

Subarea II: Human Adaptation and Diversity

Select one of the following: 3

ANTY 122S	Race and Minorities
ANTY 133X	Food and Culture
ANTY 211N	Anthropological Genetics
ANTY 310	Human Variation
ANTY 333	Culture and Population
ANTY 418	Evolution and Genetic Variation in Human Populations
ANTY 426	Culture, Health and Healing
LING 375X	Linguistic Ecology and Language Endangerment

Total Hours 3

Minimum Required Grade: C

Subarea III: World Societies and Cultures

Select one of the following: 3

ANTY 141H	The Silk Road
ANTY 241H	Central Asian Culture and Civ
ANTY 251H	Foundations of Civilization
ANTY 254H	Arch Wonders of the World
ANTY 323X	Native Peoples of Montana
ANTY 330X	Peoples and Cultures of World
ANTY 351H	Archaeology of North America
ANTY 352X	Archaeology of Montana
ANTY 353	PaleoIndian Archaeology
ANTY 354H	Mesoamerican Prehistory
ANTY 442	Cities/Landscapes Central Asia
ANTY 444	Artistic Tradtns Central Asia
ANTY 457	Arch of the Pacific Northwest
ANTY 459	Arch of the Arctic/Subarctic
ANTY 465	Arch of the SW United States

Total Hours 3

Minimum Required Grade: C

Subarea IV: Concepts and Issues

Select one of the following: 3

ANTY 216	Primates in Peril
ANTY 314	Principles of Forensic Anthro
ANTY 326E	Indigenous Peoples & the Ethics of Development
ANTY 336	Myth, Ritual and Religion
ANTY 349	Social Change in NnWstrn Socts
ANTY 422	Mind, Culture and Society
ANTY 423	Culture and Identity
ANTY 427	Anthropology of Gender
ANTY 435	Drugs, Culture and Society
ANTY 440	Cont. Issues of SSEA
LING 473	Language and Culture
LING 477	Bilingualism
LING 484	NA Indigenous Lang & Ling
LING 489	Morphology

NASX 306X	Contemp Global Iss Indg People
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Total Hours 3

Minimum Required Grade: C

Archeology Core Courses**Rule:** Complete one course from each of the 3 Archeology Core Courses Subcategories (Area, Theory, Methods)

Minimum Required Grade: C

9 Total Credits Required

Area

Select one of the following: 3

ANTY 351H	Archaeology of North America
ANTY 352X	Archaeology of Montana
ANTY 353	PaleoIndian Archaeology
ANTY 354H	Mesoamerican Prehistory
ANTY 451	Cultural Resource Management
ANTY 457	Arch of the Pacific Northwest
ANTY 459	Arch of the Arctic/Subarctic
ANTY 465	Arch of the SW United States

Total Hours 3

Minimum Required Grade: C

Theory

Select one of the following: 3

ANTY 450	Archaeological Theory
ANTY 456	Historical Archaeology
ANTY 458	Arch of Hunter-Gatherers

Total Hours 3

Minimum Required Grade: C

Methods

Select 3 credits from the following: 3

ANTY 454	Lithic Technology
ANTY 455	Artifact Analysis
ANTY 466	Archaeological Survey
ANTY 467	Archaeological Field School

Total Hours 3

Minimum Required Grade: C

Cultural and Ethnic Diversity**Bachelor of Arts - Anthropology; Cultural and Ethnic Diversity Concentration****College Humanities & Sciences**

Degree Specific Credits: 36

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: For a degree in Anthropology with a concentration in Cultural and Ethnic Diversity, the student must meet all the general requirements for the major, including the four required courses for this option (ANTY 122S, ANTY 310, ANTY 423, and ANTY 330X). Note that in addition to fulfilling concentration requirements these ANTY courses also fulfill certain major requirements.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Lower Division Core Courses	12
Anthropology or Cognate Electives	12
Upper Division Writing Requirement	3
Subarea I-Theory and Methods	6
Anthropological Theory	
Anthropological Methods	
Subarea II, III, IV	6
Subarea II: Human Adaptation and Diversity	
Subarea III: World Societies and Cultures	
Subarea IV: Concepts and Issues	
Cultural and Ethnic Diversity Concentration Requirements	12
Total Hours	51

Lower Division Core Courses

Rule: Complete all courses

ANTY 210N	Intro to Physical Anthropology	3
ANTY 220S	Culture & Society	3
ANTY 250S	Intro to Archaeology	3
LING 270S	Intro to Linguistics	3
Total Hours		12

Minimum Required Grade: C

Anthropology or Cognate Electives

Rule: Complete 12 credits.

Note: The student must complete six credits, with adviser approval, in **one** of the following disciplines (Anthropology, History, or Sociology), and six upper-division credits in **one** of the following allied disciplines (African-American Studies, Central and Southwest Asian Studies, East Asian Studies, Latin American Studies, Native American Studies, or Women's and Gender Studies).

Minimum Required Grade: C

12 Total Credits Required

Upper Division Writing Requirement

Rule: Complete either an upper-division writing course from approved list in catalog, or one of the following courses listed below.

Select one of the following:	3
ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 450	Archaeological Theory
ANTY 455	Artifact Analysis
LING 473	Language and Culture
LING 484	NA Indigenous Lang & Ling
Total Hours	3

Minimum Required Grade: C-

Subarea I-Theory and Methods

Rule: Complete 3 credits in Theory and 3 credits in Methods

Minimum Required Grade: C

6 Total Credits Required

Anthropological Theory

Select one of the following:	3
ANTY 312	Human Evolution
ANTY 400	History of Anthropology
ANTY 403	Public Anthropology
ANTY 404	Anthropological Museology
ANTY 415	Emergence Modern Humans
ANTY 430	Social Anthropology
ANTY 450	Archaeological Theory
ANTY 456	Historical Archaeology
ANTY 458	Arch of Hunter-Gatherers
LING 470	Linguistic Analysis
Total Hours	3

Total Hours 3

Minimum Required Grade: C

Anthropological Methods

Select 3 credits from the following:	3
ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 412	Osteology
ANTY 413	Forensic and Mortuary Arch
ANTY 416	Dental Anthropology
ANTY 431	Ethnographic Field Methods
ANTY 451	Cultural Resource Management
ANTY 454	Lithic Technology
ANTY 455	Artifact Analysis
ANTY 466	Archaeological Survey
ANTY 476	Methods for Native Languages
ANTY 495	Field Experience:
LING 474	Historical Linguistics
LING 475	Linguistic Field Methods
Total Hours	3

Total Hours 3

Minimum Required Grade: C

Subarea II, III, IV

Rule: Complete 6 credits from 2 of 3 Subareas

Minimum Required Grade: C

6 Total Credits Required

Subarea II: Human Adaptation and Diversity

Select one of the following: 3

ANTY 122S	Race and Minorities
ANTY 133X	Food and Culture
ANTY 211N	Anthropological Genetics
ANTY 310	Human Variation
ANTY 333	Culture and Population
ANTY 418	Evolution and Genetic Variation in Human Populations
ANTY 426	Culture, Health and Healing
LING 375X	Linguistic Ecology and Language Endangerment

Total Hours 3

Minimum Required Grade: C

Subarea III: World Societies and Cultures

Select one of the following: 3

ANTY 141H	The Silk Road
ANTY 241H	Central Asian Culture and Civ
ANTY 251H	Foundations of Civilization
ANTY 254H	Arch Wonders of the World
ANTY 323X	Native Peoples of Montana
ANTY 330X	Peoples and Cultures of World
ANTY 351H	Archaeology of North America
ANTY 352X	Archaeology of Montana
ANTY 353	PaleoIndian Archaeology
ANTY 354H	Mesoamerican Prehistory
ANTY 442	Cities/Landscapes Central Asia
ANTY 444	Artistic Tradtns Central Asia
ANTY 457	Arch of the Pacific Northwest
ANTY 459	Arch of the Arctic/Subarctic
ANTY 465	Arch of the SW United States

Total Hours 3

Minimum Required Grade: C

Subarea IV: Concepts and Issues

Select one of the following: 3

ANTY 216	Primates in Peril
ANTY 314	Principles of Forensic Anthro
ANTY 326E	Indigenous Peoples & the Ethics of Development
ANTY 336	Myth, Ritual and Religion
ANTY 349	Social Change in NnWstrn Socts
ANTY 422	Mind, Culture and Society
ANTY 423	Culture and Identity
ANTY 427	Anthropology of Gender
ANTY 435	Drugs, Culture and Society

ANTY 440	Cont. Issues of SSEA
LING 473	Language and Culture
LING 477	Bilingualism
LING 484	NA Indigenous Lang & Ling
LING 489	Morphology
NASX 306X	Contemp Global Iss Indg People

Total Hours 3

Minimum Required Grade: C

Cultural and Ethnic Diversity Option Requirements

Rule: Complete all courses

ANTY 122S	Race and Minorities	3
ANTY 310	Human Variation	3
ANTY 330X	Peoples and Cultures of World	3
ANTY 423	Culture and Identity	3

Total Hours 12

Minimum Required Grade: C

SIX Credits with Advisor approval in Anthropology, History or Sociology.

Six Upper Division Credits with Advisor approval in African-American Studies, Asian Studies, Native American Studies or Women's Studies.

English as a Second Language Certificate

Certificate of Art - Engl as a Sec Lang

College Humanities & Sciences

Degree Specific Credits: 22

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: The Certificate is issued by the University upon the recommendation of the Linguistics Program and the Faculty Senate

Summary

Core Courses	16
Required Courses	
Core Options	
Elective Courses	6
Total Hours	22

Core Courses

Rule: Must complete the following subcategories

16 Total Credits Required

Required Courses

Rule: All courses are required

Note: LING 495 may be taken for 1 credit on a credit/no credit basis.

LING 470	Linguistic Analysis	3
LING 471	Phonetics and Phonology	3
LING 472	Generative Syntax	3
LING 480	Tchg Engl as For Lang	3
LING 495	ESL Practicum (may be taken on a credit/ no credit basis)	1
Total Hours		13

Minimum Required Grade: C-

Core Options

Rule: Complete 1 of the following courses

LING 477	Bilingualism	3
or LING 478	Learner Language	
Total Hours		3

Minimum Required Grade: C-

Elective Courses

Rule: Complete 2 of the following courses

Note: LING 477 or LING 478 may be taken as an Elective if not taken as a Required

Select two of the following:	6	
LING 473	Language and Culture	
LING 489	Morphology	
Total Hours		6

Minimum Required Grade: C-

Forensic Anthropology Bachelor of Arts - Anthropology; Forensic Anthropology Concentration

College Humanities & Sciences

Degree Specific Credits: 36

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: For a degree in Anthropology with a concentration in Forensic Anthropology the student must meet all the general requirements for the major, including the completion of ANTY 310, ANTY 314, and an approved option elective field or laboratory course. Note that in addition to fulfilling concentration requirements these ANTY courses also fulfill certain major requirements.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Lower Division Core Courses	12
Anthropology or Cognate Electives	12
Upper Division Writing Requirement	3
Subarea I-Theory and Methods	6
Anthropological Theory	
Anthropological Methods	
Subarea II, III, IV	6
Subarea II: Human Adaptation and Diversity	
Subarea III: World Societies and Cultures	
Subarea IV: Concepts and Issues	
Forensic Anthropology Concentration	15-16
Concentration Requirements	
Concentration Electives	
Total Hours	54-55

Lower Division Core Courses

Rule: Complete all courses

ANTY 210N	Intro to Physical Anthropology	3
ANTY 220S	Culture & Society	3
ANTY 250S	Intro to Archaeology	3
LING 270S	Intro to Linguistics	3
Total Hours		12

Minimum Required Grade: C-

Anthropology or Cognate Electives

Rule: Complete 12 credits.

