

utilitarianism, (b) ground these theories in questions about the moral status of non-humans and our moral duties to non-humans, (c) include an applied section of the course that will cover animal welfare, biotechnology, and other current topics.

U 210 Introduction to Logic: Deduction 3 cr. Offered autumn and spring. Understanding general principles of reasoning and the habits of clear and correct thinking. Emphasis on the analysis of the logical structure of claims in natural language and the skills of elementary deductive inference.

U 211 Introduction to Logic: Applied Logic 3 cr. Offered spring. Prereq., PHIL 210 or equivalent, or consent of instr. Elementary principles of reasoning from evidence. Emphasis on effective evaluation of information and argument in public discourse.

U 215 Philosophical Reasoning 3 cr. Offered autumn. Prereq., philosophy major or minor, or consent of instr. Focus on basic skills essential to success in philosophy; careful reading, critical analysis, and well-structured writing. Emphasis on repeated practice in recognizing, reading, analyzing, and writing philosophical arguments. Intended primarily for philosophy majors and minors.

U 223E Business and Ethics 3 cr. Offered intermittently. An analysis of ethical conflicts that may arise in business.

U 240H History and Philosophy of Science 3cr. Offered intermittently. Same as HSTR 242H (HIST 240H). The epistemological and metaphysical developments of natural philosophy or science. The origins of science in ancient Greece, and its subsequent developments during the scientific revolution. Developments in biology, especially Darwinism and genetics, and developments in physics.

U 251Y History of Ancient Philosophy 3 cr. Offered autumn. Introduction to the central works of Plato and Aristotle, with an overview of Presocratic and Hellenistic philosophy.

U 252Y History of Modern Philosophy 3 cr. Offered spring. A survey of the history of philosophy from Descartes to Kant, which includes other continental rationalists and the British Empiricists.

U 290 Supervised Internship Variable cr. (R-9) Offered intermittently. Prereq., consent of faculty supervisor and department chair.

U 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 296 Independent Study 1-6 cr. (R-6) Offered intermittently.

U 298 Internship Variable cr. (R-9) Offered intermittently. Prereq., consent of faculty supervisor and the Internship Services office.. Extended classroom experience which provides practical application of classroom learning during placements off campus. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

U 300E Moral Philosophy 3 cr. Offered spring. Prereq., PHIL 215. Development of the fundamental principles grounding moral reasoning in the Western tradition. A more thorough treatment of the material offered in PHIL 200E intended for philosophy majors or prepared students who are interested in a rigorous introduction to the foundations of ethics.

U 325 Morality and the Law 3 cr. Offered intermittently. Prereq., lower-division course in Group VIII (E) or consent of instr. Analysis of moral reasoning in Anglo-American law, emphasizing certain ethical and legal concepts and the role of the Supreme Court.

UG 340 Aesthetics 3 cr. Offered intermittently. Prereq., upper-division standing. This course examines the nature of aesthetic experience, the standards of art criticism, and the kinds of knowledge communicated by art. Readings from philosophers, artists, and art critics.

U 362 Ancient Greek and Roman Philosophy 3 cr. Offered intermittently. Same as MCLG 362 and LS 362. Examination of the thought of the philosophers of Greece and Rome as expressed in original works read in English translation. Ancient philosophy studied within its historical, linguistic and cultural setting.

U 390 Supervised Internship 1-12 cr. (R-12) Offered intermittently. Prereq., consent of faculty supervisor and department chair.

U 393 Omnibus Variable cr. (R-9) Offered intermittently. Prereq., consent of instr. Independent work under the University omnibus option. See index.

U 394 Seminar Variable cr. (R-9) Offered intermittently. Prereq., consent of instr.

U 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 396 Independent Study Variable cr. (R-9) Offered intermittently. Prereq., consent of instr.

U 397 Research Variable cr. (R-9) Offered intermittently. Prereq., consent of instr.

U 398 Internship 1-6 cr. (R-6) Offered intermittently. Prereq., consent of faculty supervisor and the Internship Services office. Extended classroom experience which provides practical application of classroom learning during placements off campus. A maximum of 6 credits of

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

UG 410 Formal Logic: Scope and Limits 3 cr. Offered intermittently. Prereq., PHIL 210 or equiv. A systematic study of first-order logic, including development of standard metatheory and the significance of modern formal methods.

UG 411 Philosophy of Science 3 cr. Offered intermittently. Prereq., upper-division standing. A consideration of philosophical issues relating to the nature of modern physical science: method, explanation, theory, progress, space/time, causality, relation of science to philosophy.

UG 421 Medical Ethics 3 cr. Offered intermittently. Prereq., upper-division standing and lower-division course in Group VIII (E), or consent of instr. An examination of ethical problems raised by the practice of medicine and by recent developments in medically-related biological sciences.

UG 422 Contemporary Moral and Political Theory 3 cr. Offered intermittently. Prereq., upper-division standing and PHIL 200E or 201E, or consent of instr. Recent theories in ethics and their implications; recent work in political theory, emphasizing contemporary liberalism and its critics.

UG 427 Ethics and the Environment 3 cr. Offered spring. Prereq., PHIL 202E or PHIL300E. Same as EVST 427. Critical exploration of selected philosophical and literary texts pertinent to the ethics of human relationships with the natural environment.

UG 429 Feminist Philosophy 3 cr. Offered intermittently. Prereq., lower-division course in Group VIII (E) or consent of instr.; PHIL 200 strongly recommended. Same as WGS 429. Study of what distinguishes feminist from traditional approaches to selected areas of philosophy, including ethics, epistemology, political theory, philosophy of science and environment.

UG 430 Topics in the Philosophy of Religion 3 cr. Offered intermittently. An examination of one or more of the classic problems of Western philosophy of religion, such as the traditional arguments for and against the existence of God, the relationship of faith and reason, the status of religious experience, the problem of evil, and the problem of reconciling divine omniscience with human freedom.

UG 441 Philosophy in Literature 3 cr. Offered intermittently. Prereq., upper-division standing or consent of instr. Philosophical thought in selected works of literature.

