support in admission to law school are the aims of each member of the committee.

Pre-Law Advising Committee

- Soazig Le Bihan (Assistant Professor, Philosophy): Coordinator
- Len Broberg (Professor, EVST)
- James Burfeind (Professor, Sociology)
- Casey Charles (Professor, English)
- Amanda Dawsey (Assistant Professor, Economics)
- Dan Doyle (Professor, Sociology)
- Jerry Furniss (Professor, Management)
- James Lopach (Professor, Political Science)
- Michael Mayer (Professor, History)
- Jack Morton (Professor, Management)

Pre-Nursing

Pre-Nursing Advising Program, Lommasson Center, Room 269

The pre-nursing curriculum is a two-year program which is designed to provide the basic undergraduate education needed for entry into the professional portion of a baccalaureate nursing program.

Through an arrangement with the College of Nursing at Montana State University-Bozeman, The University of Montana-Missoula offers approved prerequisite courses for prenursing students. Students who intend to pursue the Bachelor of Science in Nursing degree offered through Montana State University can complete the 15 credits of sophomore level nursing courses in Bozeman. In addition, these 15 credits of sophomore level nursing courses are currently offered through a limited option on one of MSU's "Upper Division" campuses located at Billings, Great Falls, Kalispell, and Missoula. Students may apply for acceptance into clinical nursing (junior and senior years), to one of MSU's "Upper Division" campuses, up to a year prior to placement regardless of whether or not they have been admitted to MSU. Depending upon the specific placement, students can complete the entire nursing program in Missoula. It is highly competitive to be placed into the entire program available on MSU's Upper Division campus in Missoula

A grade of "C" (2.00) or better is required in the following specific courses for admission to clinical nursing. MSU's College of Nursing does not accept C- as a passing grade in required courses. Though a grade of "C" (2.00) is minimally acceptable, students are advised to attain the highest grade average possible in these classes for placement considerations at the upper-division level. Acceptance to clinical nursing is based on the average of the grades received in required prerequisite courses at the time of application. Admission is based strictly on grade prioritization. There is a competitive component to a successful application. At a minimum, a 2.50 cumulative GPA is required. MSU general education requirements need to be satisfied prior to graduation. Due to occasional changes in the curriculum and degree requirements, it is essential to contact the pre-nursing advisor before course selection and enrollment. The following courses may not be repeated more than once regardless of where taken.

Suggested Course of Study

First Year	A	S
BIOB 160N (BIOL 110N) Principles of Living Systems, ??BIOL 112 Human Form and Function I or ??BIOL 113 Human Form and Function	3	-
BIOM 250N (BIOL 106N) Microbiology for Health Sciences	-	3
CHMY 121N-123N (CHEM 151N-152N) Intro to General Chemistry/Intro to Organic and Biochemistry	3	3
CHMY 124N (CHEM 154N) Intro to Organic and Biochemistry Laboratory	-	2
COMM 111A Introduction to Public Speaking	-	3
WRIT 101 (ENEX 101) English Composition	3	-
M 115 (MATH 117) Probability & Linear Math	3	-
PSYX 100S (PSYC 100S) Introduction to Psychology	-	4
SOCI 101S (SOC 110S) Principles of Sociology	3	-
	15	15
Second Year	**A**	**S**
BIOL 312-313 Anatomy and Physiology I & II	4	4
HHP 236 Basic Nutrition	-	3
STAT 216 (MATH 241) Statistics	-	4
PSYX 230S (PSYC 240S) Developmental Psychology	3	-
PSYX 233 (PSYC 245) Fund of Psychology of Aging	3	-
General Education	6	3
	16	14

Individual programs may differ from the suggested course of study to better fill the needs of the particular student. Students desiring admission to other schools of nursing are encouraged to obtain a catalog from the college and, in consultation with the pre-nursing advisor, develop a plan of study tailored to meet the specific course requirements of the college of their choice. In Montana the associate of science degree in nursing (ASN) can be obtained at MSU Northern, Havre; Miles Community College, Miles City; Montana Tech of The University of Montana, Butte, Salish Kootenai College, Pablo, and Colleges of Technology in Missoula, Helena, Great Falls, and Billings6. A BSN completion program can be obtained at MSU-Northern, Havre; Montana Tech of The University of Montana, Butte, and Salish Kootenai College, Pablo. A baccalaureate degree in nursing (BSN) can be obtained at Carroll College, Helena and Montana State University, Bozeman.

Department of Psychology

- Special Degree Requirements
- Suggested Course of Study
- Courses
- Faculty

Nabil Haddad, Chair

Psychology is the science of the behavior of humans and other animals. The psychologist, using scientific methods, seeks to understand the causes and purposes of behavior. Psychologists pursue their research and its application in academia, business, government, health, military and social service. The department offers training that leads to the Bachelor of Arts, Master of Arts, Educational Specialist, and Doctor of Philosophy degrees.

Admission Requirements

To be admitted to either option of the psychology major, a student must satisfy the following requirements:

1. completion of 30 credits overall
2. completion of 6 credits in psychology courses, including PSYX 100S (PYSC 100S).

   In addition, to be admitted to the research option of the psychology major, students also should have:

3. a minimum overall GPA of 3.0

Students who intend to major in psychology but who have not yet met the credit hour requirements are admitted to the program as pre-psychology majors. Prior to meeting the above requirements for admission pre- psychology students should go to University College in the Lommasson Center for advising.

Special Degree Requirements

Refer to graduation requirements listed previously in the catalog. See index.

To earn a Bachelor of Arts degree in psychology, the student must complete one of the options. Students are not restricted to the courses listed under either option, although one option must be completed by majors.

College of Technology courses PSYX 100S (PSY 100S) and PSYX 230S (PSY 201) may be used to fulfill the requirements for the 4-year degree in Psychology. Other Psychology courses offered by the College of Technology do not fulfill these requirements.

All majors are required to earn a "C" (2.00) or better in all psychology classes taken to fulfill requirements, including the Math course.

The Upper-division Writing Expectation must be met by successfully completing an upper-division writing course from the approved list in the Academic Policies and Procedures section of this catalog. See index.

Majors are required to remain in periodic contact with departmental advisors to facilitate advanced and individual program planning, to deal with impending difficulties, and as a communication channel between student and department.

Students who are particularly interested in child, adult or family development should investigate the human and family development minor. See index.

General Option

The general option is intended for students who have a major interest in psychology, but do not intend to pursue graduate training in psychology.

1. PSYX 100S (PSYC 100S) Introduction to Psychology
2. PSYX 120 (PSYC 120) Research Methods I
3. PSYX 222 (PSYC 220) Psychological Statistics