Note: The student must complete CJUS 125N, either SOCI 211S OR SOCI 221 and 12 elective credits from approved courses in criminology or disciplines for which a branch of the forensic sciences exists. The student should work with their advisor to select these elective courses.

Minimum Required Grade: C-

12 Total Credits Required

Upper Division Writing Requirement

Rule: Complete either an upper-division writing course from the approved list in the catalog, or one of the following courses listed below.

Select one of the following:	3
ANTY 314	Principles of Forensic Anthro
ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 450	Archaeological Theory
ANTY 455	Artifact Analysis
LING 473	Language and Culture
LING 484	NA Indigenous Lang & Ling
Total Hours	3

Minimum Required Grade: C-

Subarea I-Theory and Methods

Rule: Complete 3 credits in Theory and 3 credits in Methods. Students in the Forensic Anthropology Option should satisfy this requirement with ANTY 312, ANTY 415, ANTY 450, or ANTY 456.

Minimum Required Grade: C-

6 Total Credits Required

Anthropological Theory

Select one of the following: 3

ANTY 312	Human Evolution
ANTY 400	History of Anthropology
ANTY 403	Public Anthropology
ANTY 404	Anthropological Museology
ANTY 415	Emergence Modern Humans
ANTY 430	Social Anthropology
ANTY 450	Archaeological Theory
ANTY 456	Historical Archaeology
ANTY 458	Arch of Hunter-Gatherers
LING 470	Linguistic Analysis

Total Hours 3

Minimum Required Grade: C-

Anthropological Methods

Rule: Complete one of the following. Forensic Anthropology Option students should fill this requirement with a course consistent with the Option Elective below.

Select 3 credits from the following: 3

ANTY 402	Quan Ethnographic Field Methods
ANTY 408	Advanced Anthro Statistics
ANTY 412	Osteology
ANTY 413	Forensic and Mortuary Arch
ANTY 416	Dental Anthropology
ANTY 431	Ethnographic Field Methods
ANTY 451	Cultural Resource Management
ANTY 454	Lithic Technology
ANTY 455	Artifact Analysis
ANTY 466	Archaeological Survey
ANTY 476	Methods for Native Languages
ANTY 495	Field Experience:
LING 474	Historical Linguistics
LING 475	Linguistic Field Methods

Total Hours 3

Minimum Required Grade: C-

Subarea II, III, IV

Rule: Complete 6 credits from 2 of 3 Subareas

Minimum Required Grade: C-

6 Total Credits Required

Subarea II: Human Adaptation and Diversity

Select one of the following: 3

ANTY 122S	Race and Minorities
ANTY 133X	Food and Culture
ANTY 211N	Anthropological Genetics
ANTY 310	Human Variation
ANTY 333	Culture and Population
ANTY 418	Evolution and Genetic Variation in Human Populations
ANTY 426	Culture, Health and Healing
LING 375X	Linguistic Ecology and Language Endangerment

Total Hours 3

Minimum Required Grade: C-

Subarea III: World Societies and Cultures

Select one of the following: 3

ANTY 141H	The Silk Road
ANTY 241H	Central Asian Culture and Civ
ANTY 251H	Foundations of Civilization
ANTY 254H	Arch Wonders of the World
ANTY 323X	Native Peoples of Montana
ANTY 330X	Peoples and Cultures of World
ANTY 351H	Archaeology of North America
ANTY 352X	Archaeology of Montana
ANTY 353	PaleoIndian Archaeology
ANTY 354H	Mesoamerican Prehistory
ANTY 442	Cities/Landscapes Central Asia
ANTY 444	Artistic Tradtns Central Asia
ANTY 457	Arch of the Pacific Northwest
ANTY 459	Arch of the Arctic/Subarctic
ANTY 465	Arch of the SW United States

Total Hours 3

Minimum Required Grade: C-

Subarea IV: Concepts and Issues

Select one of the following: 3

ANTY 216	Primates in Peril
ANTY 314	Principles of Forensic Anthro
ANTY 326E	Indigenous Peoples & the Ethics of Development
ANTY 336	Myth, Ritual and Religion
ANTY 349	Social Change in NnWstrn Socts
ANTY 422	Mind, Culture and Society
ANTY 423	Culture and Identity
ANTY 427	Anthropology of Gender
ANTY 435	Drugs, Culture and Society
ANTY 440	Cont. Issues of SSEA
LING 473	Language and Culture
LING 477	Bilingualism
LING 484	NA Indigenous Lang & Ling

LING 489	Morphology	
NASX 306X	Contemp Global Iss Indg People	
Total Hours		3
Minimum Required Grade: C-		

Forensic Anthropology Option

Rule: Must complete the following subcategories

15-16 Total Credits Required

Option Requirements

Rule: Complete the following courses

ANTY 310	Human Variation	3
ANTY 314	Principles of Forensic Anthro	3
CJUS 125N	Fund of Forensic Science	3
Total Hours		9

Minimum Required Grade: C-

Rule: A 400-level course with a lab or field component in physical anthropology, archaeology, non-human osteology, geographic information systems (GIS), subsurface imaging, chemical analysis, genetic/evolutionary analysis, or multivariate statistics.

ANTY 412	Osteology	4
or ANTY 413	Forensic and Mortuary Arch	
SOCI 211S	Introduction to Criminology	3
or SOCI 221	Criminal Justice System	
Total Hours		7

Minimum Grade C-

Option Electives

Twelve (12) Credits in consultation with advisor in classes relevant to the forensic sciences, such as (but not limited to) archaeology, physical anthropology, biology, chemistry, criminology, drawing, geology, pharmacy, photography, public speaking, or psychology.

Minimum grade C-

Forensic Studies Certificate

The certificate in forensic studies is designed so that students may complete the requirements either as resident students at UM-Missoula or completely online through UM-Missoula's online facility.

To earn a certificate in forensic studies the student must complete a minimum of 18 credits, including 6 credits in core forensic science courses.

Certificate of Art - Forensic Studies

College Humanities & Sciences

Degree Specific Credits: 18

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: The Certificate in Forensic Studies is primarily designed as a step toward a baccalaureate degree for those interested in a career in the forensic sciences or a related field. It is also designed as an avenue for law enforcement agents, forensic scientists, or other professionals in the justice system to satisfy mandatory continuing education requirements for continued employment or promotion.

Summary

Core Courses	6
Science Electives	6
Communication Elective	3
Ethics Elective	3
Total Hours	18

Core Courses

Rule: All courses required.

CJUS 125N	Fund of Forensic Science	3
CJUS 488	Forensic Science the Crime Lab and Beyond	3
Total Hours		6

Minimum Required Grade: C-

Science Electives

Rule: Must complete 6 credits

Note: To meet this requirement, students must complete six credits in courses with a suffix of "N" (courses that have been designated as University of Montana- Missoula General Education Group XI, Natural Sciences) in any department. Any Criminology courses offered through the Sociology department also count towards meeting this requirement. Courses numbered under 100 may not be counted toward meeting this requirement. Minimum grade required is C-.

Minimum Required Grade: C-

6 Total Credits Required

Communication Elective

Rule: Must complete a 3 credit course

Note: To meet this requirement, student must complete one, 3-credit course related to written, oral, or pictorial communication, including selected courses in Art, Curriculum & Instruction, Communication Studies, Computer Science, Forestry, Journalism, Linguistics, Media Arts or any intermediate or advanced writing course. Courses numbered under 100 may not be counted toward meeting this requirement. WRIT 101 will not be accepted as fulfilling this requirement.

Minimum Required Grade: C-

3 Total Credits Required

Ethics Elective

Rule: Must complete a 3 credit course

Note: To meet this requirement, student must complete one, 3-credit course that has been designated as a University of Montana - Missoula General Education Group VIII (Ethics and Human Values) course in any department.

Minimum Required Grade: C-

3 Total Credits Required

Historic Preservation Certificate

Historic Preservation is the interdisciplinary field that seeks to identify, document, preserve and protect significant structures, sites and landscapes.

Certificate of Applied Science - Historic Preservation

College Humanities & Sciences

Degree Specific Credits: 21

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: Historic Preservation is the interdisciplinary field that seeks to identify, document, preserve and protect significant structures, sites and landscapes. To earn a certificate in historic preservation the student must complete a minimum of 21 credits.

Summary

Core Courses	12
History Electives	3
Internship or Independent Study	3
Total Hours	18

Core Courses

Rule: must complete all courses

ANTY 451	Cultural Resource Management	3
ANTY 456	Historical Archaeology	3
GPHY 465	Planning Principles & Processes	3
HPRV 400	Historic Preservation	3
Total Hours		12

Minimum Required Grade: C

History Electives

Rule: Must complete three credits

Select one of the following:		3
HSTA 320	Birth of Modern US	
HSTA 321	America in Crisis	

HSTA 322	U.S. History: WWII to Present	
Total Hours		3

Minimum Required Grade: C

Internship or Independent Study

Rule: Must complete three credits

Note: Internship must be with an approved, appropriate preservation-based agency or focused on an approved preservation-based topic.

Select three credits from the following:		3
ANTY 398	Internship	
ANTY 492	Independent Study	
Total Hours		3

Minimum Required Grade: C

Linguistics

Bachelor of Arts - Anthropology; Linguistics Concentration

College Humanities & Sciences

Degree Specific Credits: 39

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: For a degree in Anthropology with an concentration in Linguistics the student must meet all the general requirements for the major, in addition to completing LING 470, LING 473, and two courses from the following: LING 375X, 471, 472, 474, 475, 477, 478, 484, or 489.

LING 470	Linguistic Analysis	3
LING 473	Language and Culture	3
Select two of the following:		6
LING 375X	Linguistic Ecology and Language Endangerment	
LING 471	Phonetics and Phonology	
LING 472	Generative Syntax	
LING 474	Historical Linguistics	
LING 475	Linguistic Field Methods	
LING 477	Bilingualism	
LING 478	Learner Language	
LING 484	NA Indigenous Lang & Ling	
LING 489	Morphology	
Total Hours		12

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Lower Division Core Courses	12
Anthropology or Cognate Electives	12
Upper Division Writing Requirement	3
Subarea I-Theory and Methods	6
Anthropological Theory	
Anthropological Methods	
Subarea II, III, IV	6
Subarea II: Human Adaptation and Diversity	
Subarea III: World Societies and Cultures	
Subarea IV: Concepts and Issues	
Linguistics Option Requirements	12
Option Requirements	
Option Electives	
Total Hours	51

Lower Division Core Courses

Rule: Complete all courses

ANTY 210N	Intro to Physical Anthropology	3
ANTY 220S	Culture & Society	3
ANTY 250S	Intro to Archaeology	3
LING 270S	Intro to Linguistics	3
Total Hours		12

Minimum Required Grade: C-

Anthropology or Cognate Electives

Rule: Complete 12 credits.

Note: Speak to your academic adviser for a full list of approved Anthropology or Cognate electives.

Minimum Required Grade: C-

12 Total Credits Required

Upper Division Writing Requirement

Rule: Complete either an upper-division writing course from approved list in catalog, or one of the following courses listed below.