UG 443 Ethics and Public Affairs 3 cr. Offered intermittently. Prereq., lower-division course in Group VIII (E) or consent of instr. Examination of morally relevant issues in government, journalism, education and other social institutions. Issues considered may include deception, confidentiality, conflict of interest, privacy, paternalism responsibilities in conflict with other institutions, and responsibilities across national boundaries, among others.

UG 444 Topics in the Philosophy of the Arts 3 cr. (R-9) Offered intermittently. Prereq., upper-division standing. Examination of philosophical problems related to the particular arts and discussion of the nature of the arts. Topics considered may include music, visual arts, literature, and film.

UG 452 Early Modern Philosophy 3 cr. (R-6) Offered autumn even-numbered years. Prereq., PHIL 252Y or consent of instr. Intensive reading of one or more of the major philosophers from the early modern period (Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume).

UG 453 Kant 3 cr. Offered spring even numbered years. Prereq., PHIL 252Y or PHIL 452 or consent of instr. Reading and interpretation of selected works.

UG 461 Plato 3 cr. Offered every other spring. Prereq., PHIL 251Y. General introduction to the philosophy of Plato emphasizing dialogues of the Early and Middle periods.

UG 463 Aristotle 3 cr. Offered every other spring. Prereq., PHIL 251Y. General introduction to Aristotle. Early biological writings, Categories, De Interpretatione, Nicomachean Ethics, selections from Physics, De Anima and Metaphysics.

UG 465 19th Century Continental Philosophy 3 cr. (R-6) Offered intermittently. Prereq., PHIL 252Y or consent of instr. Intensive study of the work of one or more 19th century continental philosophers (Hegel, Schopenhauer, Kierkegaard, Marx, Nietzsche, etc.).

UG 467 20th Century Continental Philosophy 3 cr. (R-9) Offered intermittently. Prereq., upper-division standing. Intensive study of the work of one philosopher (Heidegger, Husserl, Sartre, Merleau-Ponty, Ricoeur, Derrida, etc.) or several texts representing a major movement in 20th century continental thought (Phenomenology, Existentialism, Hermeneutics, Post-structuralism, etc.).

UG 469 20th Century Analytic Philosophy 3 cr. (R-9) Offered intermittently. Prereq., upper division standing and PHIL 210, or consent of instr. Intensive study of the work of one or more philosophers (Frege, Russell, Wittgenstein, etc.) or historical introduction to the major issues and figures of 20th century philosophy in the analytic tradition (with readings from Frege, Russell, Wittgenstein, Quine and others).

UG 471 Contemporary Issues in Analytic Philosophy 3 cr. (R-6) Offered intermittently. Prereq., upper-division standing and PHIL 210, or consent of instr. Examination of contemporary issues in analytic philosophy focusing on one or more of the following topics: philosophy of language, epistemology, metaphysics, philosophy of mind.

UG 477 Philosophy of Society and Culture 3 cr. Offered intermittently. Prereq., upper-division standing. A philosophical examination of

cultural forces shaping modern society, forces such as science, technology, or domesticity.

UG 480 Senior Seminar 3 cr. (R-9) Offered spring. Prereq., senior standing. Research in problems in philosophy.

U 490 Supervised Internship Variable cr. (R-12) Offered intermittently. Prereq., consent of faculty supervisor and department chair.

U 493 Omnibus Variable cr. (R-9) Offered intermittently. Prereq., consent of instr. Independent work under the University omnibus option. See index.

UG 494 Seminar Variable cr. (R-9) Offered intermittently. Prereq., consent of instr.

UG 495 Special Topics Variable cr. (R-9) Offered intermittently. Prereq., consent of instr. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 496 Independent Study Variable cr. (R-9) Offered intermittently. Prereq., consent of instr.

U 497 Research Variable cr. (R-9) Offered intermittently. Prereq., consent of instr.

U 498 Internship 1-6 cr. (R-6) Offered intermittently. Prereq., consent of faculty supervisor and the Internship Services office. Extended classroom experience which provides practical application of classroom learning during placements off campus. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

G 501 Topics in Epistemology, Philosophy of Technology and Philosophy of Science 3 cr. (R-6) Offered every year.

G 502 Topics in Value Theory 3 cr. (R-6) Offered every year.

G 503 Topics in the History of Philosophy 3 cr. (R-6) Offered every year.

G 504 Topics in Environmental Philosophy 3 cr. (R-9) Offered autumn and spring. Same as EVST 504. Critical study/discussion of current (as well as benchmark) texts and issues in environmental ethics, environmental politics, and the philosophy of ecology. Interdisciplinary; open to concerned students from all disciplines.

G 505 Topics in Contemporary Philosophy 3 cr. (R-6) Offered intermittently.

G 506 Nature, Language and Politics 3 cr. Offered intermittently. Same as LIT 524 (ENLT 524). Investigation of environmental, social and political thought from the perspective of contemporary language theory.

G 510 Philosophy Forum Colloquium 1 cr. (R-3) Offered intermittently. Prereq., graduate standing. Discussion and further exploration of issues presented at the weekly Philosophy Forum.

G 520 Seminar in Foundations of Ethics 4 cr. Offered summer. Major traditions in Western moral philosophy along with feminist and non-Western critiques.

G 521 Theory and Skills for Teaching Ethics 3 cr. Offered every summer. Exploration and critical reflection of concepts and significant issues in the teaching of practical ethics in classroom and corporate settings.

G 523 Practicum in Teaching Ethics 4 cr. Prereq., M.A. teaching ethics emphasis candidates. Field experience in a postsecondary classroom or off campus learning environment. Field work includes lesson planning, teaching, and evaluation.

G 530 Research Ethics Online 1 cr. Offered every term. Online asynchronous instruction in ethical issues in research; interpersonal, institutional, and professional responsibility; research with animals and human participants. Interactive case studies in biomedical, behavioral, and social sciences.

G 581 Thesis Proposal Preparation Variable cr. (R-2) Offered intermittently.

