U 336 (ANTH 326) Myth, Ritual and Religion 3 cr. Offered autumn odd-numbered years. Theories and practices concerning supernatural phenomena found among non-literate peoples throughout the world.

U 345 (ANTH 386) Nationalism in Modern Middle East 3 cr. Offered autumn. The several intellectual traditions and philosophies some ephemeral and visionary, most eclectic and confused, and virtually all conflicting that are usually believed to underlie the varying concept of Iranian and Arab nationalism in the 20th century.

U 346 (ANTH 387) Iran Between Two Revolutions 3 cr. Offered spring. The socioeconomic, political, and cultural causes which resulted in the transformation of the Iranian society from a traditional Islamic entity to a modern secular state and the factors which led to the downfall of the secular state and the establishment of an Islamic republic.

U 347 (ANTH 346) Central Asia and Its Neighbors 3 cr. Offered spring. Same as HSTR 358 (HIST 345). Analysis of the human communities and cultures of Central and Southwest Asia, with particular emphasis on the importance of relationships with neighboring countries and civilizations since ancient times.

U 349 (ANTH 329) Social Change in Non-Western Societies 3 cr. Offered intermittently. Prereq., ANTY 220S (ANTH 220S) or consent of instr. Study of the processes of change, modernization and development.

U 351H (ANTH 351H) Archaeology of North America 3 cr. Offered intermittently. The origins, backgrounds and development of Pre-Columbian American peoples and cultures.

U 352X (ANTH 352X) Archaeology of Montana 3 cr. Offered spring. The origins, distributions and development of aboriginal cultures in Montana and surrounding regions.

U 353 (ANTH 353) Paleoindian Archaeology 3 cr. Examines archaeological, linguistic, biological and skeletal data to determine from where and when Native Americans arrived in North America. Examines archaeological sites from such diverse places as Montana, Siberia, Virginia, and Chile to answer the most intriguing question in contemporary American archaeology today: how, when and from where did people first arrive in the Americas?

U 354H (ANTH 354H) Mesoamerican Prehistory 3 cr. Offered intermittently. The development of civilization and prehistoric states in the New World. Prehistoric lifeways and the effects of European contact on these cultures.

U 391 (ANTH 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 398 (ANTH 398) Internship Variable cr. Offered intermittently. Prereq., 9 credits in anthropology; consent of faculty supervisor and cooperative education officer. Practical application of classroom learning through internship in a number of areas such as museology, cultural resource management, and forensics. A maximum of 6 credits of Internship (198, 298, 398, and 498) may count toward graduation.

UG 400 (ANTH 400) History of Anthropology 3 cr. Offered autumn odd numbered years. Prereq., ANTY 101H and 220S (ANTH 101H and 220S). The development of theory and method in cultural anthropology to the present. Various archaeological, ethnological and socio-psychological theories in the light of historical anthropology.

UG 401 (ANTH 401) Anthropological Data Analysis 3 cr. Offered autumn. Prereq., college algebra or consent of instr. An analysis of the foundations of anthropological scaling and measurement.

UG 402 (ANTH 448) Quantitative Ethnographic Field Methods 3 cr. Offered autumn odd-numbered years. This course is designed to enhance student understanding of field methods that generate quantitative data describing human behavior. The toolkit of a student completing this course will include knowledge of basic methods that will get you from observing behavior to discussing your research and findings in a professional manner in oral or written formats.

UG 403E (ANTH 403E) Ethics and Anthropology 3 cr. Offered spring odd-numbered years. Prereq., ANTY 101H or 220S (ANTH 101H or 220S), or consent of instr. Ethical and anthropological modes of inquiry in relation to each other. Focus on the sociocultural subfield as well as ethical issues in physical anthropology and archaeology.

UG 404 (ANTH 404) Anthropological Museology 3 cr. Offered spring even-numbered years. Prereq., ANTY 101H (ANTH 101H). Introduction to anthropological museums, museum work and museum theory.

UG 408 (ANTH 402) Advanced Anthropological Statistics 3 cr. Offered spring. Prereq., introductory course in statistics or consent of inst. Focus on techniques used for microcomputer-based data management and multivariate analysis.

UG 409 (ANTH 482) Preceptorship in Anthropology 1-3 cr. (R-6) Offered autumn and spring. Prereq., ANTY 210N, 220S, 250S (ANTH 210N, 220S, 250S) and consent of instr. Assisting a faculty member by tutoring, grading objective exams, conducting review sessions, and carrying out other class-related responsibilities. Open to juniors, senior, and graduate students with consent of the faculty member with whom they serve. Proposals must be approved by department chair.

UG 412 (ANTH 412) Osteology 4 cr. Offered autumn. Prereq., ANTY 314 (ANTH 314) and consent of instr. A detailed examination of the human skeleton with an emphasis on identifying individual bones and their structures. Specifically extended to fragmentary skeletal elements. Direct hands-on experience required.

UG 413 (ANTH 413) Forensic and Mortuary Archaeology 3 cr. Offered spring. Prereq., ANTY 314 (ANTH 314) and consent of instr. Practical approaches to locating, documenting and recovering human skeletal remains, including surface scatters and burials. Emphasis on interpretations of evidence for recovery scene formation and mortuary behavior.

UG 415 (ANTH 415) Emergence of Modern Humans 3 cr. Offered spring odd-numbered years. Prereq., ANTY 210N (ANTH 210N). An exploration of the emergence of "modern" humans and their relationships with Neanderthals. Exploration of what it means to be "a modern human" through an examination of human evolutionary history.

UG 416 (ANTH 416) Dental Anthropology 3 cr. Offered spring even-numbered years. Prereq., ANTY 210N (ANTH 210N). The use of information from teeth in investigating evolutionary trends, the relationships between human groups, subsistence change, and culture change.

UG 417 (ANTH 417) Adaptation and Nutritional Anthropology 3 cr. Offered autumn odd-numbered years. Prereq., ANTY 210N (ANTH 210N). An examination of the adaptation of human populations to the environment and food supply via evolutionary, physiological, and cultural mechanisms.

UG 418 (ANTH 418) Ecology and Genetic Variation in Human Populations 3 cr. Offered autumn even-numbered years. Prereq., ANTY 210N (ANTH 210N) Human genetic variation examined from an ecological perspective. Emphasis on the role of infectious disease as a selective factor in human evolution and exploration of the implications of these associations for human genetic variation.

UG 422 (ANTH 422) Mind, Culture & Society 3 cr. Offered autumn even-numbered years. Prereq., ANTY 220S (ANTH 220S) or consent of instr. The study of socialization, personality, cognition, and mental health cross-culturally.

UG 423 (ANTH 328) Culture and Identity 3 cr. Offered spring. Prereq., ANTY 220S (ANTH 220S) or consent of instr. The comparative study of identity formation along and across racial, ethnic, and ethno-national lines. Emphasis on issues of ethnogenesis, cultural resistance, transformation, domination, colonialism as well as sharing to understand both the cultural commonalties and differences in identity formation.

UG 426 (ANTH 444) Culture, Health and Healing 3 cr. Offered intermmittently. Cross-cultural comparisons of theories and concepts and health and illness. Examination of the impact of these concepts upon health practices and treatment of disease around the world.

UG 427 (ANTH 327) Anthropology of Gender 3 cr. Offered spring even-numbered years. Prereq., ANTY 227 (ANTH 201). Same as WGS 327. Comparative study of the history and significance of gender in social life.

UG 430 (ANTH 430) Social Anthropology 3 cr. Offered autumn. Prereq., ANTY 220S (ANTH 220S). The principles and theories of social organizations and institutions.

UG 431 (ANTH 431) Ethnographic Field Methods 3 cr. Offered spring. Prereq., ANTY 220S, 401 (ANTH 220S, 401), or consent of instr. Introduction to socio-cultural anthropological methods including participant observation, interviewing and narrative techniques and analysis of qualitative data.

UG 432 Medical Anthropology and Global Health 2 cr. Offered spring. The course is designed to enhance student understanding of 'global health' from the perspective of medical anthropologists and clinicians involved in health care delivery in many settings in the developing world. Students will read broadly in medical anthropology, and will hear the real-life perspectives of health development program designers, project managers, and clinicians.

UG 435 (ANTH 445) Drugs, Culture and Society 3 cr. Offered intermittently. Drug use in a cross-cultural perspective. The role of drugs in cultural expression and social interaction. Examination of the prehistory of drug use, drug use in traditional non-Western and Western societies, and drug use in the context of global sociocultural change.

UG 440 (ANTH 340) Contemporary Issues of Southeast Asia 3 cr. Offered spring. Prereq., ANTY 220S (ANTH 220S). Same as AS 340. An examination of the major issues that affect the contemporary experience of the Southeast Asians.

UG 442 (ANTH 462) Cities and Landscapes of Central Asia 3 cr. Offered autumn. Same as HSTR 442 (HIST402). Analysis of the main centers of civilization and culture, rich sites and monuments of Central Asia and Southwest Asia since ancient times.

UG 444 (ANTH 461) Artistic Traditions of Central and Southwest Asia 3 cr. Offered autumn and spring. Same as HSTR 459 (HIST 457). Analysis of the study of human artistic creativity and scientific innovations of various cultures in Central and Southwest Asia since ancient times.

UG 450 (ANTH 450) Archaeological Theory 3 cr. Offered autumn. Prereq., ANTY 250S (ANTH 250S). Historical trends and current major theories and methods in archaeology.

UG 451 (ANTH 451) Cultural Resource Management 3 cr. Offered autumn. Introduction to the laws and practice of cultural resource/heritage property management. Focus on the methods and techniques for protecting and using cultural remains to their fullest scientific and historic extent. Also emphasis on responsibility to work with long range management of properties for the greatest scientific, historic, and public benefit.

UG 452 GIS in Archaeology 3 cr. Prereq., ANTY 250S (ANTH 250S). Anthropological and archaeological data acquistion, management, and analysis using Geographic Information Systems (GIS) tools and techniques.

UG 454 (ANTH 454) Lithic Technology 3 cr. Offered autumn odd-numbered years. Prereq., ANTY 250S (ANTH 250S) and consent of instr. Analysis of stone artifacts and debitage.

UG 455 (ANTH 455) Artifact Analysis 3 cr. Offered spring. Prereq., ANTY 250S (ANTH 250S) and consent of instr. Laboratory approaches and techniques for analyzing material culture from technological, stylistic, and chronological perspectives.

UG 456 (ANTH 456) Historic Sites Archaeology 3 cr. Offered spring. Prereq., ANTY 250S (ANTH 250S) or consent of instr. Understanding and interpreting the past through historical archaeological remains, methods, and theories. Focuses on historical archaeological sites and topics from the American West, but also examines the field's global perspective.