Select one of the following:	3
ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 450	Archaeological Theory
ANTY 455	Artifact Analysis
LING 473	Language and Culture
LING 484	NA Indigenous Lang & Ling
Total Hours	3

Minimum Required Grade: C-

Subarea I-Theory and Methods

Rule: Complete 3 credits in Theory and 3 credits in Methods

Minimum Required Grade: C-

6 Total Credits Required

Anthropological Theory

Select one of the following:	3
ANTY 312	Human Evolution
ANTY 400	History of Anthropology
ANTY 403	Public Anthropology
ANTY 404	Anthropological Museology
ANTY 415	Emergence Modern Humans
ANTY 430	Social Anthropology
ANTY 450	Archaeological Theory
ANTY 456	Historical Archaeology
ANTY 458	Arch of Hunter-Gatherers
LING 470	Linguistic Analysis
Total Hours	3

Minimum Required Grade: C-

Anthropological Methods

Select 3 credits from the following:	3
ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 412	Osteology
ANTY 413	Forensic and Mortuary Arch
ANTY 416	Dental Anthropology
ANTY 431	Ethnographic Field Methods
ANTY 451	Cultural Resource Management
ANTY 454	Lithic Technology
ANTY 455	Artifact Analysis
ANTY 466	Archaeological Survey
ANTY 476	Methods for Native Languages
ANTY 495	Field Experience:
LING 474	Historical Linguistics
LING 475	Linguistic Field Methods
Total Hours	3

Minimum Required Grade: C

Subarea II, III, IV

Rule: Complete 6 credits from 2 of 3 Subareas

Minimum Required Grade: C

6 Total Credits Required

Subarea II: Human Adaptation and Diversity

Select one of the following:	3
ANTY 122S	Race and Minorities
ANTY 133X	Food and Culture
ANTY 211N	Anthropological Genetics
ANTY 310	Human Variation

ANTY 333	Culture and Population
ANTY 418	Evolution and Genetic Variation in Human Populations
ANTY 426	Culture, Health and Healing
LING 375X	Linguistic Ecology and Language Endangerment

Total Hours 3

Minimum Required Grade: C-

Subarea III: World Societies and Cultures

Select one of the following: 3

ANTY 141H	The Silk Road
ANTY 241H	Central Asian Culture and Civ
ANTY 251H	Foundations of Civilization
ANTY 254H	Arch Wonders of the World
ANTY 323X	Native Peoples of Montana
ANTY 330X	Peoples and Cultures of World
ANTY 351H	Archaeology of North America
ANTY 352X	Archaeology of Montana
ANTY 353	PaleoIndian Archaeology
ANTY 354H	Mesoamerican Prehistory
ANTY 442	Cities/Landscapes Central Asia
ANTY 444	Artistic Tradtns Central Asia
ANTY 457	Arch of the Pacific Northwest
ANTY 459	Arch of the Arctic/Subarctic
ANTY 465	Arch of the SW United States

Total Hours 3

Minimum Required Grade: C-

Subarea IV: Concepts and Issues

Select one of the following: 3

ANTY 216	Primates in Peril
ANTY 314	Principles of Forensic Anthro
ANTY 326E	Indigenous Peoples & the Ethics of Development
ANTY 336	Myth, Ritual and Religion
ANTY 349	Social Change in NnWstrn Socts
ANTY 422	Mind, Culture and Society
ANTY 423	Culture and Identity
ANTY 427	Anthropology of Gender
ANTY 435	Drugs, Culture and Society
ANTY 440	Cont. Issues of SSEA
LING 473	Language and Culture
LING 477	Bilingualism
LING 484	NA Indigenous Lang & Ling
LING 489	Morphology
NASX 306X	Contemp Global Iss Indg People

Total Hours 3

Minimum Required Grade: C-

Linguistics Option Requirements

Rule: Must complete the following subcategories

12 Total Credits Required

Option Requirements

Rule: Complete all courses

LING 470	Linguistic Analysis	3
LING 473	Language and Culture	3
Total Hours		6

Minimum Required Grade: C-

Option Electives

Rule: Complete 2 courses

Select two of the following: 6

LING 375X	Linguistic Ecology and Language Endangerment
LING 471	Phonetics and Phonology
LING 472	Generative Syntax
LING 474	Historical Linguistics
LING 475	Linguistic Field Methods
LING 477	Bilingualism
LING 478	Learner Language
LING 484	NA Indigenous Lang & Ling
LING 489	Morphology

Total Hours 6

Minimum Required Grade: C-

Linguistics Minor

Minor - Linguistics (Minor)

College Humanities & Sciences

Degree Specific Credits: 18

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: To earn a Minor in Linguistics, students must complete 18 credits beyond their major degree requirements.

Summary

Upper Division Core Courses	9
Core Course	
Additional Core Courses	
Elective Courses	9
Total Hours	18

Upper Division Core Courses

Rule: Complete the following subcategories of courses

9 Total Credits Required

Core Course**Rule:** Must complete the following course

LING 470	Linguistic Analysis	3
Total Hours		3

Minimum Required Grade: C

Additional Core Courses

Select two of the following: 6

LING 471	Phonetics and Phonology	
LING 472	Generative Syntax	
LING 489	Morphology	
Total Hours		6

Minimum Required Grade: C

Elective Courses

Note: Please note: In earning this minor, neither LING 270S nor LING 465 may be taken after LING 470. In addition, only 1 of LING 270S and LING 465 may be counted towards the minor. LING 471, LING 472, and LING 489 may be taken as an elective, if not taken as a required core course.

Select three of the following: 9

LING 270S	Intro to Linguistics	
	or LING 465 Structure & History of English	
LING 375X	Linguistic Ecology and Language Endangerment	
LING 471	Phonetics and Phonology	
LING 472	Generative Syntax	
LING 473	Language and Culture	
LING 474	Historical Linguistics	
LING 475	Linguistic Field Methods	
LING 477	Bilingualism	
LING 478	Learner Language	
LING 484	NA Indigenous Lang & Ling	
LING 489	Morphology	
Total Hours		9

Minimum Required Grade: C

Medical Anthropology**Bachelor of Arts - Anthropology; Medical Anthropology Concentration****College Humanities & Sciences****Degree Specific Credits:** 36**Required Cumulative GPA:** 2.0**Catalog Year: 2017-2018**

Note: For a degree in Anthropology with an concentration in Medical Anthropology, the student must meet all of the general requirements for the major, including completing ANTY 426, in addition to completing three

of the following courses: ANTY 333, ANTY 418, ANTY 422, or ANTY 435. Note that in addition to fulfilling concentration requirements these ANTY courses also fulfill certain major requirements.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Lower Division Core Courses	12
Anthropology or Cognate Electives	12
Upper Division Writing Requirement	3
Subarea I-Theory and Methods	6
Subarea II, III, IV	6
Subarea II: Human Adaptation and Diversity	
Subarea III: World Societies and Cultures	
Subarea IV: Concepts and Issues	
Medical Anthropology Concentration	12
Concentration Requirements	
Concentration Electives	
Total Hours	51

Lower Division Core Courses**Rule:** Complete all courses

ANTY 210N	Intro to Physical Anthropology	3
ANTY 220S	Culture & Society	3
ANTY 250S	Intro to Archaeology	3
LING 270S	Intro to Linguistics	3
Total Hours		12

Minimum Required Grade: C

Anthropology or Cognate Electives**Rule:** Complete 12 credits.

Note: Speak to your academic adviser for a full list of approved Anthropology or Cognate electives.

Minimum Required Grade: C

12 Total Credits Required

Upper Division Writing Requirement

Rule: Complete either an upper-division writing course from approved list in catalog, or one of the following courses listed below.

Select one of the following: 3	
ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 450	Archaeological Theory
ANTY 455	Artifact Analysis
LING 473	Language and Culture

LING 484	NA Indigenous Lang & Ling	
Total Hours		3

Minimum Required Grade: C-

Subarea I-Theory and Methods

Rule: Complete 3 credits in Theory and 3 credits in Methods

Minimum Required Grade: C

6 Total Credits Required

Anthropological Theory

Select one of the following: 3

ANTY 312	Human Evolution
ANTY 400	History of Anthropology
ANTY 403	Public Anthropology
ANTY 404	Anthropological Museology
ANTY 415	Emergence Modern Humans
ANTY 430	Social Anthropology
ANTY 450	Archaeological Theory
ANTY 456	Historical Archaeology
ANTY 458	Arch of Hunter-Gatherers
LING 470	Linguistic Analysis

Total Hours 3

Minimum Required Grade: C

Anthropological Methods

Select 3 credits from the following: 3

ANTY 402	Quan Ethnographic Field Methds
ANTY 408	Advanced Anthro Statistics
ANTY 412	Osteology
ANTY 413	Forensic and Mortuary Arch
ANTY 416	Dental Anthropology
ANTY 431	Ethnographic Field Methods
ANTY 451	Cultural Resource Management
ANTY 454	Lithic Technology
ANTY 455	Artifact Analysis
ANTY 466	Archaeological Survey
ANTY 476	Methods for Native Languages
ANTY 495	Field Experience:
LING 474	Historical Linguistics
LING 475	Linguistic Field Methods

Total Hours 3

Minimum Required Grade: C

Subarea II, III, IV

Rule: Complete 6 credits from 2 of 3 Subareas

Minimum Required Grade: C

6 Total Credits Required

Subarea II: Human Adaptation and Diversity

Rule: Complete one of the following

Select one of the following: 3

ANTY 122S	Race and Minorities
ANTY 133X	Food and Culture
ANTY 211N	Anthropological Genetics
ANTY 310	Human Variation
ANTY 333	Culture and Population
ANTY 418	Evolution and Genetic Variation in Human Populations
ANTY 426	Culture, Health and Healing
LING 375X	Linguistic Ecology and Language Endangerment

Total Hours 3

Minimum Required Grade: C

Subarea III: World Societies and Cultures

Rule: Complete one of the following

Select one of the following: 3

ANTY 141H	The Silk Road
ANTY 241H	Central Asian Culture and Civ
ANTY 251H	Foundations of Civilization
ANTY 254H	Arch Wonders of the World
ANTY 323X	Native Peoples of Montana
ANTY 330X	Peoples and Cultures of World
ANTY 351H	Archaeology of North America
ANTY 352X	Archaeology of Montana
ANTY 353	PaleoIndian Archaeology
ANTY 354H	Mesoamerican Prehistory
ANTY 442	Cities/Landscapes Central Asia
ANTY 444	Artistic Tradtns Central Asia
ANTY 457	Arch of the Pacific Northwest
ANTY 459	Archof the Arctic/Subarctic
ANTY 465	Arch of the SW United States

Total Hours 3

Minimum Required Grade: C

Subarea IV: Concepts and Issues

Rule: Complete one of the following

Select one of the following: 3

ANTY 216	Primates in Peril
ANTY 314	Principles of Forensic Anthro
ANTY 326E	Indigenous Peoples & the Ethics of Development
ANTY 336	Myth, Ritual and Religion
ANTY 349	Social Change in NnWstrn Socts
ANTY 422	Mind, Culture and Society
ANTY 423	Culture and Identity
ANTY 427	Anthropology of Gender
ANTY 435	Drugs, Culture and Society
ANTY 440	Cont. Issues of SSEA

LING 473	Language and Culture	
LING 477	Bilingualism	
LING 484	NA Indigenous Lang & Ling	
LING 489	Morphology	
NASX 306X	Contemp Global Iss Indg People	
Total Hours		3

Minimum Required Grade: C

Medical Anthropology Option

Rule: Must complete the following subcategories

12 Total Credits Required

Option Requirements

Rule: Complete the following course

ANTY 426	Culture, Health and Healing	3
Total Hours		3

Minimum Required Grade: C

Option Electives

Rule: Complete 3 courses

Select three of the following:

ANTY 333	Culture and Population	
ANTY 418	Evolution and Genetic Variation in Human Populations	
ANTY 422	Mind, Culture and Society	
ANTY 435	Drugs, Culture and Society	
ANTY 433	Indig Global Health & Healing	
Total Hours		9

Minimum Required Grade: C

Applied Science Undergraduate

- Bachelor of Applied Science (p. 162)

Bachelor of Applied Science

Missoula College Academic Advising Center

The Bachelor of Applied Science (B.A.S.) degree at the University of Montana (UM) is designed for individuals who have completed an Associate of Applied Science (AAS) degree with a 2.50 grade point average at a regionally accredited institution. (The Missoula College (p. 354) section of the University of Montana-Missoula catalog identifies Associate of Applied Science degree programs offered at The University of Montana.) Individuals pursuing the B.A.S. are those who are seeking additional education to strengthen their planned or previous training and improve career advancement opportunities.