G 590 Supervised Internship 1-12 cr. (R-12) Offered intermittently. Prereq., consent of faculty supervisor and department chair.

G 593 Professional Paper Variable cr. (R-9) Offered intermittently. For students in the M.A. in Teaching Ethics and AGS options.

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

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-9) Offered intermittently. Prereq., consent of instr.

G 597 Research Variable cr. (R-9) Offered intermittently. Directed individual research and study appropriate to the background and

objectives of the student.

G 598 Internship 1-12 cr. (R-12) Offered intermittently. Prereq., consent of faculty supervisor and the Internship Services office. Extended classroom experience which provides practical application of classroom learning during placements off campus.

G 599 Thesis Variable cr. (R-9) Offered intermittently. Prereq., approval of a thesis proposal by the student's thesis committee.

Faculty

Professors

- Albert Borgmann, Ph.D., University of Munich, 1963
- Deborah Slicer, Ph.D., University of Virginia, 1989 (Chair)

Associate Professors

- David Sherman, Ph.D., University of Texas, Austin, 1999
- Christopher Preston, Ph.D., University of Oregon, 1999

Assistant Professors

- Bridget Clarke, Ph.D., University of Pittsburgh, 2003
- Armond Duwell, Ph.D., University of Pittsburgh, 2004
- Soazig Le Bihan, Ph.D., joint program at University of Nancy and University of Bielefeld, 2008
- Paul Muench, Ph.D., University of Pittsburgh, 2006
- Matthew Strohl, Ph.D., Princeton University, 2008

Lecturer

- Mark Hanson, Ph.D., University of Virginia, 1993

Adjunct Assistant Professor

- Sean O'Brien, Ph.D., University of Colorado, 1989

Emeritus Professors

- Thomas Birch, Ph.D., University of Texas, 1969
- Thomas P. Huff, Ph.D., Rice University, 1968
- Ray Lanfear, Ph.D., Rice University, 1968
- Fred McGlynn, M.A., Northwestern University, 1965
- Burke A. Townsend, Ph.D., University of Hawaii, 1976
- Richard E. Walton, M.A., Claremont Graduate School, 1970

Department of Physics and Astronomy

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- [Suggested Course of Study](#)
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Andrew S. Ware, Chair

Physics is considered to be the most fundamental of all the disciplines in the natural sciences. In physics we try to describe and understand a myriad of physical phenomena ranging from subatomic to cosmological scales by quantifying the relationships among different physical quantities. Not only does physics have its own merit as a challenging but exciting scientific endeavor, it provides the basis for understanding underlying processes in astronomy, biology, chemistry, geology, computer science, engineering, and even in behavioral sciences.

Applications of physics are virtually unlimited: computers, communications, energy production, medical technology, and space flight, to name just a few. The Department of Physics and Astronomy offers a range of physics courses from introductory to advanced undergraduate level in both experimental and theoretical physics with computational methods in mind. In addition, we offer introductory to advanced astronomy and astrophysics courses in which astronomical applications of physics are emphasized. These courses deal with the Universe, from the solar system to clusters of galaxies, both theoretically and observationally. The Department of Physics and Astronomy offers the Bachelor of Arts degree with a major in physics. Graduates with this degree are prepared for further study in physics or related fields at the masters or Ph.D. level, as well as a wide variety of technical positions in industry. In addition, the department offers two other degree paths which combine a solid background in the study of physics with in-depth study in other fields. These options allow for specialization in related fields and provide appropriate background for certain employment opportunities and for continued graduate or professional study:

Astronomy: The astronomy option provides a thorough study of astronomy and astrophysics as well as a solid background in physics and mathematics. Graduates from this program have gone on to graduate programs in astronomy and astrophysics while others have found career opportunities at national astronomical observatories.

Computational Physics: The computational physics option provides a thorough study of computer science and computational physics as well as a solid background in physics and mathematics. Graduates from this program have gone on to graduate programs in physics and computer science while others have found career opportunities in technical fields.

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 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: 211N-212N-213N-214N or 111N-113N-112N-114N (211N-212N-213N-214N strongly recommended), 301, 311, 321, 325, 341, 375, 414 (415 strongly recommended), 444, 461, and 480. Mathematics 171, 172, 273, 311 also must be taken.

Physics majors must satisfy successfully the general education requirements including the following requirement in Foreign Language/Symbolic Systems: Completion of a semester of a foreign language or demonstration of equivalent skill in a foreign language in testing administered by the Counseling Center and Department of Modern and Classical Languages and Literatures, and completion of at least one computer science language course: PHYS 331 (strongly recommended), or CS 101, 131, or 201. Recommended courses in other departments include Mathematics 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 131N, 132N, 134N, 135N, PHYS 211N- 212N-213N-214N, or 111N-113N-112N-114N (2 normally during the sophomore year), 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: 211N-212N or 213N-214N, 301, 311, 480 plus at least four courses from the following: 325, 341, 375, 414, 415, and 461. Required astronomy courses are: 131N, 132N, 134N, 135N, 353, 363, and 364 (351 and 362 recommended). At least one lab course must be taken from ASTR 362, PHYS 321, or PHYS 444. Mathematics 171, 172, 273, and 311 also must be taken. The Foreign Language/Symbolic Systems requirements must be met as set forth above under Bachelor of Arts with a major in Physics (one semester of a foreign language and one computer language course chosen from PHYS 331, CS 101, 131, or 201).

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 211N-212N-213N-214N, or 111N-113N-112N-114N, 301, 311, 331, 341, 375, 414, and 480 (PHYS 321, 444, and 415 are highly recommended); Computer Science 131-132, 241, 332, and seven credits of CS electives selected from courses numbered 200 and above (CS 242, 281, 415E, 471, and 477 recommended); Mathematics 171, 172, 273, 311 and 325 (M 307, 448 and STAT 341 recommended). Foreign language requirements must be met as set forth above under Bachelor of Arts with a major in Physics.