UG 457 (ANTH 457) Archaeology of the Pacific Northwest 3 cr. Offered autumn even-numbered years. Introduction to the study of archaeology in the Pacific Northwest region inclusive of the Northwest Coast and Columbia/Fraser-Thompson Plateau. Understanding hunter-gatherer adaptations, evolution of social complexity, and ancient history of contemporary native peoples in the region.

UG 458 (ANTH 458) Archaeology of Hunter-Gatherers 3 cr. Offered autumn even-numbered years. Introduction to the archaeological study of hunter-gatherer societies. Primary emphasis on archaeological method and theory.

UG 459 (ANTH 459) Archaeology of the Arctic and Subarctic 3 cr. Offered spring even-numbered years. Introduction

to the study of Arctic and Subarctic archaeology emphasizing the Pleistocene and Holocene prehistory of North America and eastern Siberia. Understanding of methodological problems associated with archaeology in a northern context, the evolution of Inuit, Eskimo, Aleut and Athapaskan cultures, and hunter-gatherer adaptations to northern interior and coastal environments.

UG 463 (ANTH 463) Historic Preservation 3 cr. Offered each wintersession, no prerequisites. This course is intended to provide a comprehensive foundation to historic preservation practice and issues. Topics include the history and theory of the American historic preservation movement, identification and documentation of historic properties, preservation technology, strategies for conservation of historic resources and a critical examination of the philosophy and principles of preservation.

UG 465X (ANTH 357X) Archaeology of the Southwestern United States 3 cr. Offered intermittently. The development of the prehistoric communities in the southwestern United States from ancient times to the dawn of history in the area.

UG 466 (ANTH 466) Archaeological Survey Variable cr. (R-12) Prereq., ANTY 250S (ANTH 250S) and consent of instr. Offered autumn. A field course in Montana archaeology.

UG 467 (ANTH 467) Archaeological Field School Variable cr. (R-12) Offered summer. Prereq., ANTY 250S (ANTH 250S) and consent of instructor. Provides students with a well-rounded experience in archaeological field methods. Field schools will typically occur at archaeological site locations away from campus. During the archaeological field experience, students may learn methods of excavation, survey, research, and analysis to facilitate their transition to careers as professional archaeologists.

UG 476 (ANTH 476) Methods for Native Languages 3 cr. Offered Spring. Prereq., NASX 201X (NAS 201) or consent of instruc. In an effort to highlight promising methodologies that will advance the success of Native language acquisition and instruction, students will be exposed to an innovative methodology for Indigenous language instruction and acquisition.

UG 491 (ANTH 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.

UG 492 (ANTH 496) Independent Study Variable cr. (R-6) Offered every term. Prereq., consent of instr.

UG 494 (ANTH 460) Seminar: Central Asia 3 cr. Offered spring. Same as HSTR 441 (HIST 462). Advanced analysis of the historical and contemporary issues involving the human communities, cultures, and economies in Central and Southwest Asia.

UG 495 (ANTH 487) Field Experience Variable cr. (R- 12) Offered intermittently. Prereq., consent of instr. Organized field experience in anthropology.

G 500 (ANTH 500) Contemporary Anthropological Thought 3 cr. Offered autumn and spring. A review of major contributions to current anthropological theory, with an emphasis on the application of theory to anthropological problems. Significant advances in general theory, symbolic anthropology, critical theory, cultural studies, and postmodernism.

G 501 (ANTH 501) Historical Anthropology 3 cr. Offered spring. The location, use, and value of written records in anthropological research.

G 502 (ANTH 502) Curatorial & Archival Managment 3 cr. Offered intermittently. Theory and practice in the curation of anthropological collections and the maintenance of anthropological information and records.

G 503 (ANTH 503) Seminar in Human Var & Evolution 3 cr. Offered intermittently. Practice of presenting anthropological knowledge of cultural resources to the public, with an emphasis on writing.

G 510 (ANTH 510) Seminar in Human Variation and Evolution 3 cr. (R-6) Offered autumn. Prereq., ANTY 515 (ANTH 515). Various topics related to genetic evidence of human biological evolution, morphological and genetic diversity of

modern humans, and problems of "race".

G 512 (ANTH 512) Advanced Forensic Anthropology 3 cr. (R-6) Offered spring. Prereq., ANTY 515 (ANTH 515), a lab course in skeletal analysis or consent of instr. Review of traditional methods and exploration of new methods of skeletal analysis, as applied to cases from the forensic collection.

G 513 (ANTH 513) Seminar in Bioarchaeology and Skeletal Biology 3 cr. (R-6) Offered spring. Prereq., ANTY 515 (ANTH 515) or consent of instructor. Theoretical and methodological approaches to the analysis of human skeletal remains derived from archaeological contexts. Demography, health and disease, diet and nutrition, growth, activity patterns, and measures of biological relatedness are interpreted within a biocultural framework.

G 514 Seminar in Paleoanthropolgy and Evolutionary Analysis 3 cr. (R-6) Offered autumn of odd numbered years. . Prereq., ANTY 515 (ANTH 515) or consent of instructor. Exploration of selected aspects of the human fossil, archaeological, & genetic records and the theories and methods of evolutionary analysis used to analyze them.

G 515 Theories and Methods in Biological Anthropology 3 cr. Offered autumn. A detailed review of the body of theory that is foundational for the study of human evolution, human variation, bioarchaeology, forensic anthropology, and primatology, along with a consideration of major methods used to analyze data in these fields.

G 520 (ANTH 520) Seminar in Ethnology 3 cr. (R-6) Offered autumn and spring even-numbered years. Topic varies.

G 521 (ANTH 521) Applied Anthropology 3 cr. Offered spring even-numbered years. Study of ways in which anthropological skills may be used in non-academic fields.

G 522 (ANTH 522) Medical Anthropology 3 cr. Offered autumn odd-numbered years. An examination of selected issues and trends in contemporary theory and methodology within medical anthropology. Seminar assignments and discussions focus on understanding the application of anthropological concepts and methods in medical settings and are organized around several topics, including cultural conceptualizations of health, illness and risk; global health; the social and cultural construction of illness; drug and pharmaceutical use; and mental health in cultural context.

G 550 (ANTH 550) Seminar in Archaeology 3 cr. Offered autumn odd-numbered years. Topic varies.

G 551 (ANTH 551) Seminar in Historical Archaeology 3 cr. Offered autumn odd-numbered years. An exploration of theories, methods, and literature in historical archaeology.

G 552 (ANTH 552) Power, Prestige, and Things 3 cr. Offered autumn even-numbered years. Investigation of power, prestige, leadership, and inequality in past social systems as interpreted through artifacts and architecture.

G 553 (ANTH 553) Seminar in Evolutionary Archaeology 3 cr. Offered intermittently. Examination of method and theory in Darwinian evolutionary archaeology. Seminar assignments and discussions focus on human behavioral ecology, cultural transmission, and macroevolution.

G 570 (ANTH 570) Seminar in Linguistics 3 cr. (R 12) Offered autumn even-numbered years. Same as LING 570. Advanced topics in linguistic analysis.

G 593 (ANTH 593) Professional Project Variable cr. (R-10) Offered every term.

G 595 (ANTH 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 (ANTH 596) Independent Study Variable cr. (R-9) Offered every term. Prereq., consent of instr.

G 597 (ANTH 597) Research Variable cr. (R-10) Offered every term.

G 598 (ANTH 598) Internship Variable cr. (R-6) Offered intermittently. Prereq., graduate standing and consent of faculty supervisor. Practical application of classroom learning through internship in a number of areas such as museology, cultural resource management and forensics. Written reports are required.

G 599 (ANTH 599) Thesis Variable cr. (R-10) Offered every term.

G 600 (ANTH 600) Issues in Cultural Heritage 3 cr. Offered autumn. A review of the range of topics that fall under the umbrella of cultural heritage and a review of theory and practice in one or more of these topics.

G 601 (ANTH 601) Research Design and Proposal Preparation 3 cr. Offered spring. Prereq., graduate standing. Seminar in the development of anthropological research designs and proposals.

G 602 (ANTH 602) Cultural Heritage Policy and Practice 3 cr. Offered spring. Prereq., graduate standing. Exploration of critical issues in cultural heritage policy emphasizing the regulatory basis for federal CRM, public anthropology, and indigenous people's issues. Hands-on training in the design and production of federal planning documents.

G 694 (ANTH 694) Seminar in Cultural Heritage Variable cr. (R-6) Offered intermittently. Topic varies.

G 697 (ANTH 697) Advanced Research Variable cr. (R-6) Offered every term. Prereq., consent of instr. Independent research projects, other than dissertation.

G 699 (ANTH 699) Dissertation Variable cr. (R-10) Offered every term. Doctoral dissertation research activities.

Arabic (ARAB)

U 101 Elementary Modern Standard Arabic 5 cr. Offered autumn. Active skills in elementary modern standard Arabic: listening, speaking, reading, and writing, plus basic cultural study.

U 102 Elementary Modern Standard Arabic 5 cr. Offered spring. Continuation of ARAB 101. Active skills in elementary modern standard Arabic: listening, speaking, reading, and writing, plus basic cultural study.

U 191 (ARAB 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 201 Intermediate Modern Standard Arabic I 4 cr. Offered autumn. Prereq., ARAB 102 or equiv. Expansion of active skills: Listening, speaking, reading, writing, plus further cultural analysis.

U 202 Intermediate Modern Standard Arabic II 4 cr. Offered spring. Prereq., ARAB 201 or equiv. Continuation of ARAB 201.

U 291 (ARAB 295) Special Topics Variable cr. (R–8) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one–time offerings of current topics.

U 292 (ARAB 296) Independent Study Variable cr. (R–6) Offered autumn and spring.

U 301 Advanced Modern Standard Arabic I 3 cr. Offered autumn. Prereq., ARAB 202 or equiv. Improves and builds upon oral and written expression in modern standard Arabic and accelerates the use of vocabulary and the Arabic root system.

U 302 Advanced Modern Standard Arabic II 3 cr. Offered spring. Prereq., ARAB 301 or equiv. Continuation of ARAB 301.

U 305 The Arab World: Its Peoples, History and Cultures 3 cr. Offered Autumn Semester. Students explore the Arabic-speaking countries through in-depth discussions of their history, geography, peoples, economy, political systems, educational systems, and cultural components, such as music, cuisine, tradition, customs, gender relations, etc.

U 307 Model Arab League Delegates 3cr. Offered spring. Students explore the Arabic Speaking countries, from North Africa, the Middle East and the Peninsula through discussions of political, economic, environmental, and social issues affecting the progress of the Arab world and its development.