As part of the B.A.S. curriculum, students must develop a degree plan tailored to their academic and professional goals. Due to the nature of the B.A.S., many plans are interdisciplinary in nature (i.e. consist of courses from multiple disciplines). Students initially meet with a B.A.S.

advisor at Missoula College for assistance in developing their degree plan curriculum. After drafting their plan, students create a degree plan committee that consists of faculty members from disciplines represented in the plan. This committee provides final approval of the plan.

Bachelor of Applied Science students must meet all the University of Montana requirements for graduation. Up to 50 technical credits from an accredited A.A.S. program will count toward the 127 total credits required for graduation.

Any courses taken as part of the A.A.S. that can count towards UM General Education Requirements (e.g. certain writing, psychology, math, and communication courses) *are not* considered technical and, hence, are not included in this 50 technical credit maximum.

It is important to understand that the B.A.S. degree does not identify a specific discipline major. Even though some plans may consist of courses from one sole discipline, the student is NOT a major in that discipline. Hence, the B.A.S. student's transcript and diploma will not indicate a specific major or concentration area.

Although students submit their application for admission to and are initially advised through Missoula College, B.A.S. students are enrolled through the mountain campus and, as such, are assessed UM-Missoula tuition rates.

Students interested in pursuing the B.A.S. degree should review the Missoula College Academic Advising Center's B.A.S. webpage (<http://mc.umt.edu/aac/BAS/default.php>) for informational resources and to learn how to request an initial advising appointment.

Bachelor of Applied Science - Applied Science

College Humanities & Sciences

Degree Specific Credits: 127

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umt.edu/academics/general-education-requirements>) of the catalog.

Summary

Mathematics	3-4
Perspectives	27
Expressive Arts (A)	
Literary & Artistic Studies (L)	
Historical & Cultural Studies (H)	
Social Sciences (S)	
Ethical & Human Values (E)	
Democracy and Citizenship (Y)	
Cultural and International Diversity (X)	
Natural Sciences (N)	
Lower-Division Approved Writing Course	
Writing Skills	6

Statistics/Foreign Language	3-10
Upper-Division Credit Requirement	39
Upper-Division Writing	3
AAS Degree Credits	38-50
Total Hours	119-139

Mathematics

Rule: Any Mathematics course level 104 or higher (excluding M 111).

Note: Appropriate placement into mathematics courses required. Prerequisites may apply. If a student successfully places into and completes a mathematics (either "M" or "STAT") course that is also considered a Symbolic System, that course may be used to count towards both the Mathematics and Symbolic Systems General Education Requirements.

Minimum Required Grade: C-

3-4 Total Credits Required

Perspectives

Rule: A minimum of 3 credits towards each Perspective Category is required, except Natural Sciences.

Note: Some courses satisfy multiple Perspectives or GER Categories. Some courses included in your specific degree plan may overlap with Perspective or other GER categories; visit with your advisor for more information.

Minimum Required Grade: C-

27 Total Credits Required

Expressive Arts (A)

Rule: A minimum of three credits is required.

Literary & Artistic Studies (L)

Rule: A minimum of three credits is required.

Historical & Cultural Studies (H)

Rule: A minimum of three credits is required.

Social Sciences (S)

Rule: A minimum of three credits is required.

Ethical & Human Values (E)

Rule: A minimum of three credits is required.

Democracy and Citizenship (Y)

Rule: A minimum of three credits is required.

Cultural and International Diversity (X)

Rule: A minimum of three credits is required.

Natural Sciences (N)

Rule: A minimum of six credits is required. At least one course must have a laboratory component.

Writing Skills

Rule: Both WRIT 101 AND an Approved Writing Course are required.

Note: NOTE: Students who place into and successfully complete WRIT 201 are considered to have satisfied both the WRIT 101 and the Lower-Division Approved Writing Course General Education Requirements.

Minimum Required Grade: C-

6 Total Credits Required

WRIT 101

Rule: Take 1 of the courses below.

Note: Appropriate placement into WRIT 101/WRIT 201 required. Prerequisites may apply.

WRIT 101	College Writing I	3
or WRIT 201	College Writing II	
Total Hours		3

Minimum Required Grade: C-

Lower-Division Approved Writing Course

Rule: Any course designated as an Approved Writing Course during semester it's taken.

Foreign Language

Rule: Foreign Language or Statistics Course

Minimum Required Grade: C-

3-10 Total Credits Required

Statistics Course

Rule: Successful completion of 1 course from the list below.

Note: Prerequisites apply for all courses listed below; some courses from this list are major-restricted. Other baccalaureate major-specific Symbolic Systems may be used in lieu of course list above; speak with your advisor for more information.

Select one of the following:		3-4
M 133	Geometry and Measurement for Elementary School Teachers	
M 162	Applied Calculus	
M 171	Calculus I	
PSYX 222	Psychological Statistics	
SOCI 202	Social Statistics	
STAT 216	Introduction to Statistics	
Total Hours		3-4

Minimum Required Grade: C-

Foreign Language

Rule: Successful completion of first-year sequence of a Modern and Classical Language (MCLL).

Note: A first-year sequence usually consists of courses numbered 101 & 102 (5 credits each) for most catalog-approved languages, though some exceptions to this course numbering and sequencing apply. Depending on the language, students may take a placement test to demonstrate proficiency to receive non-credit exemption from this requirement. Refer

to the General Education Requirements (p. 30) section of this catalog and speak with your advisor for more information.

Upper-Division Credit Requirement

Rule: 39 upper-division courses required for UM GERs. At least 30 of the 39 upper-division credits must be from the degree plan.

39 Total Credits Required

Upper-Division Writing

Rule: At least one upper-division writing course is required for UM GERs.

Note: This course may be included as part of the student's degree plan or total Upper-Division Credits.

3 Total Credits Required

AAS Degree Credits

Rule: Up to 50 technical credits earned from AAS may be counted towards the 127 required for the BAS.

Minimum Required Grade: C-

38-50 Total Credits Required

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, permitting students to tailor the degree to their needs. Students desiring a basic grounding in biochemistry to complement their primary major can choose to pursue a minor in Biochemistry.

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://hs.umt.edu/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.

Undergraduate

- Biochemistry B.S. (p. 164)
- Biochemistry B.S., Health Professions Concentrations (p. 166)

Undergraduate Minors

- Biochemistry (p. 168)

Biochemistry B.S.

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.

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

Bachelor of Science - Biochemistry

College Humanities & Sciences

Degree Specific Credits: 96

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018**General Education Requirements**

Information regarding these requirements can be found in the General Education Section (<http://catalog.umt.edu/academics/general-education-requirements>) of the catalog.

Summary

Lower Division Core	54
Biochemistry	
Biology	
General and Organic Chemistry	
Physics	
Mathematics	
Computer Science	
Upper Division Core	26
Biochemistry	
Biology	
Analytical Chemistry	
Inorganic Chemistry	
Physical Chemistry	
Advanced Electives	16
Total Hours	96

Lower Division Core

Rule: Must complete the following subcategories

54 Total Credits Required

Biochemistry

Rule: All of the following courses are required

BCH 110	Intro Biology for Biochemists	3
BCH 111	Intro Biol for Biochemists Lab	1
BCH 294	Seminar/Workshop	1
Total Hours		5

Minimum Required Grade: C-

Biology

Rule: All of the following courses are required

BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		8

Minimum Required Grade: C-

General and Organic Chemistry

Rule: All of the following courses are required

CHMY 141N	College Chemistry I	4
CHMY 142N	College Chemistry I Lab	1
CHMY 143N	College Chemistry II	4
CHMY 144N	College Chemistry II Lab	1
CHMY 221	Organic Chemistry I	3
CHMY 222	Organic Chemistry I Lab	2

CHMY 223	Organic Chemistry II	3
CHMY 224	Organic Chemistry II Lab	2
Total Hours		20

Minimum Required Grade: C-

Physics

Rule: All of the following courses are required

PHSX 215N	Fund of Physics w/Calc I	4
PHSX 216N	Physics Laboratory I w/Calc	1
PHSX 217N	Fund of Physics w/Calc II	4
PHSX 218N	Physics Laboratory II w/Calc	1
Total Hours		10

Minimum Required Grade: C-

Mathematics

Rule: All of the following courses are required

M 171	Calculus I	4
M 172	Calculus II	4
Total Hours		8

Minimum Required Grade: C-

Computer Science

Rule: The following course is required

Note: We advise that students take CSCI 250 in their third year after completing lower division biochemistry, biology, chemistry, mathematics and physics coursework.

CSCI 250	Computer Mdlng/Science Majors	3
Total Hours		3

Minimum Required Grade: C-

Upper Division Core

Rule: Must complete the following subcategories

26 Total Credits Required

Biochemistry

Rule: All of the following courses are required

BCH 480	Advanced Biochemistry I	3
BCH 482	Advanced Biochemistry II	3
BCH 486	Biochemistry Research Lab	3
Total Hours		9

Minimum Required Grade: C-

Biology

Rule: The following course is required

BIOB 425	Adv Cell & Molecular Biology	3
Total Hours		3

Minimum Required Grade: C-

Analytical Chemistry**Rule:** All of the following courses are required

CHMY 311	Analytical Chem-Quant Analysis	4
CHMY 421	Advanced Instrument Analysis	4
Total Hours		8

Minimum Required Grade: C-

Inorganic Chemistry**Rule:** The following course is required

CHMY 401	Advanced Inorganic Chemistry	3
Total Hours		3

Minimum Required Grade: C-

Physical Chemistry**Rule:** Choose 1 of the following courses

Note: Students planning to attend graduate school in biochemistry or biophysics are strongly advised to take the CHMY 373-CHMY 371 sequence

CHMY 360	Applied Physical Chemistry	3-4
or CHMY 373	Phys Chem-Kntcs & Thrmdynmcs	
Total Hours		3-4

Minimum Required Grade: C-

Advanced Electives**Rule:** Choose 16 credits from the courses listed

Note: No more than 3 credits combined of BIOB 490, CHMY 490, CHMY 498 and BCH 490. No more than 3 credits combined of CHMY 397 and CHMY 494.