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 111N-113N-112N-114N or 211N-212N and 213N-214N, 301, 325, 330, 341, 375, 414, 461, and 480. Also required are Astronomy 131N-132N; Mathematics 171, 172, 273, 311, STAT 216 or 341 (MATH 241 or 341) and ; Computer Science 101 or 131 or 201; Curriculum & Instruction 426; Chemistry 121N and 485; Biology 108N or 110N or 120N or 121N; Geology 101N-102N; and EVST 101 or Science 350 or Geology 301. Students also must gain admission to Teacher Education and Student Teaching and meet the requirements for certification as a secondary teacher (see the School 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 111N-113N-112N-114N or 211N-212N-213N-214N, 325, 330, 341 and 375. Also required are Astronomy 131N or 132N; Biology 108N or 110N or 120N or 121N; Chemistry 121N, 485; Mathematics 171, 172, 273, 311, STAT 216 or 341 (MATH 241 or 341); and Computer Science 101, 131, or 201. Students also must gain admission to Teacher Education and Student Teaching and meet the requirements for certification as a secondary teacher (see the School 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 MATH 121 by examination:

	First Year	A	S
CS 101 or 131 Fundamentals of Computer Science	-	3	
*WRIT 101 (ENEX 101) College Writing I	3	-	
M 171-172 (MATH 152-153) Calculus I, II	4	4	
PHYS 211N, 212N, 213N, 214N Fundamentals of Physics	5	5	
Electives and General Education	3	3	
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	-	
PHYS 301 Mathematical Methods for Physical Scientists	-	3	
PHYS 311 Oscillations and Waves	2	-	
PHYS 325 Optics	-	3	
PHYS 341 Fundamentals of Modern Physics	3		
Foreign Language*	5		
Electives and General Education	1	9	
Total	15	15	

*Can be waived with two years of foreign language in high school.

	Third Year	A	S
M 311, 412 Ordinary Differential Equations/Systems, Partial Differential Equations	3	3	
PHYS 321 Electronics for Scientists	3	-	
PHYS 330 Communicating Physics	-	3	
PHYS 375 Classical Mechanics	-	3	
PHYS 414-415 Electromagnetism	3	3	
PHYS 446 Thermodynamics and Statistical Mechanics *	(3)	-	
Electives and General Education	(3)	3	
Total	15	15	

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

	Fourth Year	A	S
PHYS 444 Advanced Physics Laboratory	-	3	
PHYS 446 Thermodynamics and Statistical Mechanics*	(3)	-	
PHYS 461 Quantum Mechanics I	3	-	
PHYS 463 Selected Topics or 462 Quantum Mechanics II	-	3	
PHYS 480 Senior Seminar	1	-	
Electives and General Education	8	9	
Total	15	15	

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

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

	First Year	A	S
ASTR 131N-132N Elementary Astronomy	3	3	
CS 101 or 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+ or General Education	5	5	
Total	15	15	

* Semester of enrollment depends on beginning letter of students last name.

+Can be waived with two years of foreign language in high school.

	Second Year	A	S
M 172 (MATH 153) Calculus II	4	-	

M 273 (MATH 251) Calculus III	-	4
PHYS 211N, 212N, 213N, 214N Fundamentals of Physics	5	5
Electives or General Education	6	6
Total	15	15

Third Year **A S**

M 311, 412 Ordinary Differential Equations/Systems, Partial Differential Equations	3	3
PHYS 311 Oscillations and Waves	2	-
PHYS 321 Electronics for Scientists	3	-
PHYS 325 Optics	-	3
PHYS 330 Communicating Physics	-	3
PHYS 341-Fundamentals of Modern Physics	3	-
PHYS 375 Classical Mechanics	-	3
PHYS 446 PHYS 446 Thermodynamics and Statistical Mechanics*	(3)	-
PHYS 301 Mathematical Methods for Physical Scientists	-	3
Electives and General Education	3	-
Total	15	15

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

Fourth Year **A S**

PHYS 414-415 Electromagnetism	3	3
PHYS 444 Advanced Physics Laboratory	-	3
PHYS 446 Thermodynamics and Statistical Mechanics *	(3)	-
PHYS 461-462 Quantum Mechanics I	3	-
PHYS 480 Senior Seminar	1	-
Electives and General Education	5	-
Total	15	16

* 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

First Year

	A	S
ASTR 131N-132N Elementary Astronomy	3	3
ASTR 134N-135N Elementary Astronomy Laboratory	1	1
CS 101 or 131 Introduction to Programming	-	3
WRIT 101 (ENEX 101) Composition*	3	-
M 151 (MATH 121) Precalculus	4	-
M 171 (MATH 152) Calculus I	-	4
Foreign language+ or General Education	5	5
Total	16	16

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

+Can be waived with two years of foreign language in high school.

Second Year

	A	S
M 172, 273 (MATH 153, 251) Calculus II, Multivariable Calculus	4	4
PHYS 211N, 212N, 213N, 214N Fundamentals of Physics with Calculus*	5	5
General Education	6	6
Total	15	15

*Student who are ready for calculus in their first year could take PHYS 211N, 212N, 213N, 214N Fundamentals of Physics with Calculus in their first year instead of a foreign language.

Third Year

	A	S
ASTR 351 Planetary Science or ASTR 362 Observational Astronomy*	2-3	-
ASTR 353 Galactic Astrophysics and Cosmology*	-	3
M 311 (MATH 311) Ordinary Differential Equations/ Systems	3	-
PHYS 301 Mathematical Methods for Physical Scientists	-	3
PHYS 325 Optics	-	3
PHYS 311 Oscillations and Waves	2	-
PHYS 330 Communicating Physics	-	3
PHYS 341 Fundamentals of Modern Physics	3	-

General Education or electives	3-4	3
Total	15	15
Fourth Year		
ASTR 363-364 Stellar Astronomy and Astrophysics*	3	3
PHYS 375 Classical Mechanics or PHYS 461 Quantum Mechanics I or PHYS 414-415 Electromagnetism I, II	3	3
PHYS 480 Senior Seminar	1	-
General Education or electives	8	9
	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

	First Year	A	S
CS 131-132 Fundamentals of Computer Science	3	3	
WRIT 101 (ENEX 101) College Writing I*	3	-	
M 171, 172 (MATH 152-153) Calculus I, II	4	4	
PHYS 211N, 212N, 213N, 214N Fundamentals of Physics with Calculus	5	5	
General Education	-	3	
Total	15	15	

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

	Second Year	A	S
CS 241 Data Structure	4	-	
M 225 (MATH 225) Introduction to Discrete Math	3	-	
M 273 (MATH 251) Multivariable Calculus	-	4	
PHYS 301 Mathematical Methods for Physical Scientists	-	3	
PHYS 311 Oscillations and Waves	2	-	
PHYS 331 Introduction to Computational Physics #	(3)	-	
PHYS 341 Fundamentals of Modern Physics	3	-	
Foreign language+ or General Education	-	5	
General Education or electives	-	0-3	
Total	15	15	

PHYS 331 is offered every other year and may be taken in the third or fourth year.

+Can be waived with two years of foreign language in high school.

	Third Year	A	S
CS 242 Programming Languages	-	4	
CS 281 Computer Architecture and Assembly Language Programming	3	-	
M 311 (MATH 311) Ordinary Differential Equations/Systems	3	-	
M 325 (MATH 325) Discrete Math II	-	3	
PHYS 321 Electronics for Scientists*	3	-	
PHYS 331 Introduction to Computational Physics #	(3)	-	
PHYS 375 Classical Mechanics	-	3	
General Education or electives	3-6	6	
Total	15	16	

PHYS 331 is offered every other year and may be taken in the third or fourth year.

	Fourth Year	A	S
CS 332 Algorithms	3	-	
CS 415E Computers, Ethics, and Society*	-	3	
PHYS 414-415 Electromagnetism*	3	3	
PHYS 480 Senior Seminar	1	-	
General Education or electives	8	9	
Total	15	15	

* CS and PHYS 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 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

To earn a minor in physics the student must complete PHYS 111N-113N-112N-114N or 211N-212N-213N-214N; 301, 311, and 375; and six credits from PHYS 325, 341, 414, 415, 446, 461 or 462. (Mathematics prerequisites for the physics minor are M 171, 172, 273, and 311 (MATH 152, 153, 251, and 311)).

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 142 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 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.

UG 351 Planetary Science 3 cr. Offered autumn even-numbered years. Prereq., 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.

UG 353 Galactic Astrophysics and Cosmology 3 cr. Offered spring odd-numbered years. Prereq., ASTR 132N, 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.

UG 362 Observational Astronomy 2 cr. Offered autumn even-numbered years. Prereq., ASTR 132N, PHYS 212N-214N. Telescopes and instrumentation for the determination of the positions, brightness, colors and other properties of stars; particular attention to photoelectric photometry. Includes observational and computational problems.

UG 363 Stellar Astronomy and Astrophysics I 3 cr. Offered autumn odd-numbered years. Prereq., ASTR 132N, M 273 (MATH 251), and PHYS 212N-214N; 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.

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

U 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 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.

Physics (PHYS)

U 111N Fundamentals of Physics I 4 cr. Offered autumn and spring. prereq., M 122 or 151 (MATH 112 or 121) or equivalent, and

prereq. or coreq. 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 PHYS 111N-112N and 211N-212N.

U 112N Fundamentals of Physics II 4 cr. Offered autumn and spring. prereq. PHYS 111N and prereq. or coreq., 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 PHYS 111N-112N and 211N-212N.

U 113N Fundamentals of Physics Laboratory I 1 cr. Offered autumn and spring. Prereq. or coreq., PHYS 111. 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 PHYS 113N-114N and 213N-214N.

U 114N Fundamentals of Physics Laboratory II 1 cr. Offered autumn and spring. Prereq., PHYS 113N, prereq. or coreq., 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 PHYS 113N-114N and 213N-214N.

U 141N Relativity: From Galileo to Einstein and Beyond 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 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. NOTE: This course may NOT be counted toward the Physics major.

U 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 211N Fundamentals of Physics with Calculus I 4 cr. Offered autumn. Prereq. or coreq., 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 PHYS 211N-212N and 111N-113N-112N-114N.

U 212N Fundamentals of Physics with Calculus II 4 cr. Offered spring. Prereq., PHYS 211N, 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 PHYS 211N-212N and 111N-113N-112N-114N.

U 213N Physics Laboratory I with Calculus 1 cr. Offered autumn. Coreq., 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 PHYS 213N-214N and 111N-113N-112N-114N.

U 214N Physics Laboratory II with Calculus 1 cr. Offered spring. Prereq., PHYS 211N, coreq., 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 PHYS 213N- 214N and 111N-113N-112N-114N.

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

U 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.

UG 301 Mathematical Methods for Physical Scientists 3 cr. Offered spring. Prereq., M 273 (MATH 251); coreq., 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 Oscillations and Waves 2 cr. Offered fall. Prereq., 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 321 Electronics for Scientists 3 cr. Offered autumn. Prereq., PHYS 212N-214N or PHYS 113N-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 325 Optics 3 cr. Offered spring. Prereq., PHYS 311. Intermediate level study of light and optics, including geometrical optics, wave optics, optical instruments, coherence, polarization, and special topics.

UG 330 Methods of Communicating Physics 3 cr. Offered spring even-numbered years. Prereq., 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 331 Introduction to Computational Physics 3 cr. Offered autumn even-numbered years. Prereq., PHYS 212N-214N; coreq., any upper-division PHYS 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.

UG 341 Fundamentals of 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 375 Classical Mechanics 3 cr. Offered spring. Prereq., PHYS 301, M 311. Topics in classical mechanics at the intermediate level, emphasizing Lagrangian and Hamiltonian dynamics.

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

UG 414 Electromagnetism I 3 cr. Offered autumn. Prereq., PHYS 301. Electricity and magnetism at the intermediate level.

UG 415 Electromagnetism II 3 cr. Offered spring. Prereq., PHYS 414. Continuation of PHYS 414. Electricity and magnetism at the intermediate level.

U 444 Advanced Physics Laboratory 3 cr. Offered spring. Prereq., PHYS 341 or equiv., PHYS 325 or equiv.; 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 Thermodynamics and Statistical Mechanics 3 cr. Offered autumn odd-numbered years. Prereq., PHYS 341; coreq., M 311. Topics in thermodynamics and statistical mechanics.

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

UG 462 Quantum Mechanics II 3 cr. Offered spring. Prereq., 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 463 Selected Topics in Modern Physics 3 cr. (R-6) Offered intermittently. Prereq., 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 480 Senior 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.

U 493 Omnibus Variable cr. (R-9) Offered intermittently. University omnibus option for independent work. See index.

UG 495 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 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 Research 1-6 cr. (R-9) Offered intermittently. Prereq., consent of instr. Research in selected physics topics.

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

Faculty

Professors

- James P. Jacobs, Ph.D., University of Washington, 1991
- Eijiro Uchimoto, Ph.D., University of Wisconsin, 1988
- Andrew S. Ware, Ph.D., University of California, San Diego, 1992 (Chair)

Associate Professor

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

Assistant Professors

- Nate McCrady, Ph.D., University of California - Berkeley, 2005
- Michael L. Schneider, Ph.D., University of Wisconsin, 2003

Research Assistant Professor/Adjunct Assistant Professor

- Maureen A. McGraw, Ph.D., University of California, Berkeley, 1996

Adjunct Associate Professors

- David E. Andrews, Ph.D., Cornell University 1972
- Bradford L. Halfpap, Ph.D., Arizona State University, 1987

Adjunct Assistant Professor

- Jack Dostal, Ph.D., Montana State University, 2008
- John Williams, Ph.D., University of Washington, 2002

Lecturer/Research Assistant Professor

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

Adjunct Lecturer

- Julie Schneider, M.S., The University of Colorado, 2007

Emeritus Professors

- Richard J. Hayden, Ph.D., University of Chicago, 1948
- Mark J. Jakobson, Ph.D., University of California, Berkeley, 1951
- Randolph H. Jeppesen, Ph.D., New Mexico State University, 1980

Department of Political Science

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James J. Lopach, Chair

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 a bachelor degree in political science with an option in American politics, international relations and comparative politics, public administration, 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 Canada, England, Western Europe, the former Soviet Union, Africa, 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 36 credits of political science, including 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 36 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 36 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 36 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 39 credits in political science, including: 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: 341, 342, 343, 352, 344 (PSC 364), 346 (PSC 366), 370, 340 (PSC 383), 347 (PSC 387), 468, 440 (PSC 483). 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 39 credits in political science, including: 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) 322 (PSC 321H), 325, 326, 327, 328, 329, 320 (PSC 381), 421 (PSC 420), 420 (PSC 481); and b) 335, 336, 337, 330 (PSC 382), 431, 433, 463, 432 (PSC 430) 430 (PSC 482). 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 39 credits in political science, including: 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: 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 39 credits in political science, including 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; 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.

Teacher Preparation in Government

Students who want to be licensed to teach civics and government at the middle and high school level must complete the BA degree requirements in political science (no option required). They also must complete a teaching minor in a second field of their choice and the professional licensure program in the School of Education. Students may also earn a teaching minor in government. See the Department of Curriculum & Instruction for information about admission to the Teacher Education Program and completion of these licensure requirements.

Teacher Preparation in Government and History

Students who want to be licensed to teach government, history, and one additional social science at the middle and high school level must complete the BA degree requirements for the combined academic major in political science and history. In completing this combined degree, students simultaneously satisfy the Comprehensive Social Science teaching major and the professional licensure program in the School of Education. See the Department of Curriculum & Instruction for information about admission to the Teacher Education Program and completion of this licensure program.

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 for all options

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 for all options

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 for all options

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 for all options

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 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.

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 199 Lower-Division Elective Variable cr.

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 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 300 Writing in Political Science 1 cr. (R-3) Offered every term. Coreq., any upper-division political science course. Designed for students seeking an approved writing course or desiring additional experience in writing.

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 322 (PSC 321H) Politics of Europe 3 cr. Offered autumn. Prereq., PSCI 210 (PSC 100S) and 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 CO₂ emitters, and prevailing national and subnational government policies and nongovernmental actions that affect emissions mitigation and adaptation.

UG 325 Politics of Latin America 3 cr. Offered autumn. Latin American politics from both historical and contemporary perspectives.

UG 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.

UG 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.

UG 328 Politics of China 3 cr. Prereq., junior standing or consent of instr. Institutions and political development in China.

UG 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 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

UG 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.

UG 336 The Causes of War 3 cr. Prereq., junior standing or consent of instr. A colloquium to clarify the definitional and philosophical problems besetting the search for the causes (and the prevention) of war.

U 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.

UG 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.

UG 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.

UG 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.

UG 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.

UG 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.

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

UG 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.

UG 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.

UG 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 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 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 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 Issues in Nonprofit Administration: Human Resources 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 Issues in Nonprofit Administration: 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 hand-on projects.

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

UG 404 Issues in Nonprofit Administration: Ethics and Legal Issues 2 cr. On-line course offered every year. Explores specific ethical dimensions and the necessity of accountability in nonprofit work.

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

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

UG 451 Ancient and 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 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 493 Omnibus Variable cr. (R-15) Offered every term. Prereq., consent of instr. Independent work under the University omnibus option. See index.

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 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 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 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
- Louis D. Hayes, Ph.D., University of Arizona, 1966
- Peter Koehn, Ph.D., University of Colorado, 1973
- James J. Lopach, Ph.D., University of Notre Dame, 1973 (Chair)
- 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

Assistant Professors

- Christopher P. Muste, Ph.D., University of California, Berkeley, 2001
- Robert P. Saldin, Ph.D., University of Virginia, 2008

Emeritus Professor

- Forest L. Grieves, Ph.D., University of Arizona, 1967

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
PHYS 211N-212N-213N-214N Fundamentals of Physics	5	5
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	-
PHYS 295 Engineering Statics	3	-
PHYS 321 Electronics for Scientists	3	-
PHYS 301 Vector Analysis	-	3
Electives	3	3
	17	15

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 pre-nursing 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
BIOL 110N Principles of Biology (prereq. for BIOL 312), BIOL 112 Human Form and Function I or BIOL 113 Human Form and Function	3	-
BIOL 106N Elementary Medical Microbiology	-	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 Billings. 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](#)

Allen Szalda-Petree, 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 the Bachelor of Arts, Master of Arts 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.

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.

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 Introduction to Psychology
2. PSYX 120 Research Methods I
3. PSYX 222 (PSYC 220) Psychological Statistics
4. At least two of the following:
 - PSYX 250N (PSYC 270N) Fundamentals of Biological Psychology
 - PSYX 270S (PSYC 260S) Fundamentals of Learning
 - PSYX 280S (PSYC 265S) Cognition
5. At least four of the following:
 - PSYX 230S (PSYC 240S) Child and Adolescent Development
 - PSYX 233 (PSYC 245) Adult Development and Aging
 - PSYX 340S (PSYC 330S) Abnormal Psychology
 - PSYX 360S (PSYC 350S) Social Psychology
 - PSYX 385S (PSYC 351S) Psychology of Personality
6. At least one of the following:
 - M 115 (MATH 117) Probability & Linear Mathematics
 - M 162 (MATH 150) Applied Calculus

- M 171 (MATH 152) Calculus I
- 7. At least four other three-credit psychology courses, not to include PSYX 292, 298, 392, 398, 493, or 499 (PSYC 296, 298, 396, 398, 493 or 499).

Research Option

The research option provides the student with an adequate foundation for graduate studies in psychology.

1. PSYX 100S Introduction to Psychology
2. PSYX 120 Research Methods I
3. PSYX 222 (PSYC 220) Psychological Statistics
4. PSYX 320 Research Methods III
5. PSYX 297 Supervised Research (minimum of 2 credits)
6. At least two of the following:
 - PSYX 250N (PSYC 270N) Fundamentals of Biological Psychology
 - PSYX 270S (PSYC 260S) Fundamentals of Learning
 - PSYX 280S (PSYC 265S) Fund of Memory & Cognition
7. At least four of the following:
 - PSYX 230S (PSYC 240S) Developmental Psychology
 - PSYX 233 (PSYC 245) Fund of Psychology of Aging
 - PSYX 340S (PSYC 330S) Abnormal Psychology
 - PSYX 360S (PSYC 350S) Social Psychology
 - PSYX 385S (PSYC 351S) Psychology of Personality
8. At least one of the following:
 - PSYX 339 (PSYC 340) Current Topics in Developmental Psychology
 - PSYX 345 (PSYC 336) Child and Adolescent Psychological Disorders
 - PSYX 348 (PSYC 385) Psychology of Family Violence
 - PSYX 376 (PSYC 337) Principles of Cognitive Behavior Modification
 - PSYX 378S (PSYC 335S) Intro to Clinical Psychology
9. At least two of the following:
 - PSYX 352 (PSYC 372) Comparative Psychology
 - PSYX 356 ((PSYC 371) Human Neuropsychology
 - PSYX 377 (PSYC 301) Personalized Student Instruction
 - PSYX 400 History and Systems in Psychology
10. At least one of the following:
 - M 115 (MATH 117) Probability & Linear Mathematics
 - M 171 (MATH 152) Calculus I

Teacher Preparation in Psychology

Students who want to be licensed to teach psychology at the high school level must complete the BA degree requirements in psychology (general option). They also must complete a teaching minor in a second field of their choice and the professional licensure program in the School of Education. Students may also earn a teaching minor in psychology. See the Department of Curriculum and Instruction for information about admission to the Teacher Education Program and completion of these licensure programs.

Suggested Course of Study

	First Year	A	S
PSYX 100S Introduction to Psychology		4	-
PSYX 105 (PSYC 110) Careers in Psychology		-	1
PSYX 120 Research Methods I		-	3
M 115 (MATH 117) Probability and Linear Math or M 162 or 171 (150 or 152) Applied Calculus/Calculus I		-	3-4
WRIT 101 (ENEX 101) Composition		3	-
Four General Education courses		6	6
Two elective courses		3	3
		16	17
	Second Year	A	S
PSYX 222 (PSYC 220) Psychological Statistics		3	-
Three other 200-level psychology courses		3	6
Four General Education courses		6	6
Two elective courses		3	3
		15	15
	Third Year	A	S
PSYX courses		3	6

PSYX 297 Supervised Research	- 2
PSYX 320 Research Methods III (upper-division writing)	3 -
Electives and General Education	9 7
	15 15
Fourth Year	A S
PSYX courses	6 -
Electives	6 15-16
	12 15-16

Requirements for a Minor

To earn a minor in psychology the student must complete a minimum of 21 credits of psychology including:

1. PSYX 100S Introduction to Psychology
2. PSYX 120 Research Methods I
3. One of:
 - o PSYX 230S (PSYC 240S) Developmental Psychology
 - o PSYX 360S (PSYC 350S) Social Psychology
 - o PSYX 385S (PSYC 351S) Psychology of Personality
4. One of:
 - o PSYX 340S (PSYC 330S) Abnormal Psychology
 - o PSYX 345 (PSYC 336) Child and Adolescent Psychological Disorders
 - o PSYX 376 (PSYC 337) Principles of Cognitive Behavior Modification
 - o PSYX 378 (PSYC 335S) Intro to Clinical Psychology
5. Two of:
 - o PSYX 250N (PSYC 270N) Fundamentals of Biological Psychology
 - o PSYX 270S (PSYC 260S) Fundamentals Psychology of Learning
 - o PSYX 280S (PSYC 265S) Fundamentals of Memory & Cognition
 - o PSYX 352 (PSYC 372) Comparative Psychology
 - o PSYX 356 (PSYC 371) Human Neuropsychology

At least six of the 21 credits must be at the 300-level or above.

All minors are required to earn a "C" (2.00) or better in all psychology classes taken to fulfill requirements.

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.

Psychology (PSYX)

U 100S Introduction to Psychology 4 cr. Offered every term. Introduction to the scientific study of behavior in humans and other animals. Credit not allowed for both PSY 100S and PSYC 100S.

U 105 (PSYC 110) Careers in Psychology 1 cr. Offered intermittently. Exploration of the various careers available in the general area of mental health research and practice.

U 107 (PSYC 113) Intergroup Dialogue 1 cr. Offered autumn. Reflective dialogue about issues of identity, diversity, and social justice.

U 120 Research Methods I 3 cr. Offered every term. Prereq., PSYX 100S. Experimental and quantitative methods employed in the scientific study of behavior.

U 191 (PSYC 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 199 Lower-Division Elective Variable cr.

U 222 (PSYC 220) Psychological Statistics 3 cr. Offered every term. Prereq., PSYX 100S, 120; M 115 (MATH 117), M 162 or 161 (MATH 150 or 152). Application of statistical techniques to psychological data. Credit not allowed for both PSYX 222 (PSYC 220) and SOCI 202 (Soc 202).

U 230S (PSYC 240S) Developmental Psychology 3 cr. Offered every term. Prereq., PSYX 100S. An overview of research findings on development from infancy through adolescence, with emphasis on application.

U 233 (PSYC 245) Fundamentals of Psychology of Aging 3 cr. Offered intermittently. Prereq., PSYX 100S. An overview of theories and

research findings in the psychology of adulthood and aging.

U 250N (PSYC 270N) Fundamentals of Biological Psychology 3 cr. Offered every term. Prereq., PSYX 100S. Introduction to the relationships between biological structures and mechanisms and their corresponding psychological processes and events. Origins and adaptations of structures and behaviors as well as the methods used to study these relationships.

U 270S (PSYC 260S) Fundamentals of Psychology of Learning 3 cr. Offered autumn. Prereq., PSYX 100S. Basic theory and research on the nature of animal learning and behavior.

U 280S (PSYC 265S) Fundamentals of memory & Cognition 3 cr. Offered intermittently. Prereq., PSYX 100S. The acquisition and uses of knowledge. An examination of research and theories of human learning, memory, and thinking.

U 291 (PSYC 295) Special Topics Variable cr. (R-6) Offered intermittently. Prereq., PSYX 100S. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 292 (PSYC 296) Independent Study Variable cr. (R-6) Offered every term.

U 294 Seminar/Workshop 1 cr. (R-3) Offered intermittently. Prereq., consent of instr.; coreq., another psychology course. Taken in conjunction with another psychology course to provide additional content and discussion for honors students. Consent of the corequisite course instructor is required for this course.

U 297 Supervised Research Variable cr. (R-6) Offered every term.

U 298 (PSYC 298) Internship 1-6 cr. (R-6) Offered every term. 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 320 Research Methods III 3 cr. Offered every term. Prereq., PSYX 100S, 120, and 222 (PSYC 220) and research option. An appreciation of the experimental approach to the scientific study of behavior through student-conducted experiments.

U 339 (PSYC 340) Current Topics in Developmental Psychology 3 cr. Offered intermittently. Prereq., PSYX 230S or 233 (PSYC 240S or 245). Topical reviews of theories, research and applications in developmental psychology.

U 340S (PSYC 330S) Abnormal Psychology 3 cr. Offered every term. Prereq., PSYX 100S. Description and classification of abnormal behavior.

U 345 (PSYC 336) Child and Adolescent Psychological Disorders 3 cr. Offered intermittently. Prereq., PSYX 100S and 230S (PSYC 240S). Study of causes, characteristics, assessment and treatment of emotional, social and intellectual disorders. The age span studied will range from infancy through adolescence.

U 348 (PSYC 385) Psychology of Family Violence 3 cr. Offered spring. Prereq., PSYX 100S; recommended prereq., PSYX 222 (PSYC 220) and 340S (PSYC 330S). Same as WGS 385. Exploration of theoretical explanations for the presence of violence in American families; research and interventions in such areas as child physical and sexual abuse, battering of women, marital rape, spousal homicide, etc.

U 352 (PSYC 372) Comparative Psychology 3 cr. Offered autumn. Prereq., PSYX 250N (PSYC 270N). Advanced evaluation and analysis of animal behavior through the synthesis of theory, research, and methods found in comparative psychology, behavioral biology, ethology, and sociobiology.

U 356 (PSYC 371) Human Neuropsychology 3 cr. Offered spring. Prereq., PSYX 250N (PSYC 270N). Study of the organization of the nervous system, functional neuroanatomy, neuropathology, neurological disorders, behavioral neurology, and clinical neuropsychology.

U 360S (PSYC 350S) Social Psychology 3 cr. Offered every term. Prereq., PSYX 100S. Individual behavior as a function of interpersonal interaction.

U 362 (PSYCH 352) Multicultural Psychology 3 cr. Offered autumn evennumbered years. Current theories and research on culture, race, and ethnicity, and how the sociocultural context influences psychological processes.

U 376 (PSYC 337) Principles of Cognitive Behavior Modification 3 cr. Offered intermittently. Prereq., PSYX 100S, 270S (PSYC 260S). Study of basic principles, assumptions, methodology and applications of behavior modification. Discussion of current literature relevant to behavioral assessment and treatment of major psychological disorders.

U 377 (PSYC 301) Personalized Student Instruction 3 cr. Offered every term. Prereq., PSYX 100S, consent of instr., and 3.0 GPA. Experience with the personalized student instruction method of teaching, gained through participating as a proctor in the introductory psychology course.

U 378S (PSYC 335S) Intro to Clinical Psychology 3 cr. Offered intermittently. Prereq., PSYX 100S and 340S (PSYC 330S). Clinical psychology as a science and a profession. Theoretical models and techniques of assessment and intervention. Case illustrations.