U 317 Model Arab League Staff 3 cr. Offered spring. As staff members students will solidify their knowledge of the history, cultures, issues, and politics of the Middle East, as well as parliamentary procedures to a level which enables

them to effectively assess, lead, and guide discussion related to their assigned countries and committee topics towards positive ends.

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

U 392 (ARAB 396) Independent Study Variable cr. (R–6) Offered autumn and spring.

Faculty

Professors

Gregory R. Campbell, Ph.D., University of Oklahoma, 1987

John E. Douglas, Ph.D., University of Arizona, 1990

S. Neyooxet Greymorning, Ph.D., University of Oklahoma, 1992

Kimber Haddix McKay, Ph.D., University of California, Davis, 1998 (Vice Chair)

Mehrdad Kia, Ph.D., University of Wisconsin-Madison, 1986 (Director, Central & SW Asia Program)

Anna M. Prentiss, Ph.D., Simon Fraser University, 1993

Randall R. Skelton, Ph.D., University of California, Davis, 1983

Gilbert Quintero, Ph.D., University of Arizona, 1997 (Chair)

G.G. Weix, Ph.D., Cornell University, 1990

Associate Professors

Irene Appelbaum, Ph.D., University of Chicago, 1995 (Director, Linguistics Program)

Kelly J. Dixon, Ph.D., University of Nevada-Reno, 2002

Ardeshir Kia, Ph.D., University of Wisconsin-Madison, 1988 (Associate Director, Central & SW Asia Program)

Ashley H. McKeown, Ph.D., University of Tennessee, Knoxville, 2000

Mizuki Miyashita, Ph.D., University of Arizona, 2002

Douglas MacDonald, Ph.D., Washington State University, Pullman, 1998

Tully J. Thibeau, Ph.D., University of Arizona, 1999

Assistant Professor

Leora Bar-el, Ph.D., University of British Columbia, 2005

Khaled Huthaily, Ed.D., The University of Montana, 2008

Adjunct Faculty

Linda J. Brown, M.A., University of Arizona, 1990

Jeanie Castillo, M.A., California State University, Fresno, 1998

Laura Felton Rosulek, Ph.D., University of Illinois at Urbana-Champaign, 2009

Udo Fluck, Ph.D., The University of Montana, 2003

Lecturers

Samir Bitar, M.A., The University of Montana, 2009

D. Garry Kerr, M.A., The University of Montana, 1994

Richard Sattler, Ph.D., University of Oklahoma, 1987

Emeritus Professors

Thomas A. Foor, Ph.D., University of California, Santa Barbara, 1982

Anthony Mattina, Ph.D., University of Hawaii, 1973

Charlene G. Smith, Ph.D., University of Utah, 1970

Katherine M. Weist, Ph.D., University of California, Berkeley, 1970

Applied Science

- Special Degree Requirements
- Courses

Lynn Stocking, Advisor

The Bachelor of Applied Science program is available to students completing an Associate of Applied Science degree program at a regionally accredited institution. The College of Technology section of The University of Montana-Missoula catalog identifies Associate of Applied Science degree programs offered at The University of Montana.

Students considering a B.A.S. degree program must have completed an accredited A.A.S. degree program with a 2.50 grade point average. Because approval of a B.A.S. degree plan is required, students considering such a degree must meet with a designated B.A.S. advisor to identify a degree plan, to create a Degree Program Committee, and to identify the procedure required for degree plan approval.

Students are urged to begin the application process one semester prior to the completion of an AAS degree if the degree is in process.

Bachelor of Applied degree students must meet all the University of Montana requirements for graduation. Fifty credits from an accredited A.A.S. program will count toward the total credits required for graduation. Student earning this degree will receive a diploma identifying the degree of Bachelor of Applied Science without designation of an area of concentration.

Asian Studies

The University of Montana-Missoula offers students multiple opportunities to study Asian lands, peoples, cultures and languages. Students may choose to pursue one or more of the following:

- A major or minor in Central and Southwest Asia Studies (see Central and Southwest Asian Studies Center)
- A major or minor in Japanese (see Modern and Classical Languages and Literatures)
- A major in Liberal Studies with an Option in Asian Studies (see Liberal Studies Program)
- A minor in Chinese (see Modern and Classical Languages and Literatures)
- A minor in South and Southeast Asia (See Liberal Studies Program)

Biochemistry

Bruce E. Bowler, Program Director

The Biochemistry Program is a joint program between the Department of Chemistry and Biochemistry and the Division of Biological Sciences. Biochemistry is an interdisciplinary science that integrates chemistry and biology to understand the molecular basis of life. The program offers a B.S. in Biochemistry and M.S. and Ph.D. degrees in Biochemistry & Biophysics.

Undergraduate majors receive a solid foundation in both chemistry and biology. Biochemistry courses are usually taken in the junior year allowing majors to become involved in research with faculty and to take electives in their senior year. The major also introduces students to computer science and bioinformatics, essential tools in modern biochemistry. The B.S. in Biochemistry prepares students for advanced degrees in biochemistry or biophysics, for medical, dental or veterinary schools and for careers in the pharmaceutical and biotechnology industries. A Health Professions option is also offered within the B.S. in Biochemistry for students whose career goals are in fields related to biochemistry. This option allows more flexibility in upper division electives, allowing students to tailor the degree to their needs.

The graduate degrees in Biochemistry & Biophysics prepare students to be independent researchers in academic laboratories or in the biotechnology and pharmaceutical industries. Through coursework and independent research, graduate students in this program will become adept at the physical and structural methods necessary to probe important problems in the life sciences at the molecular level. In collaboration with the Center for Biomolecular Structure & Dynamics, the Biochemistry Program provides state-of-the-art facilities for research in biochemistry, biophysics and structural biology.

Prospective students desiring further information on these degrees should contact the Program Director by visiting the Biochemistry Program web site: http://www.cas.umt.edu/chemistry/biochemistryProgram/.

High School Preparation: In addition to the general University admission requirements, it is strongly recommended that a student take four years of mathematics, four years of science, and a foreign language.

Bachelor of Science in Biochemistry

- CHMY 141N-143N (CHEM 161N-162N); College Chemistry I & II + Lab - 10 cr.
- CHMY 221-224 (CHEM 221-224); Organic Chemistry I & II + Lab - 10 cr.
- CHMY 225 (CHEM 264); Organic Majors Lab may be substituted for CHMY 224 (CHEM 224)
- CHMY 311-421 (CHEM 341-342); Quantitative Analysis and Instrumental Methods - 8 cr.
- CHMY 360 (CHEM 370); Applied Physical Chemistry - 3 cr.
- CHMY 373 (CHEM 371); Phys Chem-Kntcs & Thrmdynmcs may be substituted for CHMY 360 (CHEM 370). Students planning to attend graduate school in biochemistry or biophysics are strongly advised to take the CHMY 373-371 sequence.
- CHMY 401 (CHEM 452); Advanced Inorganic Chemistry - 3 cr.
- BCH 110-111 (BIOC 110-111); Biochemistry of Life + Lab - 4 cr.
- BCH 294 (BIOC 210); Introductory Biochemistry Seminar - 1 cr.
- BCH 480-482 (BIOC 481-482); Advanced Biochemistry I & II - 6 cr.
- BCH 486 (BIOC 486); Biochemistry Research Laboratory - 3 cr.
- BIOB 260 (BIOL 221); Cellular and Molecular Biology - 4 cr.
- BIOB 272 (BIOL 223); Genetics and Evolution - 4 cr.
- BIOB 425 (BIOL 464); Advanced Cellular and Molecular Biology - 3 cr.
- M 171-172 (MATH 152-153); Calculus I & II - 8 cr.
- PHSX 215N/216N and 217N/218N (PHYS 211N/213N and 212N/214N); Fundamentals of Physics with Calculus I & II + Lab - 10 cr.
- CSCI 250 (CS 177); Computer Modeling for Science Majors - 3 cr.
- CSCI 451 (CS 458); Computational Biology - 3 cr.

13 credits of electives from BCH 490[1] (BIOC 497); BIOB 301, 410, 411, 440, 490[1] (BIOL 301, MICB 410, 411, BIOL 440, 490); BIOH 345, 360, 365, 370, 405, 462 (BIOL 313, 345, 312, 347, 460, MICB 309); BIOM 360, 361, 400, 410, 411, 427, 428, 435 (MICB 300, 301, 302, 404, 405, 420; BIOL 400, 401); PHAR 347, 421, 422 (BMED 347, 421, 422); CHMY 371, 397[1], 402, 403, 442, 465, 466, 485, 490,[1] 498[1] (CHEM 372, 380, 453, 455, 442, 465, 466, 485, 489, 498).

[1]No more that 3 credits combined of BCH 490 (BIOC 497), CHMY 490, 498 (CHEM 489, 498) or BCH 490 (BIOC 497) and no more than 1 credit of CHMY 397 may be counted toward the 13 credit elective requirement.

For Group I of the General Education requirements (English Writing Skills), all students must complete WRIT 101 (ENEX 101),

a lower division writing course, an upper division writing course, and need to obtain a score of 3 or better on the WPA exam. The upper division requirement will be satisfied by BCH 482 (BIOC 482) (1/3 of requirement) and BCH 486 (BIOC 486) (2/3 of requirement).

Group II of the General Education requirement (Mathematics) is fulfilled by M 171 (MATH 152).

The Foreign Language/Symbolic Systems requirement (Group III of the General Education Requirement) is fulfilled by M 171 (MATH 152).

All students must complete 27 credit hours from groups IV to XI of the General Education requirement to graduate (CHMY 141N-143N (CHEM 161N- 162N) counts as the 6 credit group XI requirement). One of these courses should be an approved lower division writing course.

Credits to Graduate:

Required courses: 83

Elective courses: 13

General education:[1] 21

WRIT 101 (ENEX 101): 3

Total: 120

[1]Groups IV to X account for 21 credit hours.