Select 16 credits from the following: 16

BCH 490	Undergraduate Research
BIOB 301	Developmental Biology
BIOB 375	General Genetics
BIOB 410	Immunology
BIOB 411	Immunology Laboratory
BIOB 440	Biological Electron Microscopy
BIOB 486	Genomics
BIOB 490	Adv Undergrad Research
BIOH 365	Human AP I for Health Profsns
BIOH 370	Human AP II for Health Profsns
BIOH 405	Hematology
BIOH 462	Principles Medical Physiology
BIOM 360	General Microbiology
BIOM 361	General Microbiology Lab
BIOM 400	Medical Microbiology
BIOM 410	Microbial Genetics
BIOM 411	Exprmntl Microbial Genetcs Lab
BIOM 427	General Parasitology
BIOM 428	General Parasitology Lab
BIOM 435	Virology

CHMY 371	Phys Chem-Qntm Chm & Spctrscty	
CHMY 397	Teaching Chemistry	
CHMY 402	Advanced Inorganic Chem Lab	
CHMY 403	Descriptive Inorganic Chem	
CHMY 442	Aquatic Chemistry	
CHMY 465	Organic Spectroscopy	
CHMY 466	FT-NMR Optn for Undrgrd Rsrch	
CHMY 490	Undergraduate Research	
CHMY 494	Seminar/Workshop	
CHMY 498	Internship/Cooperative Educ	
CSCI 451	Computational Biology	
PHAR 421	Medicinal Chem I	
PHAR 422	Medicinal Chem II	
Total Hours		16

Minimum Required Grade: C-

Biochemistry Health Professions

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, permitting students to tailor the degree to their needs.

Bachelor of Science - Biochemistry; Health Professions Concentration**College Humanities & Sciences****Degree Specific Credits:** 99**Required Cumulative GPA:** 2.0**Catalog Year: 2017-2018****General Education Requirements**

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Lower Division Core	50-51
Biochemistry	
Biology	
General and Organic Chemistry	
Physics	
Mathematics	
Upper Division Core	25-26
Biochemistry	
Microbiology	
Analytical Chemistry	
Inorganic Chemistry	
Physical Chemistry	

Biology Laboratory Course	
Advanced Electives	21
Ethics	3
Total Hours	99-101

Lower Division Core

Rule: Must complete the following subcategories

50 Total Credits Required

Biochemistry

Rule: All of the following courses are required

BCH 110	Intro Biology for Biochemists	3
BCH 111	Intro Biol for Biochemists Lab	1
BCH 294	Seminar/Workshop	1
Total Hours		5

Minimum Required Grade: C-

Biology

Rule: All of the following courses are required

BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		8

Minimum Required Grade: C-

General and Organic Chemistry

Rule: All of the following courses are required

CHMY 141N	College Chemistry I	4
CHMY 142N	College Chemistry I Lab	1
CHMY 143N	College Chemistry II	4
CHMY 144N	College Chemistry II Lab	1
CHMY 221	Organic Chemistry I	3
CHMY 222	Organic Chemistry I Lab	2
CHMY 223	Organic Chemistry II	3
CHMY 224	Organic Chemistry II Lab	2
Total Hours		20

Minimum Required Grade: C-

Physics

Rule: Either the PHSX 205N-PHSX 208N or the PHSX 215N-PHSX 218N sequence may be completed

Select one of the following sequences: 10

Sequence 1:

PHSX 205N	College Physics I	
PHSX 206N	College Physics I Laboratory	
PHSX 207N	College Physics II	
PHSX 208N	College Physics II Laboratory	

Sequence 2:

PHSX 215N	Fund of Physics w/Calc I	
PHSX 216N	Physics Laboratory I w/Calc	
PHSX 217N	Fund of Physics w/Calc II	

PHSX 218N	Physics Laboratory II w/Calc	
Total Hours		10

Minimum Required Grade: C-

Mathematics

Rule: Either the M 162/M 263 sequence or the M 171/M 172 sequence may be completed

Select one of the following: 7-8

M 162 & M 263	Applied Calculus and Applied Differential Equations	
M 171 & M 172	Calculus I and Calculus II	

Total Hours 7-8

Minimum Required Grade: C-

Upper Division Core

Rule: Must complete the following subcategories

25 Total Credits Required

Biochemistry

Rule: All of the following courses are required

BCH 480	Advanced Biochemistry I	3
BCH 482	Advanced Biochemistry II	3
Total Hours		6

Minimum Required Grade: C-

Microbiology

Rule: The following course is required

BIOM 360	General Microbiology (equiv to 260)	3
Total Hours		3

Minimum Required Grade: C-

Analytical Chemistry

Rule: All of the following courses are required

CHMY 311	Analytical Chem-Quant Analysis	4
CHMY 421	Advanced Instrument Analysis	4
Total Hours		8

Minimum Required Grade: C-

Inorganic Chemistry

Rule: The following course is required

CHMY 401	Advanced Inorganic Chemistry	3
Total Hours		3

Minimum Required Grade: C-

Physical Chemistry

Rule: Choose 1 of the following courses

CHMY 360	Applied Physical Chemistry	3-4
or CHMY 373	Phys Chem-Kntcs & Thrmdynmcs	
Total Hours		3-4

Minimum Required Grade: C-

Biology Laboratory Course

Rule: Choose one of the following lab courses

Select one of the following:		2
BIOB 411	Immunology Laboratory	
BIOB 440	Biological Electron Microscopy	
BIOM 361	General Microbiology Lab	
BIOM 428	General Parasitology Lab	
Total Hours		2

Minimum Required Grade: C-

Advanced Electives

Rule: Choose 21 credits from the courses listed

Note: No more than 3 credits combined of BIOB 490, CHMY 490, CHMY 498 and BCH 490. No more than 3 credits combined of CHMY 397 and CHMY 494.

Select 21 credits from the following:		21
BCH 486	Biochemistry Research Lab	
BCH 490	Undergraduate Research	
BIOB 301	Developmental Biology	
BIOB 375	General Genetics	
BIOB 410	Immunology	
BIOB 411	Immunology Laboratory	
BIOB 425	Adv Cell & Molecular Biology	
BIOB 440	Biological Electron Microscopy	
BIOB 486	Genomics	
BIOB 490	Adv Undergrad Research	
BIOH 365	Human AP I for Health Profsns	
BIOH 370	Human AP II for Health Profsns	
BIOH 405	Hematology	
BIOH 462	Principles Medical Physiology	
BIOM 400	Medical Microbiology	
BIOM 410	Microbial Genetics	
BIOM 411	Exprmntl Microbial Genetcs Lab	
BIOM 427	General Parasitology	
BIOM 428	General Parasitology Lab	
BIOM 435	Virology	
CHMY 371	Phys Chem-Qntm Chm & Spctrsctpy	
CHMY 397	Teaching Chemistry	
CHMY 402	Advanced Inorganic Chem Lab	
CHMY 403	Descriptive Inorganic Chem	
CHMY 442	Aquatic Chemistry	
CHMY 465	Organic Spectroscopy	
CHMY 466	FT-NMR Optn for Undrgrd Rsrch	
CHMY 490	Undergraduate Research	
CHMY 494	Seminar/Workshop	

CHMY 498	Internship/Cooperative Educ	
PHAR 421	Medicinal Chem I	
PHAR 422	Medicinal Chem II	
Total Hours		21

Minimum Required Grade: C-

Ethics

Rule: Complete the following course

CHMY 305E	Ethics, Literature and Writing in the Sciences	3
Total Hours		3

Minimum Required Grade: C-

Biochemistry Minor

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, an essential tool 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 Concentration is also offered within the B.S. in Biochemistry for students whose career goals are in fields related to biochemistry. This concentration allows more flexibility in upper division electives, permitting 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://hs.umd.edu/biochemistry>): <http://hs.umd.edu/biochemistry/>

Minor - Biochemistry

College Humanities & Sciences

Degree Specific Credits: 29

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Summary

Biochemistry	4
Chemistry	16
Upper Division Biochemistry	9
Total Hours	29

Biochemistry

Rule: All courses are required

BCH 110	Intro Biology for Biochemists	3
BCH 111	Intro Biol for Biochemists Lab	1
Total Hours		4

Minimum Required Grade: C-

Chemistry

Rule: All courses are required

CHMY 141N	College Chemistry I	4
CHMY 142N	College Chemistry I Lab	1
CHMY 143N	College Chemistry II	4
CHMY 144N	College Chemistry II Lab	1
CHMY 221	Organic Chemistry I	3
CHMY 223	Organic Chemistry II	3
Total Hours		16

Minimum Required Grade: C-

Upper Division Biochemistry

Rule: All courses are required

BCH 480	Advanced Biochemistry I	3
BCH 482	Advanced Biochemistry II	3
BCH 486	Biochemistry Research Lab	3
Total Hours		9

Minimum Required Grade: C-

Biological Sciences

Charles H. Janson, Associate Dean for the Biological Sciences

The Division of Biological Sciences has undergraduate and graduate programs representing the full range of the biological sciences. The Division offers Bachelor's degrees in

- Biology (with a broad array of formal concentrations described in more detail below),
- Medical Laboratory Science,
- Microbiology including microbial ecology,
- Wildlife Biology (a cooperative program administered by the College of Forestry and Conservation), and

- Biochemistry (an interdepartmental degree administered by the Chemistry Department).

The Division also advises students in pre-health sciences and offers a series of summer field courses at the University's Flathead Lake Biological Station (<http://flbs.umt.edu>) a year-round academic center for the ecological sciences, located 85 miles north of Missoula near Kalispell and Glacier National Park. The Division is one of the leading research units in the University. Research programs in the Division provide abundant opportunities for students to enhance their educational experience by participating in mentored research. Several sources of funding are available to support undergraduate student research, and the Division participates in the University of Montana Conference on Undergraduate Research each spring.

Graduate degrees offered by the Division of Biological Sciences include Master of Science and Doctor of Philosophy degrees in

- Cellular, Molecular and Microbial Biology (CMMB),
- Organismal Biology and Ecology (OBE), and
- Systems Ecology (SE).

The Division also participates in the graduate (M.S. and Ph.D.) program in Wildlife Biology, administered by the College of Forestry and Conservation and in the Ph.D. program in Biochemistry and Biophysics, administered by the Chemistry Department. Information on graduate study and program requirements is available from the Graduate School or the Division of Biological Sciences.

The Division offers a Bachelor of Science degree in **Biology** that provides a solid foundation in core areas of the biological sciences and in supporting physical sciences and mathematics. Several concentrations are provided within the B.S. biology degree:

- **Cellular and molecular biology:** For students interested in the cellular and molecular aspects of biology, and for students interested in health-related professions.
- **Ecology and organismal biology:** For students interested in the biology of organisms (plants and animals), populations or communities, and for students interested in veterinary school.
- **Field ecology:** For students interested in field-based ecology. Students with this option spend one or two summers taking field courses at the Flathead Lake Biological Station.
- **Genetics and evolution:** For students interested in all aspects of genetics, as well as evolutionary biology, and for students interested in health-related professions.
- **Human biological sciences:** Provides a strong background in the biological sciences for students interested in pursuing further study in a health sciences professional program.

The Division also offers a Bachelor of Arts degree in **Biology** with the following concentrations:

- **Natural history:** For students who would like to combine basic natural history and biological sciences with another field such as art, journalism, or creative writing.
- **Biological Education and General Sciences Broadfield:** Two separate options designed for students interested in a career teaching biology or all sciences at the secondary (middle or high school) level.

The Division also offers a Bachelor of Science degree in **Microbiology**. Microbiology is the study of microorganisms, including bacteria, yeasts, molds, viruses, protozoa and other microscopic parasites. The

Bachelor's degree in Microbiology is offered as a general degree or with a concentration in microbial ecology. The general concentration emphasizes microbial structure, function, and interactions and relationships with humans. The microbial ecology concentration emphasizes microbial structure, function, and interactions and relationships with the environment and other organisms.

The Division also offers a Bachelor of Science degree in **Medical Laboratory Science** (Michael Minnick, Professor of Microbiology, Advisor). Medical Laboratory Science (<http://hs.umt.edu/medtech>) or clinical laboratory science is a combined study of chemistry, physiology and microbiology. A medical laboratory scientist performs chemical, microscopic, and microbiological procedures used in the diagnosis, study and treatment of human disease. Medical laboratory scientists are in high demand in hospitals, clinical labs, research institutions and government health departments. Certification is required for clinical practice.

To become certified, a student, after satisfying the minimum course requirements, completes a clinical practicum of at least 12 consecutive months in a school of medical laboratory science accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). After completing a clinical practicum and passing the American Society for Clinical Pathology (ASCP) Board of Certification examination, the student is certified as a Medical Laboratory Scientist [MLS(ASCP)].

The University of Montana has two coursework tracks for the Medical Laboratory Science B.S. degree. The 3+1 track includes the practicum at one of our affiliated programs as part of the degree, while the practicum is not included in the 4+1 track.

Degree requirements for all three majors and courses are described below (see the College of Forestry and Conservation for information about Wildlife Biology and the Biochemistry Program in the College of Humanities and Sciences for information about Biochemistry).

The Division of Biological Sciences is committed to providing coursework and experiences for non-science majors. The world faces many problems and opportunities that include significant biological components. Courses for non-science majors have the goal of fostering understanding of the process of science and enhancing biological knowledge as it relates to environmental, medical, social, and other issues. A number of introductory courses are open both to majors and non-majors. In addition, the Division offers courses designed specifically for non-majors: Microbiology for Health Sciences, Introductory Ecology, Survey of Montana Wildlife and Habitats, and others.

Undergraduate

- Biology B.A. (p. 185)
- Biology B.A., Biological Education Concentration (p. 170)
- Biology B.A., Natural History Concentration (p. 183)
- Biology B.S., Cellular & Molecular Biology Concentration (p. 172)
- Biology B.S., Ecology and Organismal Biology Concentration (p. 174)
- Biology B.S., Field Ecology Concentration (p. 177)
- Biology B.S., Genetics and Evolution Concentration (p. 179)
- Biology B.S., Human Biological Sciences (p. 181)
- Medical Laboratory Science B.S. (p. 188)
- Microbiology B.S. (p. 192)
- Microbiology B.S., Microbial Ecology Concentration (p. 190)

Undergraduate Minors

- Biology (p. 187)
- Microbiology (p. 194)

Biological Education (Teacher Preparation Biology)

Individuals interested in teaching in K-12 schools must complete a degree in the content area they want to teach plus the teacher preparation program through the Department of Teaching and Learning. Individuals must complete the teaching major/teaching track within that degree program, which may contain different course requirements than the academic major since the sequence of courses is designed to meet state standards. Upon completion of the degree program with the teaching track and the secondary licensure program, one will be eligible for a standard Montana teaching license in this content area.

- Secondary Education Licensure Program (<http://www.coehs.umt.edu/departments/currinst/undergradprograms/seced/default.php>)
- Licensure Degree Requirements (p. 101)

Bachelor of Arts - Biology; Biological Education Concentration

College Humanities & Sciences

Degree Specific Credits: 62

Required Cumulative GPA: 2.75

Catalog Year: 2017-2018

Note: This option provides students with coursework in biology and related science and mathematics needed to be certified by the State of Montana to teach secondary biology (in middle and high school). This concentration is appropriate for students interested in teaching biology in a larger, more urban school. In order to be licensed to teach secondary biology, students must be admitted to the Teacher Education Program through the Phyllis J. Washington College of Education and Human Sciences.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umt.edu/academics/general-education-requirements>) of the catalog.

Summary

Biology/Microbiology Lower Division Core	17
Upper Division Core Courses Required by the Biological Education Concentration	14
Animal-Based Organismal Requirement	3
Required Content Courses Outside of the Major	28
Mathematics - Calculus	
Mathematics - Statistics	
Chemistry	
Physics	
Environmental Geosciences	

Education	
Upper Division Writing Expectation for the Major	3
Secondary Teaching Licensure	
Total Hours	65

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

BIOB 160N	Principles of Living Systems	3
BIOB 161N	Prncpls of Living Systems Lab	1
BIOB 170N	Prncpls Biological Diversity	3
BIOB 171N	Prncpls Biological Dvrsty Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		17

Minimum Required Grade: C-

Upper Division Core Courses Required by the Biological Education Concentration

Rule: All of the following courses are required.

BIOE 370	General Ecology	3
BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 360	General Microbiology	3
BIOM 361	General Microbiology Lab	2
BIOO 433	Plant Physiology	3
BIOO 434	Plant Physiology Lab	1
Total Hours		14

Minimum Required Grade: C-

Animal-Based Organismal Requirement

Rule: Complete one of the following courses

BIOB 301	Developmental Biology	3
or BIOL 435	Comparative Animal Physiology	
Total Hours		3

Minimum Required Grade: C-

Required Content Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Complete one of the following calculus courses

Note: Choose M 171, if you plan to take additional calculus courses, or if you plan a double major or minor in a field that requires more calculus (e.g. math, physics, biochemistry, computer science).

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Mathematics - Statistics

Rule: The following course is required

STAT 216	Introduction to Statistics	4
Total Hours		4

Minimum Required Grade: C-

Chemistry

Rule: All of the following courses are required

CHMY 123	Introduction to Organic and Biochemistry	5
& CHMY 124	and Introduction to Organic and Biochemistry Lab	

Choose one of the Chemistry sequences: 4-10

CHMY 121N Introduction to General Chemistry

CHMY 485 Laboratory Safety

Or (Required for the broadfield teaching concentration)

CHMY 141N College Chemistry I

CHMY 142N College Chemistry I Lab

CHMY 143N College Chemistry II

& CHMY 144N and College Chemistry II Lab

Total Hours 9-15

Minimum Required Grade: C-

Physics

Select one of the following Physics sequences: 10

Algebra- and Trigonometry-based:

PHSX 205N College Physics I
& PHSX 206N and College Physics I Laboratory

PHSX 207N College Physics II
& PHSX 208N and College Physics II Laboratory

Calculus-based:

PHSX 215N Fund of Physics w/Calc I
& PHSX 216N and Physics Laboratory I w/Calc (requires M 171)

PHSX 217N Fund of Physics w/Calc II
& PHSX 218N and Physics Laboratory II w/Calc

Total Hours 10

Minimum Required Grade: C-

Environmental Geosciences

Rule: Complete one of the following courses

GEO 105N	Oceanography	3
or GEO 103N	Introduction to Environmental Geology	

Total Hours 3

Minimum Required Grade: C-

Education

Rule: The following course is required

Note: The course number EDU 497 covers many different teaching method courses. The section of EDU 497 entitled "Methods: 5 - 12 Science" for 3 credits is required for the Biological Education option.

EDU 497	Teaching and Assessing	4
Total Hours		4

Minimum Required Grade: C-

Advanced College Writing Requirement

Rule: Complete the equivalent of a full writing course (either three 1/3 writing courses or one 2/3 writing course + one 1/3 writing course or one complete writing course)

Note: To meet the Advanced College Writing Requirement, Biology students take 2 or 3 partial writing courses (either three 1/3 writing courses or one 1/3 writing course and one 2/3 writing course) or one complete writing course. The Biological Education concentration requires one 2/3 writing course (BIOE 371) and one 1/3 writing course (BIOO 434). No additional courses are needed to meet this requirement.

Minimum Required Grade: C-

1/3 Advanced Writing Courses

BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 403	Vert Design & Evolution	5
BIOE 409	Behavior & Evolution Discussion	1
BIOE 428	Freshwater Ecology	5
BIOL 484	Plant Evolution	3
BIOM 402	Medical Bacteriology& Mycology	3
BIOO 320	General Botany	5
BIOO 434	Plant Physiology Lab	1
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4

Minimum Required Grade: C-

2/3 Advanced Writing Courses

BCH 486	Biochemistry Research Lab	3
BCH 499	Senior Thesis/Capstone	3-6
BIOB 411	Immunology Laboratory	2
BIOB 499	Undergraduate Thesis	3-6
BIOE 342	Field Ecology	5
BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 411	Exprmntl Microbial Genetcs Lab	1
BIOM 499	Undergraduate Thesis	3-6

Minimum Required Grade: C-

Complete Advanced Writing Course

BIOH 462	Principles Medical Physiology	3
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Secondary Teaching Licensure

Note: For endorsement to teach biology, a student also must gain admission to the Teacher Education Program and meet all the requirements for secondary teaching licensure (see the College of Education & Human Sciences (p. 83))

Exception to the Modern/Classical Languages Requirement

Rule: Choose one of the following Math courses

Note: The Division of Biological Sciences has been granted an exception to the Modern/Classical Language Requirement. Either of these Calculus courses (required by the major) will satisfy this requirement.

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Biology - Cellular and Molecular Biology**Bachelor of Science - Biology; Cellular & Molecular Biology Concentration****College Humanities & Sciences**

Degree Specific Credits: 81

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: Cellular and molecular biology is the study of cellular, molecular, and physiological aspects of biology. This concentration is a graduate prep program, and is for students interested in academia or research jobs in private or government laboratories. It is also an excellent concentration for pre-medical sciences students.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Biology/Microbiology Lower Division Core	17
Upper Division Core Courses Required by Cellular & Molecular Biology concentration	20
Additional UD Major Courses Required for the Cellular & Molecular Biology concentration	7-12
Disease Elective	
Additional UD Depth Courses (Lecture)	
Additional UD Depth Courses (Laboratory)	
Required Courses Outside of the Major	37-38
Mathematics - Calculus	
Chemistry	

Additional Depth in Chemistry	
Physics	
Upper Division Writing Expectation for the Major	7-12
Total Hours	88-99

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

BIOB 160N	Principles of Living Systems	3
BIOB 161N	Prncpls of Living Systems Lab	1
BIOB 170N	Prncpls Biological Diversity	3
BIOB 171N	Prncpls Biological Dvrsty Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		17

Minimum Required Grade: C-

Upper Division Core Courses Required by Cellular & Molecular Biology Concentration

Rule: All of the following courses are required.

BCH 480	Advanced Biochemistry I	3
BCH 482	Advanced Biochemistry II	3
BIOB 301	Developmental Biology	3
BIOB 375	General Genetics	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOM 360	General Microbiology	3
BIOM 361	General Microbiology Lab	2
Total Hours		20

Minimum Required Grade: C-

Additional UD Major Courses Required for the Cellular & Molecular Biology Concentration

Rule: Complete one or two courses in each subcategory (as indicated)

Minimum Required Grade: C-

Disease Elective

Select at least one of the following: 3

BIOB 410	Immunology	
BIOM 435	Virology	
Total Hours		3

Minimum Required Grade: C-

Additional UD Depth Courses (Lecture)

Select at least one of the following: 2-4

BIOB 440	Biological Electron Microscopy	
BIOB 468	Endocrinology	

BIOB 483	Phylogenics and Evolution	
BIOB 486	Genomics	
BIOL 435	Comparative Animal Physiology	
BIOM 410	Microbial Genetics	
BIOM 450	Microbial Physiology	
BIOO 433 & BIOO 434	Plant Physiology and Plant Physiology Lab	
Total Hours		2-4

Minimum Required Grade: C-

Additional UD Depth Courses (Laboratory)

Select at least two of the following: 2-5

BCH 486	Biochemistry Research Lab	
BIOB 411	Immunology Laboratory	
BIOM 411	Exprmntl Microbial Genetcs Lab	
BIOM 451	Microbial Physiology Lab	
BIOM 490	Adv Undergrad Research	
Total Hours		2-5

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Required

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Chemistry

Rule: All of the following courses are required.