Bachelor of Science in Biochemistry: Health Professions Option

- CHMY 141N-143N; (CHEM 161N-162N) College Chemistry I & II + Lab - 10 cr.
- CHMY 221-224 (CHEM 221-224); Organic Chemistry I & II + Lab - 10 cr.
- CHMY 225 (CHEM 264); Organic Majors Lab may be substituted for CHMY 224 (CHEM 224)
- CHMY 302E (CHEM 334); Chem. Lit and Science Writing - 3 cr.
- CHMY 311-421; (CHEM 341-342) Quantitative Analysis and Instrumental Methods - 8 cr.
- CHMY 360 (CHEM 370); Applied Physical Chemistry - 3 cr.
- CHMY 373 (CHEM 371); Phys Chem-Kntcs & Thrmdynmcs may be substituted for CHMY 360 (CHEM 370)
- CHMY 401 (CHEM 452); Advanced Inorganic Chemistry - 3 cr.
- BCH 110-111 (BIOC 110-111); Biochemistry of Life + Lab - 4 cr.
- BCH 294 (BIOC 210); Introductory Biochemistry Seminar - 1 cr.
- BCH 480-482 (BIOC 481-482); Advanced Biochemistry I & II - 6 cr.
- BIOB 260 (BIOL 221); Cellular and Molecular Biology - 4 cr.
- BIOB 272 (BIOL 223); Genetics and Evolution - 4 cr.
- BIOM 360 (MICB 300); General Microbiology - 3 cr.
- BIOM 400 (MICB 302); Medical Microbiology may be substituted for BIOM 360 (MICB 300)
- M 162 (MATH 150); Applied Calculus - 4 cr.
- M 274 (MATH 158); Intro to Differential Equations - 3 cr.
- PHSX 205N/206N-207N/208N (PHYS 111N/113N-112N/114N); College Physics I&II + Lab - 10 cr.
- 23 credits of electives from BCH 486, 490[1] (BIOC 486, 497); BIOB 301, 410, 411, 425, 440, 490[1] (BIOL 301, MICB 410, 411, BIOL 464, 440, 490); BIOH 345, 360, 365, 370, 405, 462 (BIOL 312, 313, 345, 347, 460, MICB 309); BIOM 361, 410, 411, 427, 428, 435 (MICB 301, 404, 405, BIOL 400, 401, MICB 420); PHAR 347, 421, 422 (BMED 347, 421, 422); CHMY 371, 397, 402, 403, 442, 465, 466, 485, 490,[1] 498[1] (CHEM 372, 380, 453, 455, 442, 465, 466, 485, 489, 498).
  - [1]No more that 3 credits combined of BIOB 490 (BIOL 497), CHMY 490, 498 (CHEM 489, 498) or BCH 490 (BIOC 497) and no more than 1 credit of CHMY 397 may be counted toward the 23 credit elective requirement.

  For Group I of the General Education requirements (English Writing Skills), all students must complete WRIT 101 (ENEX 101), a lower division writing course, an upper division writing course, and need to obtain a score of 3 or better on the

WPA exam. CHMY 302E (CHEM 334) is the formal requirement to satisfy the upper division requirement in this option. It can also be satisfied by taking the following combinations of required and elective courses: BCH 482 (BIOC 482) (1/3 of requirement), and BCH 486 (BIOC 486) (2/3 of requirement); BCH 482 (BIOC 482) or BIOB 410 (MICB 410) (1/3 of requirement) and BIOM 410 or BIOB 411 (MICB 404 or MICB 411) (2/3 of requirement).

Group II of the General Education requirement (Mathematics) is fulfilled by M 162 (MATH 150).

The Foreign Language/Symbolic Systems requirement (Group III of the General Education Requirement) is fulfilled by M 162 (MATH 150).

All students must complete 27 credit hours from groups IV to XI of the General Education requirement to graduate (CHMY 141N-143N (CHEM 161N-162N) counts as the 6 credit group XI requirement; If CHMY 302E (CHEM 334) is taken to satisfy the upper division writing requirement it also satisfies the group VIII requirement). One of these courses should be an approved lower division writing course.

Credits to Graduate:

Required courses: 76

Elective courses: 23

General education:[1] 18

WRIT 101 (ENEX 101): 3

Total: 120

[1]Groups IV to VII, IX and X account for 18 credit hours, assuming CHMY 302E is used for group VIII.

Suggested Course of Study for B.S. Degree in Biochemistry

First Year	A	S
CHMY 141N (CHEM 161N) College Chemistry I	5	-
CHMY 143N (CHEM 162N) College Chemistry II	-	5
M 171 (MATH 152) Calculus I	4	-
M 172 (MATH 153) Calculus II	-	4
WRIT 101 (ENEX 101) College Writing I	3	-
BCH 110 (BIOC 110) Biochemistry of Life Lecture	-	3
BCH 111 (BIOC 111) Biochemistry of Life Laboratory	-	1
General Education	-	3
Total	15	16
Second Year		
CHMY 221-222 (CHEM 221-222) Organic Chemistry I and Lab	5	-
CHMY 223-224 (CHEM 223-224) Organic Chemistry II and Lab	-	5
PHSX 215N/216N (PHYS 211N/213N) Fundamentals of Physics I with Calculus and Lab	5	-
PHSX 217N/218N (PHYS 212N/214N) Fundamentals of Physics II with Calculus and Lab	-	5
BIOB 260 (BIOL 221) Cellular and Molecular Biology	4	-
BIOB 272 (BIOL 223) Genetics and Evolution	-	4
BCH 294 (BIOC 210) Introductory Biochemistry Seminar	-	1
Total	14	15
Third Year		
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4	-

CHMY 360 (CHEM 370) Applied Physical Chemistry (or CHMY 373 (CHEM 371) offered autumn). Students planning to attend graduate school in biochemistry or biophysics are strongly advised to take the CHMY 373-371 sequence.)	-	3
CHMY 421 (CHEM 342) Advanced Instrument Analysis	-	4
BCH 480 (BIOC 481) Advanced Biochemistry I	3	-
BCH 482 (BIOC 482) Advanced Biochemistry II	-	3
BCH 486 (BIOC 486) Biochemistry Research Laboratory	-	3
CSCI 250 (CS 177) Computer Modeling for Science Majors	3	-
General Education	6	-
Total	16	13
Fourth Year		
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3	-
CSCI 451 (CS 458) Computational Biology	3	-
BIOB 425 (BIOL 464) Advanced Cellular & Molecular Biology	-	3
Advanced Electives *	6	7
General Education	3	6
Total	15	16
*Advanced Biochemistry Electives: BCH 490 (BIOC 497), BIOB 301 (BIOL 301), BIOB 410 (MICB 410), BIOB 411 (MICB 411), BIOB 440 (BIOL 440), BIOB 490 (BIOL 490), BIOH 345 (BIOL 345), BIOH 360 (BIOL 347), BIOH 365 (BIOL 312), BIOH 370 (BIOL 313), BIOH 405 (MICB 309), BIOH 462 (BIOL 460), BIOM 360 (MICB 300), BIOM 361 (MICB 301), BIOM 400 (MICB 302), BIOM 410 (MICB 404), BIOM 411 (MICB 405), BIOM 427 (BIOL 400), BIOM 428 (BIOL 401), BIOM 435 (MICB 420), PHAR 347 (BMED 347), PHAR 421 (BMED 421), PHAR 422 (BMED 422), CHMY 371 (CHEM 372), CHMY 397 (CHEM 380), CHMY 402 (CHEM 455), CHMY 403 (CHEM 453), CHMY 442 (CHEM 442), CHMY 465 (CHEM 465), CHMY 466 (CHEM 466), CHMY 485 (CHEM 485), CHMY 490 (CHEM 489), CHMY 498 (CHEM 498)		

Suggested Course of Study for B.S. Degree in Biochemistry: Health Professions Option

First Year	**A**	**S**
CHMY 141N (CHEM 161N) College Chemistry I	5	-
CHMY 143N (CHEM 162N) College Chemistry II	-	5
M 162 (MATH 150) Applied Calculus	4	-
M 274 (MATH 158) Intro to Differential Equations	-	3
WRIT 101 (ENEX 101) College Writing I	3	-
BCH 110 (BIOC 110) Biochemistry of Life Lecture	-	3
BCH 111 (BIOC 111) Biochemistry of Life Laboratory	-	1
General Education	3	3
Total	15	15
Second Year		
CHMY 221-222 (CHEM 221-222) Organic Chemistry I and Lab	5	-
CHMY 223-224 (CHEM 223-224) Organic Chemistry II and Lab	-	5

PHSX 205N/206N (PHYS 111N/113N) College Physics I and Lab	5	-
PHSX 207M/208N (PHYS 112N/114N) College Physics II and Lab	-	5
BIOB 260 (BIOL 221) Cellular and Molecular Biology	4	-
BIOB 272 (BIOL 223) Genetics and Evolution	-	4
BCH 294 (BIOC 210) Introductory Biochemistry Seminar	-	1
Total	14	15
Third Year		
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4	-
CHMY 302E (CHEM 334) Chemistry Lit and Science Writing	3	-
CHMY 360 (CHEM 370) Applied Physical Chemistry (or CHMY 373 (CHEM 371) offered autumn)	-	3
CHMY 421 (CHEM 342) Advanced Instrument Analysis	-	4
BIOM 360 (MICB 300) General Microbiology (or BIOM 400 (MICB 302) offered autumn)	-	3
Advanced Electives*	3	5
General Education	6	-
Total	16	15
Fourth Year		
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3	-
BCH 480 (BIOC 481) Advanced Biochemistry I	3	-
BCH 482 (BIOC 482) Advanced Biochemistry II	-	3
Advanced Electives *	3	9
General Education	6	3
Total	15	15
*Advanced Biochemistry Electives: BCH 486 (BIOC 486), BCH 490 (BIOC 497), BIOB 301 (BIOL 301), BIOB 410 (MICB 410), BIOB 411 (MICB 411), BIOB 425 (BIOL 464), BIOB 440 (BIOL 440), BIOB 490 (BIOL 490), BIOH 345 (BIOL 345), BIOH 360 (BIOL 347), BIOH 365 (BIOL 312), BIOH 370 (BIOL 313), BIOH 405 (MICB 309), BIOH 462 (BIOL 460), BIOM 361 (MICB 301), BIOM 410 (MICB 404), BIOM 411 (MICB 405), BIOM 427 (BIOL 400), BIOM 428 (BIOL 401), BIOM 435 (MICB 420), PHAR 347 (BMED 347), PHAR 421 (BMED 421), PHAR 422 (BMED 422), CHMY 371 (CHEM 372), CHMY 397 (CHEM 380), CHMY 402 (CHEM 455), CHMY 403 (CHEM 453), CHMY 442 (CHEM 442), CHMY 465 (CHEM 465), CHMY 466 (CHEM 466), CHMY 485 (CHEM 485), CHMY 490 (CHEM 489), CHMY 498 (CHEM 498).		

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.

Biochemistry (BCH)

U 110 (BIOC 110) The Biochemistry of Life 3 cr. Offered spring. Prereq. CHMY 141N (CHEM 161N) or equivalent. Coreq., CHMY 143N (CHEM 162N) and BCH 111 (BIOC 111). An introductory course that explores biomolecules and their roles in life processes. Provides a foundation for Cellular and Molecular Biology (BIOB 260 (BIOL 221)), Genetics and Evolution (BIOB 272 (BIOL 223)), Introductory Biochemistry Seminar (BCH 294 (BIOC 210)), and many other advanced science courses.

U 111 (BIOC 111) The Biochemistry of Life Laboratory 1 cr. Offered spring. Prereq., CHMY 141N (CHEM 161N) or equivalent. Coreq., CHMY 143N (CHEM 162N) and BCH 110 (BIOC 110). Introduction to the experimental techniques used to study biomolecules and their roles in life processes. Provides a foundation for other advanced level laboratory courses in chemistry and biochemistry.

U 294 (BIOC 210) Introductory Biochemistry Seminar 1 cr. Offered spring. prereq., BCH 110/111 (BIOC 110/111) or equivalent. An introduction to important advances in biochemistry through readings from the primary literature and discussion of this literature. Faculty members will also make presentations on their research. Graded credit/no credit.

U 380 (BIOC 380) Biochemistry 4 cr. Offered autumn and spring. Prereq., CHMY 223 (preferred, CHEM 223) or both CHMY 123/124 (CHEM 152N/154N) and BIOB 260 (BIOL 221). Fundamental biochemistry; chemistry and metabolism of biomolecules, energy relationships in metabolism; storage, transmission, and expression of genetic information. Credit not allowed for both BCH 380 and 480-482 (BIOC 380 and BIOC 481-482).

UG 480 (BIOC 481) Advanced Biochemistry I 3 cr. Offered autumn. Prereq., CHMY 223 (CHEM 223). Primarily for science majors. The chemistry and metabolism of biomolecules, with emphasis on the structure and function of proteins, carbohydrates, lipids and nucleic acids and the associated bioenergetics. Credit not allowed for both BCH 380 and 480-482 (BIOC 380 and BIOC 481-482).

UG 482 (BIOC 482) Advanced Biochemistry II 3 cr. Offered spring. Prereq., BCH 480 (BIOC 481) or equiv. Continuation of BCH 480 (BIOC 481). Metabolism, especially macromolecule biosyntheses, the chemistry and regulation of the transfer and expression of genetic information, protein synthesis and molecular physiology. Credit not allowed for both BCH 380 and BCH 480-482 (BIOC 380 and BIOC 481-482).

UG 486 (BIOC 486) Biochemistry Research Laboratory 3 cr. Offered spring. Prereq., BCH 380 or 480 (BIOC 380 or 481). Applications of biochemical principles to modern protein biochemistry. Basic micro- and molecular biology techniques are used to produce mutant proteins; then students learn basic and advanced biophysical techniques to characterize the mutant proteins.

U 490 (BIOC 497) Undergraduate Research 1-10 cr. (R-10) Offered every term. Prereq., junior or senior standing and consent of instr. Independent research under the direction of a faculty member. Graded pass/not pass.

UG 491 (BIOC 495) Special Topics 1-10 cr. (R-10) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 499 (BIOC 499) Senior Thesis/Capstone 3-6 cr. (R-6) Offered every term. Prereq., senior standing and consent of instr. Preparation of a thesis or manuscript based on undergraduate research for presentation and/or publication. Student must give an oral or poster presentation at the Undergraduate Research Symposium or a scientific meeting. Graded pass/not pass.

G 547 Experimental Molecular, Cellular and Chemical Biology. 1 cr. (R-8) Offered every term. Prereq., graduate standing or consent of instr. Same as BIOB 547. Focus on experimental design, methods, and presentation of experimental results for graduate students in laboratories with a molecular, cellular or chemical biological focus.

G 561 (BIOC 561) RNA Structure and Function 1 cr. (R-8) Offered every semester. Prereq., BCH 482, BIOB 260 (BIOC 482, BIOL 221), and consent of instr. Exploration of current scientific literature and new data that focuses on RNA biochemistry. Emphasis on literature relevant to research on RNA viruses and ribosomes and protein synthesis.

G 562 (BIOC 562) The Structural Basis of Amyloid Disease 1 cr. (R-8) CR/NCR only, offered every semester. Prereq., BCH 480 (BIOC 481) or equivalent and consent of instructor. Weekly exploration of current literature and new research that focuses on the biophysical aspects of amyloid diseases, including protein structure and therapeutic treatments.

G 570 (BIOC 570) Introduction to Research 1 cr. Offered autumn. Prereq., graduate standing. Required course for Biochemistry and Biophysics graduate students. Students are acquainted with faculty research projects. Instruction in basic research techniques, research equipment. Introduction to relevant scientific research literature.

G 581 (BIOC 581) Physical Biochemistry 3 cr. Offered spring odd-numbered years. Prereq., CHMY 360 (CHEM 370) or CHMY 373 (CHEM 371) or CHMY 371 (CHEM 372); BCH 480 (BIOC 481). Techniques of physical chemistry used in studying biological structure and function of macromolecules. Emphasis is on spectroscopic methods, hydrodynamic methods and x-ray and other scattering and diffraction techniques.

G 582 (BIOC 582) Proteins and Enzymes 3 cr. Offered autumn even-numbered years. Prereq., BCH 482 (BIOC 482) or equivalent. An investigation into the structure/function relationship in proteins and a detailed exploration of enzyme kinetics, using examples from current literature.

G 584 (BIOC 584) Nucleic Acids 3 cr. Offered autumn odd-numbered years. Prereq., BCH 482 (BIOC 482) or equivalent. Emphasis on critical reading of current literature that investigates structure, chemistry, and function of nucleic acids.

G 594 (BIOC 594) Professional Seminar 1 cr. (R-4) Offered autumn and spring. Prereq., graduate standing or consent of instr. Same as BIOM 594 (MICB 594). Presentation of current research in biochemistry and molecular biology by senior graduate students, faculty, and invited outside speakers.

G 595 (BIOC 595) Special Topics 1-3 cr. (R-6) Offered intermittently. Prereq., graduate standing and consent of instr. Experimental offering of new courses by resident or visiting faculty.

G 597 (BIOC 597) Research Variable cr. (R-18) Offered intermittently.

G 599 (BIOC 599) Thesis 1-10 cr. (R-10) Offered intermittently. Prereq., master's student in biochemistry and biophysics. Laboratory research for and preparation of a master's thesis.

G 600 (BIOC 600) Cell Organization & Mechanisms 3 cr. Offered spring even-numbered years. Prereq., BCH 480 or consent of instr. Same as BMED 600. Primary literature exploration of the regulation of structure, function, and dynamics of eukaryotic cells. Topics include membranes, cytoskeleton, transcription, translation, signal transduction, cell motility, cell proliferation, and programmed cell death.

G 685 (BIOC 685) Advanced Biochemistry and Molecular Biology Laboratory 1-3 cr. (R-9) Offered autumn and spring. Prereq., BCH 482 (BIOC 482) or equiv. and consent of instr. Introduction to research techniques in biochemistry and molecular biology.

G 694 Biomolecular Structure and Dynamics Seminar 1 cr. (R-8) Credit/No credit only. Offered Autumn and Spring. Prereq., graduate standing or consent of instructor. Presentation of current research in Structural Biology, Biochemistry, Biophysics, or related fields by invited outside speakers, UM faculty, and senior graduate students.

G 699 (BIOC 699) Dissertation 1-10 cr. (R-20) Offered intermittently. Prereq., doctoral student in biochemistry. Laboratory research for and preparation of a doctoral dissertation.

Faculty

Professors:

Bruce E. Bowler (Director), Chemistry & Biochemistry, Ph.D., Massachusetts Institute of Technology, 1986

J. Stephen Lodmell, Division of Biological Sciences, Ph.D., Brown University, 1996

J.B.A. (Sandy) Ross, Chemistry & Biochemistry, Ph.D., University of Washington, 1976

D. Scott Samuels, Division of Biological Sciences, Ph.D., University of Arizona, 1991

Stephen R. Sprang, Division of Biological Sciences, Ph.D., University of Wisconsin, Madison, 1977

Kent D. Sugden, Chemistry & Biochemistry, Ph.D, Montana State University, 1992

Associate Professor:

Michele A. McGuirl, Division of Biological Sciences, Ph.D., Montana State University, 1999

Assistant Professors:

Klara Briknarova, Chemistry & Biochemistry, Ph.D., Carnegie Mellon University, 1999

Doug Raiford, Computer Science, Ph.D., Wright State University, Dayton, Ohio, 2008

Valeriy Smirnov, Chemistry & Biochemistry, Ph.D., University of Nebraska, 2004

Central and Southwest Asian Studies

Dr. Ardi Kia, Advisor

The University of Montana has emerged as a national and international leader in recognizing the significance of Central and Southwest Asia, and translating that awareness into a major academic program. The program builds on significant faculty experience and expertise in the region, and includes scholars from a variety of academic disciplines. The program has also organized intensive summer language training programs at UM, as well as summer study tours for K-12 teachers to Central Asia, and also hosts an annual conference that brings leading scholars, diplomats, analysts, and journalists to the UM campus.

The University of Montana offers an undergraduate major as well as a Minor in Central and Southwest Asian Studies. Arabic, Chinese, Persian, Russian and Turkish language instruction are also offered. Faculty exchanges have been organized with universities in China, Egypt, Georgia, Kazakhstan, Kyrgyzstan, Morocco, Russia and Tajikistan.

Major in Central and Southwest Asia:

Suggested Course of Study in Central and Southwest Asian Studies (CSWA)

First Year	**A**	**S**
CSWA 146 H Silk Road (Anthropology106H/History 146H)	3	-
WRIT 101 (ENEX 101) Composition	3	-
Languages (First Year)(Arabic OR Chinese OR Persian OR Russian)	5	5
Math General Education requirement		3
General Education Electives (Groups IV, V, VII, VIII, IX, XI)*	4	7
Total	15	15
Second Year	**A**	**S**
Three 200-level Central and Southwest Asian Studies (CSWA) courses.	3	6
Languages (Second Year)(Arabic OR Chinese OR Persian OR Russian)WPE (Writing Proficiency Examination)	5±	5±
General Education Electives (Groups IV, V, VII, VIII, IX, XI)*	7	4
Total	15	15
Third Year	**A**	**S**
Three upper level courses in Central and Southwest Asian Studies courses (CSWA) (300 level or above)	3	6
Upper Division Electives(Third and Fourth Year language study strongly encouraged)	12	9
Total	15	15
Fourth Year	**A**	**S**
Capstone Requirement: CSWA/ANTH/HSTR 441(HIST 110): Seminar Central Asia OR CSWA 496: Independent Study (Twenty-five page research paper) Either course fulfills the Upper Division Writing Requirement in the Major		3
Upper Division Electives	15	12
Total	15	15

± Some languages may require 4 credits at the sophomore level.

* See General Education section in the catalogue.

Central & Southwest Asian Studies Program (CSWA)

- 1. CSWA/HSTR 146 (HIST 106)/ANTH 106H: The Silk Road
- 2. CSWA/HSTR 241 (HIST 214S)/ANTH 214: Central Asia: Peoples and Environments
- 3. CSWA/HSTR 262 (HIST 283H)/ANTH 283: Islamic Civilization: The Classical Age
- 4. CSWA/HSTR 264 (HIST 284H)/ANTH 284: Islamic Civilization: The Modern Era
- 5. CSWA/HSTR 347 (HIST 346)/ANTH 346: Central Asia and Its Neighbors

- 6. CSWA/HSTR (HIST 386H)/ANTH 386: Nationalism in the Middle East & Central Asia
- 7. CSWA/HSTR 368 (HIST 387)/ANTH 387: Iran Between Two Revolutions
- 8. CSWA/HSTR 442 (HIST 402)/ANTH 462: Cities and Landscapes of Central and Southwest Asia
- 9. CSWA 457: Artistic Traditions of Central Asia (same as ANTH 461/HSTR 459 (HIST 457)
- 10. CSWA/HSTR 441 (HIST 462)/ANTH 460: Central Asia Seminar

Department of Anthroplogy

- ARAB 101: Elementary Modern Standard Arabic I
- ARAB 102: Elementary Modern Standard Arabic I
- ARAB 195: Special Topics Variable
- ARAB 201: Intermediate Modern Standard Arabic I
- ARAB 202: Intermediate Modern Standard Arabic II
- ARAB 295: Special Topics Variable
- ARAB 301: Advanced Modern Standard Arabic I
- ARAB 302: Advanced Modern Standard Arabic II
- ARAB 307: Model Arab League Delegates
- ARAB 317: Model Arab Leage Staff
- ARAB 391: The Arab World
- ARAB 392: Independent Study Variable
- ARAB 395: Special Topics Varaiable
- CHIN 101: Elementary Chinese I
- CHIN 102: Elementary Chinese II
- CHIN 201: Intermediate Chinese I
- CHIN 202: Intermediate Chinese II
- CHIN 301: Advanced Chinese I
- CHIN 302: Advanced Chinese II
- CHIN 313L: Classical Chinese Poetry in English Translation
- CHIN 314L: Traditional Chinese Literature in English Translation
- CHIN 432L: Twentieth Century Chinese Fiction in English Translation
- CHIN 211H: Chinese Culture and Civilization
- MCLG 380L: Chinese Folktales
- MCLG 195: Elementary Persian I
- MCLG 195: Elementary Persian II
- MCLG 295: Intermediate Persian I
- MCLG 295: Intermediate Persian II
- RUSS 101: Elementary Russian I
- RUSS 102: Elementary Russian II
- RUSS 105: Introduction to Russian Culture (same as MCLG/LS 105)
- RUSS 201: Intermediate Russian I
- RUSS 202: Intermediate Russian II
- RUSS 301: Oral and Written Expression I
- RUSS 302: Oral and Written Expression II
- RUSS 312L: Introduction to Russian Literature I (same as MCLG/LS 306)
- RUSS 313L: Introduction to Russian Literature II (same as MCLG/LS 307)
- RUSS 308: Russian Cinema and Culture (same as MCLG/LS/ENFM 308)
- RUSS 411: 19th Century Major Russian Authors
- RUSS 424: Russian Short Story
- RUSS 440: Russian Poetry
- RUSS 494: Seminar in Russian Studies [Variable] (same as MCLG/HRS 494)

Department of Anthropology

- ANTH 106H: The Silk Road (same as CSWA 146/HSTR 146 (HIST 106H))
- ANTH 214: Central Asia: Peoples and Environments (HSTR 241 (HIST 214S))
- ANTH 283: Islamic Civilization: The Classical Age (same as CSWA 262/HSTR 262 (HIST 283H))
- ANTH 284: Islamic Civilization: The Modern Era (same as CSWA 264/HSTR 264 (HIST 284H))
- ANTH 334647: Central Asia and Its Neighbors (same as CSWA 346/HSTR 347 (HIST 346))
- ANTH 367: Iran Between Two Revolutions (same as CSWA 368/HSTR 368 (HIST 387))
- ANTH 462: Cities and Landscapes of Central and Southwest Asia (same as CSWA 442/HSTR 442 (HIST 402))
- ANTH 461: Artistic Traditions of Central Asia (same as CSWA 457/HSTR 459 (HIST 457))
- ANTH 460: Central Asia Seminar (same as CSWA 441/HSTR 441 (HIST 462))

Department of History

- HSTR 146 (HIST 106): The Silk Road (same as ANTH106H/AS 146)
- HSTR 241 (HIST 214S): Peoples and Environments (same as ANTH 214/CSWA 241)
- HSTR 262 (HIST 283H): Islamic Civilization: The Classical Age (same as ANTH 283)
- HSTR 264 (HIST 284H): Islamic Civilization: The Modern Era (same as ANTH 284)
- HSTR 357 (HIST 344): Russia to 1881
- HSTR 358 (HIST 245): Russia Since 1881
- HSTR 347 (HIST 346): Central Asia & Its Neighbors
- HSTR 380H (HIST 331H): Modern China
- HSTR 386H (HIST 386H): Nationalism in the Middle East and Central Asia
- HSTR 368 (HIST 387): Iran Between Two Revolutions
- HSTR 442 (HIST 402): Cities and Landscapes of Central and Southwest Asia (same as ANTH 462/CSWA 442)
- HSTR 457 (HIST 445): World of Anna Karnina
- HSTR 458 (HIST 446): Russian Revolution 1900-1930
- HSTR 459 (HIST 457): Artistic Traditions of Central Asia (same as ANTH 461/CSWA 457)
- HSTR 441 (HIST 462): Central Asia Seminar (same as ANTH 460/CSWA 441)
- HSTR 544 (HIST 544): Modern Russia
- HSTR 586 (HIST 586): Modern Islamic Politics

Requirements for a Minor in Central and Southwest Asia

The Central and Southwest Asian Studies Minor is available to all students. It consists of eighteen credits. Students selecting the minor are required to successfully complete HSTR 146 (HIST106)/ANTH 106H/AS 106H and six credits in foundational Central and Southwest Asian Studies courses (200-level courses). Students must then complete nine credits of additional course work at the 300- or 400- level. No language courses are required; however, students pursuing theminor are strongly encouraged to meet he University-wide general education foreign language competency requirement by completing at least the second semester of one of the following languages (100 level or higher): Chinese, Persian, Arabic, Turkish or Russian. Participation in a study-abroad program is strongly recommended.

To earn a minor in Central and Southwest Asian Studies, students must successfully complete 18 credits as follows:

1. Three credits: The Silk Road - Central and Southwest Asian Studies 106 (ANTH106H or HSTR 146H (HIST 106H)).

2. Six credits in approved 200-level foundational Central and Southwest Asian Studies courses

3. Nine credits in approved 300 or 400-level Central and Southwest Asian Studies courses.

In addition, it is expected that students will study one of the following languages: Turkish, Persian, Arabic, Russian or Chinese.

A list of approved Central and Southwest Asian courses is available from advisors.

Courses

Central & Southwest Asian Studies Program

U 146H The Silk Road 3 cr. Offered autumn and spring. Same as HSTR 146H (HIST 106H) and ANTH 106H. Introduction to the study of the human communities, cultures, and economies in Central and Southwest Asia along the ancient four thousand mile-long Silk Road.

U 241 Central Asia: Peoples and Environments 3 cr. Offered autumn. Same as HSTR 241 (HIST 214S) and ANTH 214. Introduction to Central Asia's history, culture and ways of thinking. Focus on the political and social organization of Central Asia and cultural changes as expressed in art and interactions with China, India and the Middle East.

U 262 Islamic Civilization: The Classical Age 3 cr. Offered autumn. Same as HSTR 262 (HIST 283H) and ANTH 283. A concise history of the Islamic world from the 6th century to the fall of the Abbasid Empire in the 13th century, focusing primarily on the teachings of Islam and the causes for the rapid expansion of the Islamic empire.

U 264 Islamic Civilization: The Modern Era 3 cr. Offered spring. Same as HSTR 264 (HIST 284H) and ANTH 284H. History of the Islamic world and particularly the Persian, Arabic, and Turkish speaking lands between 1453 and 1952.

U 346 Central Asia and Its Neighbors 3 cr. Offered spring. Same as HSTR 347 (HIST 346) and ANTH 346. Analysis of the human communities and cultures of Central and Southwest Asia, with particular emphasis on the importance of relationships with neighboring countries and civilizations since ancient times.

U 368 Iran Between Two Revolutions 3 cr. Offered spring. Same as ANTH 387. The socioeconomic, political, and cultural causes which resulted in the transformation of the Iranian society from a traditional Islamic entity to a modern secular state and the factors which led to the downfall of the secular state and the establishment of an Islamic republic.

U 386 Nationalism in Modern Middle East 3 cr. Offered autumn. Same as HSTR 386H (HIST 386H) and ANTH 386H. The several intellectual traditions and philosophies some ephemeral and visionary, most eclectic and confused, and virtually all conflicting that are usually believed to underlie the varying concept of Iranian and Arab nationalism in the 20th century.

UG 441 Central Asia Seminar 3 cr. Offered spring. Same as HSTR 441 (HIST 462) and ANTH 460. Advanced analysis of the historical and contemporary issues involving the human communities, cultures, and economies in Central and Southwest Asia.

UG 442 Cities and Landscapes of Central Asia 3 cr. Offered autumn. Same as HSTR 442 (HIST 402) and ANTH 462. Analysis of the main centers of civilization and culture, rich sites and monuments of Central Asia and Southwest Asia since ancient times.

UG 457 Artistic Traditions of Central and Southwest Asia 3 cr. Offered autumn and spring. Same as HSTR 459 (HIST 457) and ANTH 461. Analysis of the study of human artistic creativity and scientific innovations of various cultures in Central and Southwest Asia since ancient times.

FACULTY

Donald Bedunah, Ph.D., Texas Tech University, 1981

Samir Bitar, M.I.S., The University of Montana, 2009

Timothy Bradstock, Ph.D., Harvard University, 1984

Zhen Cao, Ed.D., The University of Montana, 1997

Robert H. Greene, Ph.D., University of Michigan, 2004

Louis D. Hays, Ph.D., University of Arizona, 1966

Marc Hendrix, Ph.D., Stanford University, 1992

Khaled Huthaily, Ed.D., The University of Montana, 2008

Ardi Kia, Ph.D., University of Wisconsin, 1988

Mehrdad Kia, Ph.D., University of Wisconsin, 1986

Ona Renner-Fahey, Ph.D., Ohio State University, 2003

Bharath Sriraman, Ph.D., Northern Illinois University, 2002

Clint Walker, Ph.D., University of Wisconsin, 2006

Department of Chemistry and Biochemistry

Mark S. Cracolice, Chair

This section of the catalog was edited after the catalog was published. Updated October 23, 2012.

Chemistry is the central science that involves the study of atoms and molecules, their structures, their combinations, their interactions, and the energy changes accompanying chemical processes.

The Department offers the following degrees: B.S., B.A., M.S., and Ph.D.

A departmental honors program has been established for chemistry majors who attain a strong scholastic record. This program is based upon independent study and research with the direction of individual faculty members. In many cases financial support is available on a part-time research fellowship basis from research grants obtained by individual faculty members or from departmental endowment funds.

Prospective students desiring further information on any program of the Department of Chemistry and Biochemistry should contact the Chair by visiting the Department of Chemistry and Biochemistry.

High School Preparation: In addition to the general University admission requirements, it is strongly recommended that a student take four years of mathematics, four years of science, and a foreign language.

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

Special Degree Requirements

All chemistry and biochemistry majors must use the traditional letter grade option in registering for their required science and mathematics courses. The beginning mathematics course for a particular student depends upon a placement examination administered by the Department of Mathematical Sciences. Students are reminded of the University requirements that 39 of the 120 credits presented for graduation must be at the 300 or higher level, and that at least a 2.00 GPA must be earned in all credits attempted in the major. In addition, courses taken to satisfy the requirements of the major or minor must be completed with a grade of C- or better.

Bachelor of Science (American Chemical Society Certified)

The courses required for the B.S. degree provide a solid education in chemistry for the professional chemist and in preparation for graduate work in most areas of chemistry. These requirements meet the latest certification standards of the American Chemical Society.

Course	Credits
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	10
CHMY 221-223 (CHEM 221-222) Organic Chemistry I, II	6

CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2
CHMY 225 (CHEM 264) Organic Chemistry Laboratory for Chemistry Majors (preferred) or 224 Organic Chemistry II Laboratory	2-3
CHMY 302E (CHEM 334) Chemistry Literature and Scientific Writing (satisfies the Upper-division Writing Expectation)	3
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4
CHMY 421 (CHEM 342) Advanced Instrumental Analysis	4
CHMY 373-371 (CHEM 371-372) Phys Chem-Kntcs & Thrmdynmcs & Phys Chem-Qntm Chm & Spctrscpy	8
CHMY 401-403 (CHEM 452-453) Advanced Inorganic Chemistry & Descriptive Inorganic Chem	6
BCH 480 (BIOC 481) Advanced Biochemistry or equivalent	3
CHMY 402 (CHEM 455) Advanced Inorganic Chemistry Laboratory	2
Advanced Electives (from CHMY 391, 442, 445, 465, 491 and 3 credits maximum of 492, or 3 credit maximum of 499, or with consent of chemistry advisor, from advanced courses in chemistry, physics, geology, biochemistry, or mathematics (CHEM 395, 442, 445, 465, 495, 3 credits maximum of 497, or 3 credit maximum of 499, or with consent of chemistry advisor, from advanced courses in chemistry, physics, geology, biochemistry or mathematics)).	3
Cognate courses:	
CSCI 172 (CS 172) Introduction to Computer Modeling (or similar computing experience with consent of chemistry advisor)	3
M 171-172 and 273 (MATH 152-153 and 251) Calculus I, II, III	12
M 311 (MATH 311) Ordinary Differential Equations and Systems or M 221 (MATH 221) Linear Algebra	3
PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	10
Modern foreign language	10
WRIT 101 (ENEX 101)	3

At the time of graduation a recipient of this degree has the option of taking two semesters of one modern foreign language which, as a departmental requirement, may be taken credit/no credit. Students not taking this option will be required to take 2 additional advisor-approved Chemistry & Biochemistry or related discipline electives for 3 credits each. This will bring the elective credits for this option to 9.

Bachelor of Science with a major in Chemistry, Option in Environmental Chemistry

Course	Credits
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	10
CHMY 221-223 (CHEM 221-222) Organic Chemistry and Laboratory I, II	6
CHMY 222 (CHEM 223) Organic Chemistry Laboratory I	2
CHMY 225 (CHEM 264) Organic Chemistry Laboratory for Chemistry Majors or 224 Organic Chemistry II Laboratory	2-3
CHMY 302E (CHEM 334) Chemistry Literature and Scientific Writing (satisfies the Upper-division Writing Expectation)	3
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4
CHMY 421 (CHEM 342) Advanced Instrumental Analysis	4
CHMY 360 (CHEM 370)Applied Physical Chemistry or CHMY 373 (CHEM 371) Phys Chem-Kntcs & Thrmdynmcs	3-4
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3
BCH 480 (BIOC 481) Advanced Biochemistry I	3
BIOB 160N (BIOL 110N) Principles of Living Systems or equivalent	4
BIOB 260/261 (BIOL 221) Cell and Molecular Biology	4
BIOB 275 (BIOL 223) General Genetics	4
GEO 101N-102N (GEOS 100N-101N) General Geology and Laboratory	3
GEO 327 (GEOS 327) Geochemistry	3
Electives from CHMY 373, 371, 442, 445, 403, 402, 465, 466; (CHEM 371, 372, 442, 445, 453, 455, 465, 466); 3 credits maximum of 792 (CHEM 497); BIOE 370 (BIOL 340), BIOL 453, 454, 455, BIOB 490 (BIOL 497), 3 credits maximum of 497; GEO 320, 382, 431, 420 (GEOS 320, 382, 431, 480), 3 credits maximum of 497; BIOM 360 (MICB 300), 3 credits maximum of 497; STAT 452 (MATH 445); Modern Foreign Language (5 credits maximum)	8
M 162 (MATH 150)Applied Calculus or 171 (MATH 152) Calculus I	4
M 274 (MATH 158) Applied Differential Equations or 172 (MATH 153), Calculus II	3-4
STAT 451, 457 (MATH 444, 447) Statistics	4
PHSX 205N-206N and 207N-208N (PHYS 111N-113N and 112N-114N) Fundamentals of Physics I, II or PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	10

Bachelor of Science with a major in Chemistry, Option in Forensic Chemistry

The Chemistry B.S. degree with the option in Forensic Chemistry forms a solid base for students interested in careers in forensic chemistry or advanced work in chemistry including graduate school.

At the time of graduation a recipient of this degree has the option of taking two semesters of one modern foreign language which, as a departmental requirement, may be taken credit/no credit. Students not taking this option will be required to take 2 additional advisor-approved Chemistry & Biochemistry or related discipline electives for 3 credits each. This will bring the elective credits for this option to 9.

Course	Credits
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	10

CHMY 221-223 (CHEM 221-222) Organic Chemistry I, II	6
CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2
CHMY 225 (CHEM 264) Organic Chemistry Laboratory for Chemistry Majors of CHMY 223 (CHEM 223) Organic Chemistry II Laboratory	2-3
CHMY 302E (CHEM 334) Chemistry Literature and Scientific Writing (satisfies the Upper-division Writing Expectation)	3
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4
CHMY 421 (CHEM 342) Advanced Instrument Analysis	4
CHMY 360 (CHEM 370)Applied Physical Chemistry or CHMY 373 (CHEM 371) Phys Chem-Kntcs & Thrmdynmcs	3-4
BCH 480-482 (BIOC 481-482) Advanced Biochemistry I, II or equivalent	6
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3
CHMY 488 (CHEM 488) Forensic Research or CHEM 498 Internship	3
CHMY 489 (CHEM 489) Forensic Science Seminar	1
ANTH 286N Survey of Forensic Science	3
BIOB 106N (BIOL 110N) Principles of Living Systems	4
BIOB 260/261 (BIOL 221) Cell and Molecular Biology	4
COMM 111A Public Speaking	3
M 171-172 (MATH 152-153) Calculus I, II	8
STAT 451 (MATH 444) Statistical Methods	3
STAT 457 (MATH 447) Computer Data Analysis	1
PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	10
SOCI 211S (SOC 230S) Criminology	3
SOCI 221 (SOC 235) Criminal Justice	3
Electives from CHMY 465, 466, 542 (CHEM 465, 466, 542); ANTH 488; BIOB 275 (BIOL 223), 440; PHAR 110. (at least 8 of these credits must be in courses numbered 300 and above	11

Bachelor of Science with a major in Chemistry, Option in Pharmacology

Course	Credits
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	10
CHMY 221-223 (CHEM 221-222) Organic Chemistry and Laboratory I, II	6
CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2
CHMY 225 (CHEM 264) Organic Chemistry Laboratory for Chemistry Majors or 224 (CHEM 224)Organic Chemistry II Laboratory	2-3
CHMY 302E (CHEM 334) Chemistry Literature and Scientific Writing (satisfies the Upper-division Writing Expectation)	3
CHMY 311 (CHEM 341) Quantitative Analysis & Instrumental Methods	4
CHMY 421 (CHEM 342) Advanced Instrument Analysis	4
CHMY 360 (CHEM 370)Applied Physical Chemistry or CHMY 373 (CHEM 371) Phys Chem-Kntcs & Thrmdynmcs	3-4
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3
BCH 481-482 (BIOC 481-482) Advanced Biochemistry I, II	6
BIOB 160N (BIOL 110N) Principles of Living Systems or equivalent	4
BIOB 260/261 (BIOL 221) Cell and Molecular Biology	4
BIOM 400 (MICB 302) Medical Microbiology	3
PHAR 341-342 Applied Anatomy and Physiology	8
PHAR 443-444 Pharmacology and Toxicology	8
Electives from CHMY 373, 371, 442, 445, 403, 402, 465, 466 (CHEM 371, 372, 442, 445, 453, 455, 465, 466), 3 credits maximum of 492 (CHEM 497); BIOB 490 (BIOL 497) 3 credits maximum; PHAR 421, 422, 3 credits maximum of 497	3
Cognate courses:	
M 162 (MATH 150)Applied Calculus or 171 (MATH 152) Calculus I	4
M 274 (MATH 158) Applied Differential Equations or 172 (MATH 153) Calculus II	3-4
PHSX 205N-206N and 207N-208N (PHYS 111N-113N and 112N-114N) Fundamentals of Physics I, II or PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	10

Bachelor of Arts Degree

The courses required for the B.A. degree provide a less extensive training in chemistry than do the courses required for the American Chemical Society certified B.S. degree. This is to allow the student to supplement his or her program with courses that meet his or her specific needs. Thus this degree provides the core of traditional preparation in chemistry together with

latitude for combination with an interdisciplinary field or the Teacher Preparation program. It is strongly advised that students using this degree obtain faculty advice in planning their program.

Course	Credits
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	10
CHMY 221-223 (CHEM 221-222) Organic Chemistry I, II	6
CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2
CHMY 225 (CHEM 264) Organic Chemistry Laboratory for Chemistry Majors or 224 (CHEM 224)Organic Chemistry II Laboratory	2-3
CHMY 302E (CHEM 334) Chemistry Literature and Scientific Writing (satisfies the Upper-division Writing Expectation)	3
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4
CHMY 421 (CHEM 342) Advanced Instrument Analysis	4
CHMY 373-371 (CHEM 371-372) Phys Chem-Kntcs & Thrmdynmcs & Phys Chem-Qntm Chm & Spctrscpy	8
* Advanced electives	15
Cognate courses:	
CSCI 172 (CS 172) Introduction to Computer Modeling (or similar computing experience with approval of Chemistry advisor)	3
M 171, 172, 273 (MATH 152, 153, 251) Calculus I, II and III	12
PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus (preferred) or PHSX 205N-206N and 207N-208N (PHYS 111N-113N and 112N-114N) Fundamentals of Physics I, II or	10
Modern Foreign Language	10
WRIT 101 (ENEX 101) Composition.	3

*As preparation for teaching at the secondary level, students should elect CHMY 401, 403, 485 (CHEM 452, 453, and 485), BCH 380 (BIOC 380), STAT 216 (MATH 241), SCI 350 and teaching licensure requirements including EDU 497 (C&I 426). A student should consult his or her chemistry advisor for other options.

At the time of graduation a recipient of this degree must have completed two semesters of one foreign language. The Department of Chemistry waives the foreign language requirement for a student who completes the B.A. degree in preparation for secondary teaching and who meets the requirements for teaching licensure, including the student teaching requirement. These students still must meet the foreign language/symbolic systems competency requirement (likely via M 171 and 172 (MATH 152 and 153) for General Education as described in the Academic Policies and Procedures section of this catalog.

Teacher Preparation in Chemistry

Major Teaching Field of Chemistry: For an endorsement in the major teaching field of Chemistry, a student must complete the requirements for the above B.A. degree with a major in Chemistry with appropriate electives but without the foreign language requirement, and with the addition of CHMY 401, 403, and 485 (CHEM 452, 453, and 485). Students also must complete BCH 380 (BIOC 380), STAT 216 (MATH 241), SCI 350, and EDU 497 (C&I 426), gain admission to Teacher Education Program and meet the requirements for teaching licensure (see the College of Education section of this catalog).

Minor Teaching Field of Chemistry: For an endorsement in the minor teaching field of Chemistry, a student must complete CHMY 101N, 141N-143N, 221-222-223, 311, 360 or 373 and 485 (CHEM 101N, 161N-162N, 221-222-223, 341, 370 or 371, and 485); BCH 380 (BIOC 380), CSCI 100 or 172 (CS 101 or 172), M 162 (MATH 150) and STAT 216 (MATH 241), PHSX 205N-206N, 207N-208N (PHYS 111N-113N, 112N-114N) and SCI 350. Students also must complete EDUC 497 (C&I 426), gain admission to Teacher Education Program and meet other requirements for teaching licensure (see the College of Education section of this catalog).

Suggested Course of Study

For B.S. Degree (American Chemical Society Certified)

First Year	A	S
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	5	5
CSCI 172 (CS 172) Computer Modeling	-	3
M 171-172 (MATH 152-153) Calculus I, II	4	4
WRIT 101 (ENEX 101) Composition	3	-
Electives and General Education	3	3
	15	15
Second Year	**A**	**S**
CHMY 221-223 (CHEM 221-222) Organic Chemistry I, II	3	3
CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2	-
CHMY 225 (CHEM 264) (or 224) Organic Chemistry Laboratory	-	3
M 273 (MATH 251) Calculus III	4	-

M 311 (MATH 311) Ordinary Differential Equations and Systems or M 221 (MATH 221) Linear Algebra	-	3
PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	5	5
Electives and General Education	-	3
	14	17

Third Year	A	S
CHMY 302E (CHEM 334) Chem Literature & Scientific Writing	3	-
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4	-
CHMY 421 (CHEM 342) Advanced Instrument Analysis	-	4
CHMY 373-371 (CHEM 371-372) Phys Chem-Kntcs & Thrmdynmcs & Phys Chem-Qntm Chm & Spctrscpy	4	4
General Education (one upper-division)	6	9
	17	17

Fourth Year	A	S
CHMY 401-403 (CHEM 452-453) Advanced Inorganic Chemistry	3	3
CHMY 402 (CHEM 455) Advanced Inorganic Chemistry Laboratory	-	2
BCH 480 (BIOC 481) Advanced Biochemistry I	3	-
Advanced CHEM elective	3	3
General Education	-	3
Upper-division elective	6	6
	15	17

For B.S. Degree, Option in Environmental Chemistry

First Year	A	S
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	5	5
M 162 (MATH 150)Applied Calculus or 171 (MATH 152) Calculus I	4	-
M 274 (MATH 158) Applied Differential Equations or MATH 153 Calculus II	-	3-4
BIOB 160N (BIOL 110N) Principles of Living Systems or equivalent	-	4
WRIT 101 (ENEX 101) Composition	3	-
Electives and General Education	4	2
	16	14-15

Second Year	A	S
CHMY 221-223 (CHEM 221-222) Organic Chemistry	3	3
CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2	-
CHMY 225 or 224 (CHEM 264 or 224) Organic Chemistry Laboratory	-	3
PHSX 205N-206N and 207N-208N (PHYS 111N-113N and 112N-114N) Fundamentals of Physics I, II or PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	5	5
BIOB 260/261 (BIOL 221) Cell and Molecular Biology	4	-
BIOB 275 (BIOL 223) General Genetics	-	4
GEO 101N-102N (GEOS 100N-101N) General Geology and Laboratory	3	-
	17	15

Third Year	A	S
CHMY 302E (CHEM 334) Chem Literature & Scientific Writing	3	-
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4	-
CHMY 421 (CHEM 342) Advanced Instrument Analysis	-	4
CHMY 360 (CHEM 370)Applied Physical Chemistry or CHMY 373 (CHEM 371) Phys Chem-Kntcs & Thrmdynmcs	-	3-4
GEO 327 (GEOS 327) Geochemistry	3	-
Electives and General Education	6	9
	16	16-17

Fourth Year	A	S
BCH 480-482 (BIOC 481-482) Advanced Biochemistry I, II	3	-
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3	-
CHMY 494 (CHEM 494) Seminar/Workshop	-	1
STAT 451/457 (MATH 444/447) Statistical Methods	4	-
Electives and General Education	4	15
	17	16

For B.S. Degree, Option in Forensic Chemistry

First Year	A	S
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	5	5
M 171-172 (MATH 152-153) Calculus I, II	4	4
BIOB 160N (BIOL 110N) Principles of Living Systems or equivalent	-	4
COMM 111A Public Speaking	3	-
WRIT 101 (ENEX 101) Composition	-	3
Electives and General Education	3	-
	15	16

Second Year	A	S
CHMY 221-223 (CHEM 221-222) Organic Chemistry	3	3

CHMY 223 (CHEM 223) and CHMY 225 or 224 (CHEM 264 or 224) Organic Chemistry I Laboratory	2	2
PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	5	5
BIOB 260/261 (BIOL 221) Cell and Molecular Biology	4	-
SOCI 211S (SOC 230S) Criminology	3	-
ANTH 286N Survey of Forensic Science	-	3
General Education	-	3
	17	16
Third Year	**A**	**S**
CHMY 302E (CHEM 334) Chem Literature & Scientific Writing	3	-
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4	-
CHMY 421 (CHEM 342)Advanced Instrument Analysis	-	4
CHMY 360 (CHEM 370)Applied Physical Chemistry	-	3
STAT 451/457 (MATH 444/447) Statistical Methods	4	-
SOCI 221 (SOC 235) Criminal Justice	-	3
Electives and General Education	6	6
	15	16
Fourth Year	**A**	**S**
BIOC 480-482 (BIOC 481-482) Advanced Biochemistry I	3	3
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3	-
CHMY 488 (CHEM 488) Forensic Research	-	3
CHMY 489 (CHEM 489) Forensics Research Seminar	1	-
Electives and General Education	9	9
	16	15

For B.S. Degree, Option in Pharmacology

First Year	**A**	**S**
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	5	5
M 162 (MATH 150) Applied Calculus or 171 (MATH 152) Calculus I	4	-
M 274 (MATH 158) Applied Differential Equations or M 172 (MATH 153) Calculus II	-	3-4
BIOB 160N (BIOL 110N) Principles of Living Systems or equivalent	-	4
WRIT 101 (ENEX 101) Composition	3	-
Electives and General Education	4	2
	16	14-15
Second Year	**A**	**S**
CHMY 221-223 (CHEM 221-222) Organic Chemistry	3	3
CHMY 222 (CHEM 223) Organic Chemistry I Laboratory	2	-
CHMY 225 or 224 (CHEM 264 or 224) Organic Chemistry Laboratory	-	3
PHSX 205N-206N and 207N-208N (PHYS 111N-113N and 112N-114N) Fundamentals of Physics I, II or PHSX 215N-216N and 217N-218N (PHYS 211N-213N or 212N-214N) Fundamentals of Physics I and II with Calculus	5	5
BIOB 260-261 (BIOL 221) Cell and Molecular Biology	4	-
Electives and General Education	-	6
	17	15
Third Year	**A**	**S**
CHMY 302E (CHEM 334) Chem Literature & Scientific Writing	3	-
CHMY 311 (CHEM 341) Analytical Chem-Quant Analysis	4	-
CHMY 421 (CHEM 342) Advanced Instrument Analysis	-	4
CHMY 360 (CHEM 370) Applied Physical Chemistry or CHMY 373 (CHEM 371) Phys Chem-Kntcs & Thrmdynmcs	-	3-4
BIOM 400 (MICB 302E) Medical Microbiology	3	-
PHAR 341-342 Applied Anatomy and Physiology	4	4
Electives and General Education	3	6
	17	17-18
Fourth Year	**A**	**S**
BCH 480-482 (BIOC 481-482) Advanced Biochemistry I, II	3	3
CHMY 401 (CHEM 452) Advanced Inorganic Chemistry	3	-
PHAR 443-444 Pharmacology and Toxicology	4	4
Electives and General Education	6	7
	16	14

For B.A. Degree

First Year	**A**	**S**
CHMY 141N-143N (CHEM 161N-162N) College Chemistry I, II	5	5
CSCI 172 (CS 172) Introduction to Computer Modeling	-	3
WRIT 101 (ENEX 101) Composition	3	-
M 171-172 (MATH 152-153) Calculus I and II	4	4
General Education or electives	3	3
	15	15