CHMY 141N	College Chemistry I	4
CHMY 142N	College Chemistry I Lab	1
CHMY 143N	College Chemistry II	4
CHMY 144N	College Chemistry II Lab	1
CHMY 221	Organic Chemistry I	3
CHMY 222	Organic Chemistry I Lab	2
CHMY 223	Organic Chemistry II	3
CHMY 224	Organic Chemistry II Lab	2
Total Hours		20

Minimum Required Grade: C-

Additional Depth in Chemistry

Select at least one of the following: 3-4

CHMY 311	Analytical Chem-Quant Analysis	
CHMY 360	Applied Physical Chemistry	
CHMY 373	Phys Chem-Kntcs & Thrmodynms	
Total Hours		3-4

Minimum Required Grade: C-

Physics

Rule: All of the following courses are required.

Select one of the following physics sequences: 10

Algebra- and Trigonometry-based:

PHSX 205N College Physics I
& PHSX 206N and College Physics I Laboratory

PHSX 207N College Physics II
& PHSX 208N and College Physics II Laboratory

Calculus-based:

PHSX 215N Fund of Physics w/Calc I
& PHSX 216N and Physics Laboratory I w/Calc

PHSX 217N Fund of Physics w/Calc II
& PHSX 218N and Physics Laboratory II w/Calc (require M 171 and M 172)

Total Hours 10

Minimum Required Grade: C-

Advanced College Writing Requirement

Rule: Complete the equivalent of a full writing course (either three 1/3 writing courses or one 2/3 writing course + one 1/3 writing course or one complete writing course)

Note: To meet the Advanced College Writing Requirement, Biology students take 2 or 3 partial writing courses (either three 1/3 writing courses or one 1/3 writing course and one 2/3 writing course) or one complete writing course. The Cellular & Molecular Biology concentration requires two 1/3 writing courses: BCH 482 and BIOB 425. The Advanced College Writing Requirement is completed with one additional course, chosen from any of the following.

Minimum Required Grade: C-

1/3 Advanced Writing Courses

BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 403	Vert Design & Evolution	5
BIOE 409	Behavior & Evolution Discussion	1
BIOE 428	Freshwater Ecology	5
BIOL 484	Plant Evolution	3
BIOM 402	Medical Bacteriology& Mycology	3
BIOO 320	General Botany	5
BIOO 434	Plant Physiology Lab	1
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4

Minimum Required Grade: C-

2/3 Advanced Writing Courses

BCH 486	Biochemistry Research Lab	3
BCH 499	Senior Thesis/Capstone	3-6
BIOB 411	Immunology Laboratory	2
BIOB 499	Undergraduate Thesis	3-6
BIOE 342	Field Ecology	5

BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 411	Exprmntl Microbial Genetcs Lab	1
BIOM 499	Undergraduate Thesis	3-6

Minimum Required Grade: C-

Complete Advanced Writing Course

BIOH 462	Principles Medical Physiology	3
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Minimum Required Grade: C-

Exception to the Modern/Classical Languages Requirement

Rule: Choose one of the following Math courses

Note: The Division of Biological Sciences has been granted an exception to the Modern/Classical Language Requirement. Either of these Calculus courses (required by the major) will satisfy this requirement.

M 162	Applied Calculus	4
or M 171	Calculus I	

Total Hours 4

Minimum Required Grade: C-

Biology - Ecology and Organismal Biology**Bachelor of Science - Biology; Ecology and Organismal Biology Concentration****College Humanities & Sciences**

Degree Specific Credits: 69

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: The Ecology and Organismal Biology concentration is for students interested in the biology of organisms (plants or animals) or the biology of populations or communities. Course offerings include those from organismal biology, ecology, evolutionary biology, and conservation biology. This concentration is a graduate prep program, and it is designed for students interested in academia or employment with government agencies (e.g. National Biological Survey, U.S. FWS, etc.), or environmental consulting agencies. This concentration is also an excellent choice for pre-veterinary students.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements>) of the catalog.

Summary

Biology/Microbiology Lower Division Core	17
Upper Division Core Courses Required by Ecology & Organismal Biology Concentration	5

Additional Upper Division Major Courses Required for the Ecology & Organismal Biology Concentration	21
Organismal Course Requirement	
-ology Course Requirement	
Specialized Ecology Course Requirement	
Evolution Course Requirement	
Required Courses Outside of the Major	26-42
Mathematics - Calculus	
Mathematics - Statistics	
Chemistry	
Physics	
Upper Division Writing Expectation for the Major	3-8
<hr/> Total Hours	<hr/> 72-93

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

BIOB 160N	Principles of Living Systems	3
BIOB 161N	Prncpls of Living Systems Lab	1
BIOB 170N	Prncpls Biological Diversity	3
BIOB 171N	Prncpls Biological Dvrsty Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
<hr/> Total Hours		<hr/> 17

Minimum Required Grade: C-

Upper Division Core Courses Required by Ecology & Organismal Biology Concentration

Select one of the following:	5
BIOE 370 & BIOE 371	General Ecology and Gen Ecology Lab (equiv to 271)
BIOE 342	Field Ecology (taken at the Flathead Lake Biological Station)
<hr/> Total Hours	<hr/> 5

Minimum Required Grade: C-

Additional Upper Division Major Courses Required for the Ecology & Organismal Biology Concentration

Rule: Complete a minimum of 21 credits of UD BIOB, BIOE, BIOH, BIOL, BIOM, BIOO, or BCH, with at least one course from each subcategory

Note: Other recommended courses include BCH 380 or BCH 480-BCH 482.

Minimum Required Grade: C-

21 Total Credits Required

Organismal Course Requirement

Rule: Complete at least one organismal course (lab must also be taken, if available) from the following list

Select at least one of the following:	3-5
BIOB 301	Developmental Biology
BIOB 375	General Genetics
BIOB 468	Endocrinology
BIOE 403	Vert Design & Evolution
BIOL 435	Comparative Animal Physiology
BIOO 433 & BIOO 434	Plant Physiology and Plant Physiology Lab
<hr/> Total Hours	<hr/> 3-5

Minimum Required Grade: C-

-ology Course Requirement

Rule: Complete at least one course with a focus on a group of organisms (lab must also be taken, if available) from the following list

Select at least one of the following:	3-5
BIOM 360 & BIOM 361	General Microbiology and General Microbiology Lab (equiv to 260)
BIOM 427 & BIOM 428	General Parasitology and General Parasitology Lab
BIOO 320	General Botany
BIOO 335	Rocky Mountain Flora
BIOO 340	Biology and Mgmt of Fishes
BIOO 462	Entomology
BIOO 470	Ornithology
BIOO 475	Mammalogy
<hr/> Total Hours	<hr/> 3-5

Minimum Required Grade: C-

Specialized Ecology Course Requirement

Select at least one of the following:	3-5
BIOE 428	Freshwater Ecology
BIOE 448	Terrestrial Plant Ecology
BIOE 449	Plant Biogeography
BIOM 415	Microbial Dvrsty Eclgy & Evltn
WILD 346	Wildlife Physiological Ecology
WILD 470	Conserv of Wildlife Populatns

Flathead Lake Biological Station courses:

BIOE 416	Alpine Ecology
BIOE 439	Stream Ecology
BIOE 440	Conservation Ecology
BIOE 451	Landscape Ecology
BIOE 453	Ecology of Small & Large Lakes
BIOE 458	Forest and Grassland Ecol
<hr/> Total Hours	<hr/> 3-5

Minimum Required Grade: C-

Evolution Course Requirement

Select at least one of the following: 3

BIOB 480	Conservation Genetics	
BIOB 483	Phylogenics and Evolution	
BIOB 486	Genomics	
BIOE 406	Behavior & Evolution	
BIOL 484	Plant Evolution	

Total Hours 3

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus**Rule:** Complete one of the following calculus courses**Note:** Choose M 171, if you plan to take additional calculus courses, or if you plan a double major or minor in a field that requires more calculus (e.g. math, physics, biochemistry, computer science).

M 162	Applied Calculus	4
or M 171	Calculus I	

Total Hours 4

Minimum Required Grade: C-

Mathematics - Statistics**Note:** Choose the full year of statistics for graduate preparation in ecology.

Select either one semester or a full year of statistics from the following: 4-8

One Semester:		
STAT 216	Introduction to Statistics	
Full Year:		
STAT 451 & STAT 452	Statistical Methods I and Statistical Methods II	
STAT 457 & STAT 458	Computer Data Analysis I and Computer Data Analysis II	

Total Hours 4-8

Minimum Required Grade: C-

Chemistry**Note:** Choose the advanced sequence for graduate preparation in organismal biology, or if you are pre-veterinary.

Select either one or two years of chemistry from the following: 8-20

One Year:		
CHMY 121N	Introduction to General Chemistry	
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab	
Two Years:		
CHMY 141N	College Chemistry I	
CHMY 142N	College Chemistry I Lab	
CHMY 143N	College Chemistry II	

CHMY 144N	College Chemistry II Lab	
CHMY 221 & CHMY 222	Organic Chemistry I and Organic Chemistry I Lab	
CHMY 223 & CHMY 224	Organic Chemistry II and Organic Chemistry II Lab	

Total Hours 8-20

Minimum Required Grade: C-

Physics

Select one of the following physics sequences: 10

Algebra- and Trigonometry-based:		
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory	
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory	

Calculus-based:		
PHSX 215N & PHSX 216N	Fund of Physics w/Calc I and Physics Laboratory I w/Calc	
PHSX 217N & PHSX 218N	Fund of Physics w/Calc II and Physics Laboratory II w/Calc (require M 171 and M 172)	

Total Hours 10

Minimum Required Grade: C-

Advanced College Writing Requirement**Rule:** Complete the equivalent of a full writing course (either three 1/3 writing courses or one 2/3 writing course + one 1/3 writing course or one complete writing course)**Note:** To meet the Advanced College Writing Requirement, Biology students take 2 or 3 partial writing courses (either three 1/3 writing courses or one 1/3 writing course and one 2/3 writing course) or one complete writing course. The Ecology & Organismal Biology concentration requires one 2/3 writing course (BIOE 371). The Advanced College Writing Requirement is completed with one more course, chosen from any of the following.

Minimum Required Grade: C-

1/3 Advanced Writing Courses

BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 403	Vert Design & Evolution	5
BIOE 409	Behavior & Evolution Discussion	1
BIOE 428	Freshwater Ecology	5
BIOL 484	Plant Evolution	3
BIOM 402	Medical Bacteriology& Mycology	3
BIOO 320	General Botany	5
BIOO 434	Plant Physiology Lab	1
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4

Minimum Required Grade: C-

2/3 Advanced Writing Courses

BCH 486	Biochemistry Research Lab	3
BCH 499	Senior Thesis/Capstone	3-6
BIOB 411	Immunology Laboratory	2
BIOB 499	Undergraduate Thesis	3-6
BIOE 342	Field Ecology	5
BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 411	Exprmntl Microbial Genetcs Lab	1
BIOM 499	Undergraduate Thesis	3-6

Minimum Required Grade: C-

Complete Advanced Writing Course

BIOH 462	Principles Medical Physiology	3
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Exception to the Modern/Classical Languages Requirement

Rule: Choose one of the following Math courses

Note: The Division of Biological Sciences has been granted an exception to the Modern/Classical Language Requirement. Either of these Calculus courses (required by the major) will satisfy this requirement.

M 162	Applied Calculus	4
or M 171	Calculus I	

Total Hours		4
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Minimum Required Grade: C-

Biology - Field Ecology Bachelor of Science - Biology; Field Ecology Concentration

College Humanities & Sciences

Degree Specific Credits: 69

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: The Field Ecology Concentration is for students interested in field-based ecology. Students with this concentration spend one or two summers taking field courses at the Flathead Lake Biological Station (<http://flbs.umt.edu>). This concentration is a graduate prep program, and is for students interested in academia or employment at a governmental, private or non-profit agency.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umt.edu/academics/general-education-requirements>) of the catalog.

Summary

Biology/Microbiology Lower Division Core	17
Upper Division Core Courses Required for the Field Ecology Concentration	5

Additional Upper Division Major Courses Required for the Field Ecology Concentration	8
Evolution Course Requirement	
-ology Course Requirement	
Ecology Requirement at the Flathead Lake Biological Station	13
Aquatic Emphasis	
Terrestrial Emphasis	
Required Courses Outside of the Major	26-42
Mathematics - Calculus	
Mathematics - Statistics	
Chemistry	
Physics	
Upper Division Writing Expectations for the Major	8-13
Total Hours	77-98

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

BIOB 160N	Principles of Living Systems	3
BIOB 161N	Prncpls of Living Systems Lab	1
BIOB 170N	Prncpls Biological Diversity	3
BIOB 171N	Prncpls Biological Dvrsty Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		17

Minimum Required Grade: C-

Upper Division Core Courses Required for the Field Ecology Concentration

Select one of the following:	5	
BIOE 342	Field Ecology (at Flathead Lake Biological Station)	
BIOE 370 & BIOE 371	General Ecology and Gen Ecology Lab (equiv to 271)	
Total Hours		5

Minimum Required Grade: C-

Additional Upper Division Major Courses Required for the Field Ecology Concentration

Rule: Complete a minimum of 8 credits of Upper Division Biology or Microbiology, with at least one course from each subcategory

Minimum Required Grade: C-

8 Total Credits Required

Evolution Course Requirement

Rule: Complete at least one evolutionary biology course from the following list

Select at least one of the following: 3

BIOB 480	Conservation Genetics	
BIOB 483	Phylogenics and Evolution	
BIOB 486	Genomics	
BIOE 406	Behavior & Evolution	
BIOL 484	Plant Evolution	

Total Hours 3

Minimum Required Grade: C-

-Ology Course Requirement

Select at least one of the following: 3-5

BIOM 360 & BIOM 361	General Microbiology and General Microbiology Lab (equiv to 260)	
BIOM 427 & BIOM 428	General Parasitology and General Parasitology Lab	
BIOO 320	General Botany	
BIOO 335	Rocky Mountain Flora	
BIOO 340	Biology and Mgmt of Fishes	
BIOO 462	Entomology	
BIOO 470	Ornithology	
BIOO 475	Mammalogy	

Total Hours 3-5

Minimum Required Grade: C-

Ecology Requirement at the Flathead Lake Biological Station

Rule: Complete either the Aquatic Emphasis or the Terrestrial Emphasis

Minimum Required Grade: C-

Aquatic Emphasis

Rule: All of the following courses are required for the Aquatic Emphasis

BIOE 439	Stream Ecology	3
BIOE 440	Conservation Ecology	3
BIOE 451	Landscape Ecology	3
BIOE 453	Ecology of Small & Large Lakes	3
BIOL 492	Seminars in Ecol & Res Man	1

Total Hours 13

Minimum Required Grade: C-

Terrestrial Emphasis

Rule: All of the following courses are required for the Terrestrial Emphasis

BIOE 416	Alpine Ecology	3
BIOE 440	Conservation Ecology	3
BIOE 451	Landscape Ecology	3
BIOE 458	Forest and Grassland Ecol	3

BIOL 492	Seminars in Ecol & Res Man	1
Total Hours		13

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Required

M 162	Applied Calculus	4
or M 171	Calculus I	

Total Hours 4

Minimum Required Grade: C-

Mathematics - Statistics

Select either one semester or a full year of statistics from the following: 4-8

One Semester:		
STAT 216	Introduction to Statistics	
Full Year:		
STAT 451	Statistical Methods I	
& STAT 452	and Statistical Methods II	
STAT 457	Computer Data Analysis I	
& STAT 458	and Computer Data Analysis II	

Total Hours 4-8

Minimum Required Grade: C-

Chemistry

Select either one or two years of chemistry from the following: 8-20

One Year:		
CHMY 121N	Introduction to General Chemistry	
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab	

Two Years:

CHMY 141N	College Chemistry I	
CHMY 142N	College Chemistry I Lab	
CHMY 143N	College Chemistry II	
CHMY 144N	College Chemistry II Lab	
CHMY 221 & CHMY 222	Organic Chemistry I and Organic Chemistry I Lab	
CHMY 223 & CHMY 224	Organic Chemistry II and Organic Chemistry II Lab	

Total Hours 8-20

Minimum Required Grade: C-

Physics

Select one of the following physics sequences: 10

Algebra- and Trigonometry-based:		
PHSX 205N	College Physics I	
& PHSX 206N	and College Physics I Laboratory	

PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory	
Calculus-based:		
PHSX 215N & PHSX 216N	Fund of Physics w/Calc I and Physics Laboratory I w/Calc	
PHSX 217N & PHSX 218N	Fund of Physics w/Calc II and Physics Laboratory II w/Calc	
Total Hours		10
Minimum Required Grade: C-		

Advanced College Writing Requirement

Rule: Complete the equivalent of a full writing course (either three 1/3 writing courses or one 2/3 writing course + one 1/3 writing course or one complete writing course)

Note: To meet the Advanced College Writing Requirement, Biology students take 2 or 3 partial writing courses (either three 1/3 writing courses or one 1/3 writing course and one 2/3 writing course) or one complete writing course. The Field Ecology concentration requires BIOE 371 or BIOE 342 (both 2/3 writing courses). The Advanced College Writing Requirement is completed with one additional course, chosen from any of the following.

Minimum Required Grade: C-

1/3 Advanced Writing Courses

BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 403	Vert Design & Evolution	5
BIOE 409	Behavior & Evolution Discussion	1
BIOE 428	Freshwater Ecology	5
BIOL 484	Plant Evolution	3
BIOM 402	Medical Bacteriology& Mycology	3
BIOO 320	General Botany	5
BIOO 434	Plant Physiology Lab	1
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4

Minimum Required Grade: C-

2/3 Advanced Writing Courses

BCH 486	Biochemistry Research Lab	3
BCH 499	Senior Thesis/Capstone	3-6
BIOB 411	Immunology Laboratory	2
BIOB 499	Undergraduate Thesis	3-6
BIOE 342	Field Ecology	5
BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 411	Exprmntl Microbial Genetcs Lab	1
BIOM 499	Undergraduate Thesis	3-6

Minimum Required Grade: C-

Complete Advanced Writing Course

BIOH 462	Principles Medical Physiology	3
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Exception to the Modern/Classical Languages Requirement

Rule: Choose one of the following Math courses

Note: The Division of Biological Sciences has been granted an exception to the Modern/Classical Language Requirement. Either of these Calculus courses (required by the major) will satisfy this requirement.

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Biology - Genetics and Evolution Bachelor of Science - Biology; Genetics and Evolution Concentration

College Humanities & Sciences

Degree Specific Credits: 70

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: The Genetics and Evolution Concentration is for students interested in genetics and evolutionary biology, including molecular genetics, population genetics, ecological genetics, and genomics. This concentration is a graduate prep program, and is for students interested in academia or research jobs in private or government laboratories. It is also an excellent concentration for students interested in a professional health program such as medical school or a genetic counseling graduate program.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umt.edu/academics/general-education-requirements>) of the catalog.

Summary

Biology/Microbiology Lower Division Core	17
Upper Division Core Courses Required by the Genetics & Evolution Concentration	11
Additional UD Major Courses Required for the Genetics & Evolution Concentration	16-22
Biochemistry	
Genetics/Evolution Depth Courses	
Physiology Requirement	
Required Courses Outside of the Major	26-42
Mathematics - Calculus	
Mathematics - Statistics	
Chemistry	
Physics	

Upper Division Writing Expectation for the Major	3-8
Total Hours	73-100

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

BIOB 160N	Principles of Living Systems	3
BIOB 161N	Prncpls of Living Systems Lab	1
BIOB 170N	Prncpls Biological Diversity	3
BIOB 171N	Prncpls Biological Dvrsty Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		17

Minimum Required Grade: C-

Upper Division Core Courses Required by the Genetics & Evolution Concentration

Rule: All of the following courses are required.

BIOB 375	General Genetics	3
BIOB 486	Genomics	3
BIOE 370	General Ecology	3
BIOE 371	Gen Ecology Lab (equiv to 271)	2
Total Hours		11

Minimum Required Grade: C-

Additional UD Major Courses Required for the Genetics & Evolution Concentration

Minimum Required Grade: C-

Biochemistry

Note: If introductory chemistry is completed, then BCH 380 must be taken. Either BCH 380 or BCH 480-BCH 482 may be taken if the advanced chemistry sequence is completed.

Select one of the following: 4-6

BCH 380	Biochemistry	
BCH 480 & BCH 482	Advanced Biochemistry I and Advanced Biochemistry II	
Total Hours		4-6

Minimum Required Grade: C-

Genetics/Evolution Depth Courses

Select at least three of the following: 9-12

BIOB 480	Conservation Genetics	
BIOB 483	Phylogenics and Evolution	
BIOB 488	Programming for Biology	
BIOE 403	Vert Design & Evolution	
BIOE 406	Behavior & Evolution	

BIOL 484	Plant Evolution	
BIOM 410	Microbial Genetics	
BIOM 415	Microbial Dvrsty Eclgy & Evltn	
CSCI 451	Computational Biology	
Total Hours		9-12

Minimum Required Grade: C-

Physiology Requirement

Select at least one of the following (labs must be taken if available): 3-4

BIOB 425	Adv Cell & Molecular Biology	
BIOL 435	Comparative Animal Physiology	
BIOM 450 & BIOM 451	Microbial Physiology and Microbial Physiology Lab	
BIOO 433 & BIOO 434	Plant Physiology and Plant Physiology Lab	
Total Hours		3-4

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Complete one of the following calculus courses

Note: Choose M 171 if you plan to take additional calculus courses, or if you plan a double major or minor in a field that requires more calculus (e.g. math, physics, biochemistry, computer science).

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Mathematics - Statistics

Select either one semester or a full year of statistics from the following: 4-8

One Semester:		
STAT 216	Introduction to Statistics	
Full Year:		
STAT 451 & STAT 452	Statistical Methods I and Statistical Methods II	
STAT 457 & STAT 458	Computer Data Analysis I and Computer Data Analysis II	
Total Hours		4-8

Minimum Required Grade: C-

Chemistry

Select either one or two years of chemistry from the following: 8-20

One Year:		
CHMY 121N	Introduction to General Chemistry	
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab	