

# College of Agriculture, Biotechnology and Natural Resources

David G. Thawley, Dean  
Fleischmann Agriculture Building  
(775) 784-1660

## Departments of Instruction:

Animal Biotechnology  
School of Veterinary Medicine  
Medicine Biochemistry and Molecular Biology  
Natural Resources and Environmental Science  
Nutrition  
Resource Economics

The mission of the College is to educate students as they endeavor to enhance quality of life and economic vitality through the responsible use of plant, animal and other natural resources utilizing advances in biological technologies and the environmental sciences. Central to this mission is the protection, utilization and management of the soil, water, air, plant, animal, and human resources; the economic vitality of the agriculture industry; the development and implementation of technologies; and the quality of the environment. Of equal importance is a concern for the proper utilization of food in promoting healthier diets, as well as the social and economic well-being of individuals, families and society.

## Instructional Programs

The college provides instructional programs that emphasize applications of science, technology and theory. Excellent field and laboratory facilities provide students with realistic educational experiences. These programs prepare students for careers in agriculture, natural resource management, environmental science, state of the art biotechnology, dietetics and nutrition, veterinary medicine, medicine and policy making positions in the agriculture and environmental protection industries.

## Certificates

The College of Agriculture, Biotechnology and Natural Resources grants certificates for the successful completion of at least 75 credits toward a bachelor's degree, or for duly-authorized short courses or travel experiences. Students must apply for a certificate at the office of the associate dean.

## Bachelor's Degree Programs

The College of Agriculture, Biotechnology and Natural Resources offers the bachelor of science degree with majors in agricultural and applied economics; animal science, with an additional specialization in rangeland livestock production; biochemistry; biotechnology; environmental science; ecophysiology; forest and rangeland management; and wildlife ecology and conservation; environmental and resource economics; and veterinary science. An agricultural education degree is offered by the College of Education.

By selecting appropriate study options, students may specialize within their major. Each option includes certain required courses and electives to be selected in consultation with the student's advisor.

In order to graduate, students who major in College of Agriculture, Biotechnology and Natural Resources degree programs must complete a minimum of 128 credits. At least 40 of those credits must be in upper-division courses.

## Agricultural Education Major

The College of Agriculture, Biotechnology and Natural Resources and the College of Education have implemented a cooperative

agreement to prepare teachers of agriculture. **Students who seek careers as teachers of agriculture should enroll in the secondary education program in the College of Education's department of curriculum, teaching and learning.** They should complete the professional teaching courses in secondary education and occupational education.

Students will be required to take at least 36 credits of approved course work in the College of Agriculture, Biotechnology and Natural Resources to earn a major certification to teach agriculture education. In order to receive a teaching minor in agriculture education, students must complete 24 credits in the College of Agriculture, Biotechnology and Natural Resources.

For further information, contact either the College of Agriculture, Biotechnology and Natural Resources' associate dean for resident instruction or the occupational education coordinator in the College of Education's Curriculum, Teaching, and Learning Department.

## ANIMAL BIOTECHNOLOGY

### School of Veterinary Medicine

103 Fleischmann Agriculture

(775) 784-6135

The major in Animal Biotechnology is designed to prepare undergraduate students for outstanding careers working with domestic animals in the biotechnology industry or to continue with graduate or professional studies in biotechnology, veterinary and human medicine, respectively. The discipline is intended to stream large animal biotechnology into veterinary and human medicine. A major in Animal Biotechnology provides students with a unique scientific platform from which to pursue multiple levels of employment in a series of biotechnologically related fields. These cannot be effectively pursued without a strong scientific background that includes exposure to the latest technologies and development of critical problem solving skills.

## Bachelor of Science Animal Biotechnology Major

	Credits
<b>I. UNIVERSITY CORE CURRICULUM REQUIREMENTS</b> .....	<b>39-44</b>
<b>NOTE:</b> Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".	
<b>A. English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
<b>NOTE:</b> Students who place in ENG 102 are not required to complete ENG 101.	
<b>B. Mathematics—4 credits</b>	
MATH 181—Calculus I .....	4
<b>C. Natural Sciences—8 credits</b>	
CHEM 121-122—General Chemistry I and II <b>OR</b>	
CHEM 201-202—General Chemistry for Scientists and Engineers I and II.....	8
<b>D. Social Science—3 credits</b>	
Refer to the "Social Science" section of the Core Curriculum chapter in this catalog.....	3

<b>E. Fine Arts—3 credits</b>	
Refer to the “Fine Arts” section of the Core Curriculum chapter in this catalog.....	3
<b>F. Core Humanities—9 credits</b>	
CH 201—Ancient and Medieval Cultures .....	3
CH 202—The Modern World .....	3
CH 203—American Experiences and Constitutional Change.....	3
<b>G. Capstone Courses—6 credits</b>	
ANSC 415—Economics and Ethics of Biotechnology .....	3
VM 481—Animals in Human Culture .....	3
<b>H. Diversity—3 credits</b>	
Refer to the “Diversity” section of the Core Curriculum chapter of this catalog.....	3
<b>II. ADDITIONAL COLLEGE REQUIREMENTS.....</b>	<b>0</b>
<b>III. MAJOR REQUIREMENTS.....</b>	<b>79-85</b>
<b>A. Group One Department Requirements—23 credits</b>	
ANSC 100—Elements of Livestock Production .....	3
ANSC 101—Introduction to Biotechnology.....	2
APST 270—Introduction to Statistical Methods .....	4
BIOL 190—Introduction to Cell and Molecular Biology.....	3
BIOL 191—Introduction to Organismal Biology.....	3
PHYS 151 R—General Physics I & Laboratory.....	4
PHYS 152 R—General Physics II & Laboratory.....	4
<b>B. Group Two Department Requirements—37 credits</b>	
ANSC 327—Animal Physiology: Cells to Systems.....	3
ANSC 316, 416—Internships.....	3
ANSC 325—Animal Genetics.....	3
ANSC 429—Biotechniques.....	3
BCH 303—Biochemical Analysis <b>OR</b>	
BIOL 192—Principles of Biological Investigation.....	2
BCH 400—Introductory Biochemistry.....	4
BCH 403—Biochemistry Laboratory.....	2
BCH 405—Molecular Biology.....	3
BCH 406—Molecular Biology Lab.....	3
BIOL 315 R—Cell Biology .....	3
CHEM 241—Organic Chemistry I <b>OR</b>	
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
CHEM 242—Organic Chemistry II <b>OR</b>	
CHEM 342—Organic Chemistry for Scientists and Professionals II.....	3
CHEM 345—Organic Chemistry Laboratory <b>OR</b>	
CHEM 347—Laboratory Techniques of Organic Chemistry II.....	2
<b>C. Electives.....</b>	<b>19-25</b>
Students must consult with department advisor for selection of appropriate elective courses.	
<b>IV. TOTAL CREDITS.....</b>	<b>128</b>
40 credits of the total must be upper-division courses.	
<b>V. RECOMMENDED SCHEDULE</b>	
<b>First Year - First Semester</b>	
CHEM 121—General Chemistry I <b>OR</b>	
CHEM 201—General Chemistry for Scientists and Engineers I.....	4
MATH 181—Calculus I.....	4
ENG 101—Composition I.....	3
ANSC 100—Elements of Livestock Production (Fall Only)3	
ANSC 101—Introduction to Biotechnology (Fall Only).....	2
TOTAL.....	16
<b>First Year - Second Semester</b>	
CHEM 122—General Chemistry II <b>OR</b>	
CHEM 202—General Chemistry for Scientist and Engineers II.....	4
ENG 102—Composition II.....	3
BIOL 190—Cell & Molecular Biology.....	3
PHYS 151 R—General Physics I & Laboratory.....	4
Core Social Sciences.....	3
TOTAL.....	17
<b>Second Year - First Semester</b>	
CHEM 241—Organic Chemistry I <b>OR</b>	
CHEM 341—Organic Chemistry for Scientists and Professionals.....	3
BIOL 191—Organismal Biology.....	3
CH 201—Ancient and Medieval Cultures.....	3
APST 270—Introduction to Statistical Methods .....	4
PHYS 152 R—General Physics II & Laboratory.....	4
TOTAL.....	17
<b>Second Year - Second Semester</b>	
CHEM 242—Organic Chemistry II <b>OR</b>	
CHEM 342—Organic Chemistry for Scientists and Professionals II.....	3
CHEM 345—Organic Chemistry Lab <b>OR</b>	
CHEM 347—Laboratory Techniques of Organic Chemistry I.....	2
Core Fine Arts.....	3
CH 202—The Modern World .....	3
BCH 303—Biochemical Analysis (Spring Only) <b>OR</b>	
BIOL 192—Principles of Biological Investigation.....	2
ANSC 325—Animal Genetics (Spring Only).....	3
TOTAL.....	16
<b>Third Year - First Semester</b>	
BCH 400—Introductory Biochemistry .....	4
ANSC 316 or 416—Internships (Fall Only) .....	3
ANSC 327—Animal Physiology: Cells to System (Fall Only) .....	3
BCH 403—Biochemistry Laboratory (Fall Only).....	2
BIOL 315—Cell Biology .....	3
Elective .....	1
TOTAL.....	16
<b>Third Year - Second Semester</b>	
BCH 405—Molecular Biology (Spring Only) .....	3
BCH 406—Molecular Biology Lab (Spring Only).....	3
CH 203—American Experiences & Constitutional Change.....	3
Diversity .....	3
Elective .....	3
TOTAL.....	15
<b>Fourth Year - First Semester</b>	
ANSC 415—Economics and Ethics of Biotechnology - CAPSTONE (Fall Only) .....	3
VM 481—Animals in Human Culture - CAPSTONE (Fall Only) .....	3
Elective.....	13
TOTAL.....	19
<b>Fourth Year - Second Semester</b>	
ANSC 429—Biotechniques (Spring Only).....	3
Elective .....	13
TOTAL.....	16
<b>Animal Science Major</b>	
Students majoring in animal science prepare for careers in livestock production, as well as in the business, education, research and services related to livestock. Professional opportunities include: beef cattle ranching, meat processing and production, livestock extension, university teaching and research, livestock consulting, market livestock analysis, and work as an animal recreationist.	

## Bachelor of Science Animal Science Major

### I. UNIVERSITY CORE CURRICULUM REQUIREMENTS.....38-46

NOTE: Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".

#### A. English—3-8 credits

Refer to the "English" section of the Core Curriculum chapter in this catalog.....3-8

NOTE: Students who place in ENG 102 are not required to complete ENG 101.

#### B. Mathematics—3-6 credits

Select one of the following courses.....3-6

MATH 126 R—Precalculus I AND

MATH 127 R—Precalculus II (6 credits) OR

MATH 128—Precalculus and Trigonometry (5 credits) OR

MATH 181—Calculus I (4 credits)

#### C. Natural Sciences—8 credits

CHEM 121—General Chemistry I.....4

CHEM 122—General Chemistry II.....4

#### D. Social Science—3 credits

Refer to the "Social Science" section of the Core Curriculum chapter in this catalog.....3

#### E. Fine Arts—3 credits

Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....3

#### F. Core Humanities—9 credits

CH 201—Ancient and Medieval Cultures .....3

CH 202—The Modern World .....3

CH 203—American Experiences and Constitutional Change .....3

#### G. Capstone Courses—6 credits

VM 481—Animals in Human Culture OR

ANSC 415—Economics and Ethics of Biotechnology.....3

Additional acceptable capstone course.....3

#### H. Diversity—3 credits

Refer to the "Diversity" section of the Core Curriculum chapter of this catalog.....3

### II. ADDITIONAL COLLEGE REQUIREMENTS.....0

### III. MAJOR REQUIREMENTS.....84-90

#### A. Group One Department Requirements—24 credits

ANSC 100—Elements of Livestock Production .....3

ANSC 211—Fundamentals of Animal Nutrition.....3

APST 270—Introduction to Statistical Methods .....4

BIOL 190—Introduction to Cell and Molecular Biology.....3

BIOL 191—Introduction to Organismal Biology.....3

BIOL 192—Principles of Biological Investigation.....2

CHEM 220A—Introductory Organic Chemistry

Lecture OR

CHEM 241—Organic Chemistry I OR

CHEM 341—Organic Chemistry for Scientists and Professionals I.....3

COM 113—Fundamentals of Speech Communication.....3

#### B. Group Two Department Requirements—36-38 credits

ANSC 309—Physiology of Reproduction .....3

ANSC 413—Range-Livestock Interaction.....3

ANSC 325—Animal Genetics OR

BIOL 300—Principles of Genetics .....3

BCH 400—Introductory Biochemistry.....4

ANSC 400—Seminar .....1

ANSC 327—Animal Physiology: Cells to Systems.....3

ANSC 406—Advanced Nutrition Management.....4

VM 328—Veterinary Physiology and Applied Anatomy ..4

VM 470—Agro-Bioterrorism; Agriculture & Public

Health.....3

VM 475—Diseases of Domestic Animals.....3

Animal science electives.....5-7

#### Select two courses from the following list:

ANSC 410—Sheep Management (3 credits)

ANSC 411 R—Small Ruminant Animal Management (4 credits)

ANSC 416—Internship (3 credits)

ANSC 418—Beef Cattle Management (3 credits)

ANSC 450 R—Equine Production (2 credits)

#### C. Electives.....20-30

Students must consult with department advisor for selection of appropriate elective courses.

### IV. MINOR REQUIREMENTS.....0

### V. TOTAL CREDITS.....128

### VI. RECOMMENDED SCHEDULE

#### First Year - First Semester

CHEM 121—General Chemistry I.....4

MATH 126 R & 127 R or 128 or 181 Math Requirement 3-6

ENG 101—Composition I.....3

ANSC 100—Elements of Livestock Production (Fall Only)3

Elective .....1-3

TOTAL .....14-18

NOTE: If MATH 128 is taken, take 1 credit elective. If

MATH 181 is taken, take 2 credits elective

#### First Year - Second Semester

CHEM 122—General Chemistry II.....4

Core Fine Arts.....3

ENG 102—Composition II .....3

Diversity .....3

BIOL 190—Cell & Molecular Biology .....3

TOTAL .....16

#### Second Year - First Semester

BIOL 191—Organismal Biology .....3

BIOL 192—Biological Investigation .....2

ANSC 211—Fundamentals of Animal Nutrition .....3

APST 270—Introduction to Statistical Methods .....4

CH 201—Ancient and Medieval Cultures.....3

Elective .....3

TOTAL .....18

#### Second Year - Second Semester

Core Social Science.....3

Directed Animal Science Elective.....3

Free Elective.....1

ANSC 325—Animal Genetics OR

BIOL 300—Principles of Genetics (ANSC 325 Spring Only).....3

CH 202—The Modern World .....3

COM 113—Fundamentals of Speech Communication .....3

TOTAL .....16

#### Third Year - First Semester

CHEM 220A—Introductory Organic Chemistry Lecture

OR CHEM 241—Organic Chemistry I

OR CHEM 341—Organic Chemistry for Scientists

and Professionals I .....3

ANSC 406—Advanced Nutrition Management

(Fall Only) .....4

Directed Animal Science Elective.....3

Directed Animal Science Elective.....3

CH 203—American Experiences and Constitutional

Change .....3

TOTAL .....16

**Third Year - Second Semester**

VM 328—Veterinary Physiology and Applied Anatomy (Spring Only) .....	4
Directed Animal Science Elective.....	6
ANSC 400—Seminar .....	1
ANSC 413—Range-Livestock Interaction.....	3
Free Elective.....	2
TOTAL .....	16

**Fourth Year - First Semester**

ANSC 309—Physiology of Reproduction (Fall Only).....	3
ANSC 327—Animal Physiology: Cells to Systems (Fall Only) .....	3
BCH 400—Introductory Biochemistry.....	4
VM 481—Animals in Human Culture (Fall Only).....	3
Free Elective.....	1
Directed Animal Science Elective.....	3
TOTAL .....	17

**Fourth Year - Second Semester**

Capstone Elective Acceptable Capstone.....	3
ANSC Production Course (ANSC 410, 411 R, or 418) (Spring Only) OR	
ANSC 416 Internship .....	3
ANSC Production Course (ANSC 410, 411 R, or 418) (Spring Only) .....	3
VM 470—Agro-Bioterrorism; Agriculture & Public Health.....	3
VM 475—Diseases of Domestic Animals.....	3
Free Elective.....	1
TOTAL .....	16

NOTE: Classes within the following disciplines may fulfill ANSC directed elective requirements: ANSC, APST, BCH, BIOL, CHEM, GEOG, MATH, and NRES. Please contact your advisor for the selected class list.

## Bachelor of Science Animal Science Major RANGELAND LIVESTOCK PRODUCTION SPECIALIZATION

	Credits
<b>I. UNIVERSITY CORE CURRICULUM REQUIREMENTS.....</b>	<b>38-46</b>
NOTE: Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".	
<b>A. English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
NOTE: Students who place in ENG 102 are not required to complete ENG 101.	
<b>B. Mathematics—3-6 credits</b>	
Select one of the following courses:	
MATH 126 R & 127 R—Precalculus I & II (6 credits) OR	
MATH 128—Precalculus and Trigonometry (5 credits) OR	
MATH 176—Introductory Calculus for Business and Social Sciences (3 credits) OR	
MATH 181—Calculus I (4 credits)	
<b>C. Natural Sciences—8 credits</b>	
CHEM 121—General Chemistry I .....	4
CHEM 122—General Chemistry II.....	4
<b>D. Social Science—3 credits</b>	
RECO 202—Natural Resources, the Environment and the Economy.....	3
<b>E. Fine Arts—3 credits</b>	
Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....	3

**E. Core Humanities—9 credits**

CH 201—Ancient and Medieval Cultures .....	3
CH 202—The Modern World .....	3
CH 203—American Experiences and Constitutional Change.....	3

**G. Capstone Courses—6 credits**

VM 481—Animals in Human Culture .....	3
RECO 466—Natural Resources and Environmental Economics.....	3

**H. Diversity—3 credits**

Refer to the "Diversity" section of the Core Curriculum chapter of this catalog.....	3
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**II. ADDITIONAL COLLEGE REQUIREMENTS.....0****III. MAJOR REQUIREMENTS.....84-90****A. Group One Department Requirements—25 credits**

ANSC 100—Elements of Livestock Production .....	3
APST 270—Introduction to Statistical Methods .....	4
BIOL 190—Introduction to Cell and Molecular Biology.....	3
BIOL 191—Introduction to Organismal Biology .....	3
CHEM 220A—Introductory Organic Chemistry Lecture OR	
CHEM 241—Organic Chemistry I OR	
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
NRES 322—Soils.....	3
COM 113—Fundamentals of Speech Communication .....	3
COM 101—Oral Communication OR	
COM 434—Communication and Conflict Resolution.....	3

**B. Group Two Department Requirements—51-53 credits**

ANSC 325—Animal Genetics.....	3
ANSC 400—Seminar.....	1
ANSC 406—Advanced Nutrition Management.....	4
ANSC 408—Rangeland Ecosystems .....	5
ANSC 410—Sheep Management OR	
ANSC 418—Beef Cattle Management.....	3
ANSC 413—Range-Livestock Interaction.....	3
BCH 410—Plant Physiology OR	
NRES 406 R - Ecophysiology of Forest & Range Plants ..	3-4
NRES 295—Principles of Ecohydrology OR	
NRES 310—Wildlife Conservation OR	
NRES 421—Conservation Biology OR	
GEOG 435—Conservation of Natural Resources .....	3-4
NRES 341—Principles of Range Management.....	3
NRES 345—Range and Forest Plants .....	5
NRES 407—Forest and Range Measurements.....	5
NRES 460—Rangeland Resource Management .....	3
NRES 498—Rangeland Restoration Ecology.....	3
PSC 403B—Energy Politics and Policy OR	
PSC 403C—Environmental Policy OR	
NRES 494—Range and Forest Administration Policy .....	3
VM 328—Veterinary Physiology and Applied Anatomy ..	4

**C. Electives—4-14 credits**

Students must consult with department advisor for selection of appropriate elective courses.

**IV. MINOR REQUIREMENTS.....0****V. TOTAL CREDITS .....**

40 credits of the total must be upper-division courses.

**VI. RECOMMENDED SCHEDULE**

\*\*\*Students must have advisor approval for course selections each semester\*\*\*

**First Year - First Semester**

CHEM 121—General Chemistry I.....	4
MATH 126 R & 127 R or 128 or 176 or 181 Core Math Requirement.....	3-6
ENG 101—Composition I .....	3
ANSC 100—Elements of Livestock Production (Fall Only).....	3
Free Elective.....	1-3
<b>TOTAL.....</b>	<b>14-19</b>

**First Year - Second Semester**

CHEM 122—General Chemistry II <b>OR</b> CHEM 202—General Chemistry for Scientist and Engineers.....	4
Fine Arts.....	3
ENG 102—Composition II .....	3
COM 113—Fundamentals of Speech Communication.....	3
BIOL 190—Cell & Molecular Biology .....	3
<b>TOTAL.....</b>	<b>16</b>

**Second Year - First Semester**

BIOL 191—Organismal Biology .....	3
CHEM 220A—Introductory Organic Chemistry Lecture <b>OR</b> CHEM 241—Organic Chemistry I <b>OR</b> CHEM 341—Organic Chemistry for Scientists and Professionals I (241 & 341 Fall Only).....	3
NRES 322—Soils.....	3
CH 201—Ancient & Medieval Cultures.....	3
APST 270—Introduction to Statistical Methods .....	4
<b>TOTAL.....</b>	<b>16</b>

**Second Year - Second Semester**

COM 101—Oral Communication <b>OR</b> COM 434 Communication and Conflict Resolution (COM 434 Spring Only) .....	3
ANSC 325—Animal Genetics (Spring Only).....	3
NRES 341—Principles of Range Management (Spring Only) .....	3
RECO 202—Natural Resources, Environment & the Economy (Spring Only).....	3
CH 202—The Modern World .....	3
<b>TOTAL.....</b>	<b>15</b>

**Third Year - First Semester**

NRES 345—Range & Forest Plants (Fall Only).....	5
ANSC 406—Advanced Nutrition Management (Fall Only) .....	4
Diversity .....	3
CH 203—American Experiences & Constitutional Change.....	3
Free Elective.....	1
<b>TOTAL.....</b>	<b>16</b>

**Third Year - Second Semester**

Elective .....	3
ANSC 408—Rangeland Ecosystems (Spring Only).....	5
NRES 460—Rangeland Resource Management (Spring Only-Odd Years).....	3
VM 328—Vet. Physiology & Applied Anatomy.....	4
Free Elective.....	1
<b>TOTAL.....</b>	<b>16</b>

**Fourth Year - First Semester**

VM 481—Animals in Human Culture (Fall Only).....	3
RECO 466—Natural Resources Environment Economics (Fall Only) .....	3
NRES 407—Forest and Range Measurements (Fall Only-Odd Years).....	5
NRES 498—Rangeland Restoration Ecology (Fall Only-Odd Years).....	3
Directed Elective .....	3
<b>TOTAL.....</b>	<b>17</b>

**Fourth Year - Second Semester**

BCH 410—Plant Physiology (Spring Only).....	3
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ANSC 413—Rangeland Livestock Interactions (Spring Only).....	3
ANSC 400—Seminar .....	1
NRES 494—Range & Forest Administration and Policy .....	3
ANSC 410 or 418—Beef Cattle or Sheep Management (Spring Only) .....	3
Directed or Free Elective .....	3
<b>TOTAL.....</b>	<b>16</b>

**Directed Elective:**

Students must select one class from each group.  
 Group 1: NRES 295, 310 or 421;  
 Group 2: NRES 295, GEOG 435, PSC 403C  
 Classes listed above are taught periodically during the following semesters:  
 Spring: NRES 295, 310, 494;  
 Fall: NRES 295, GEOG 435, PSC 403C  
 Students should check the class schedule to determine when classes above are offered.  
 The credits for the Math class taken + the free elective taken the first semester must equal 6 credits.

**Animal Science Minor—20-21 credits**

The minor program is designed for non-majors who seek a background in animal science.

All courses are 3 credits unless otherwise noted.  
 ANSC 100—Elements of Livestock Production  
 ANSC 309—Physiology of Reproduction  
 ANSC 406—Advanced Nutrition Management (4 credits)  
 VM 328—Veterinary Physiology and Applied Anatomy (4 credits)

**Select ONE of the four following courses:**

ANSC 410—Sheep Production **OR**  
 ANSC 411 R—Small Ruminant Animal Management (4 credits) **OR**  
 ANSC 418—Beef Cattle Management **OR**  
 ANSC 450 R—Equine Production (2 credits)

**Select ONE of the two following courses:**

ANSC 413—Range-Livestock Interaction **OR**  
 VM 470—Agro-Bioterrorism; Agriculture & Public Health

**Veterinary Science Program**

The program, offered by the School of Veterinary Medicine, provides a basic pre-professional curriculum that satisfies the entrance requirements for the four-year professional curriculum at various schools of veterinary medicine.

Qualified Nevada residents may participate in a program funded through the Western Interstate Commission for Higher Education (WICHE). The contract program allows Nevada residents access to enrollment at certain professional schools.

The university's pre-professional program offers students intensive advisement, an internship with veterinary practitioners and scholarships from the Gordon MacMillan endowment. Students are selected for the professional program based on the following factors: high academic performance, practical experience in some phase of veterinary medicine, references, motivation, personal interview and results of written examinations.

Students who satisfactorily complete the pre-veterinary curriculum (including the university core and total credit requirements), and who are accepted into a professional program, may qualify for a bachelor of science degree from the university after completing 32 semester credits in a program leading to a doctorate of veterinary medicine at the professional school.

Required and elective courses which will fulfill the entrance requirements for most veterinary schools.

ANSC 100—Elements of Livestock Production .....	3
ANSC 406—Advanced Nutrition Management.....	3

ANSC 410—Sheep Management <b>OR</b>	
ANSC 411 R—Small Ruminant Animal Management (4 credits) <b>OR</b>	
ANSC 418—Beef Cattle Management.....	3
ANSC 325—Animal and Plant Genetics <b>OR</b>	
BIOL 300—Principles of Genetics.....	3
BCH 400—Introductory Biochemistry.....	4
BIOL 190—General Biology I.....	3
BIOL 191—Introduction to Organismal Biology.....	3
BIOL 192—Principles of Biological Investigation.....	2
BIOL 251—Microbiology.....	4
BIOL 368—Parasitology.....	3
BIOL 466—Developmental Biology.....	3
CHEM 121—General Chemistry I.....	4
CHEM 122—General Chemistry II.....	4
CHEM 241—Organic Chemistry I <b>OR</b>	
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
CHEM 242—Organic Chemistry II <b>OR</b>	
CHEM 342—Organic Chemistry for Scientists and Professionals II.....	3
CHEM 345—Organic Chemistry Laboratory.....	2
COM 113—Fundamentals of Speech Communication.....	3
ENG 101—Composition I.....	3
ENG 102—Composition II.....	3
MATH 126 R & 127 R—Precalculus I & II (6 credits) <b>OR</b>	
MATH 128—Precalculus and Trigonometry (5 credits) <b>OR</b>	
MATH 181—Calculus I (4 credits).....	4-6
PHYS 151 R—General Physics I and Lab.....	4
PHYS 152 R—General Physics II and Lab.....	4
VM 100—Veterinary Medicine.....	1
VM 328—Veterinary Physiology and Applied Anatomy.....	4
VM 470—Agro-Bioterrorism; Agriculture & Public Health	3
VM 475—Diseases of Domestic Animals.....	3
Social Science (see Core Curriculum Social Science list).....	6
Humanities/Fine Arts (see Core Curriculum Fine Arts list)	6
<b>Statistics—Select ONE:</b>	
APST 207—Practical Statistics.....	3
APST 270—Introduction to Statistical Methods (Recommended/Required for ANSC Major).....	4
<b>NOTE:</b> Students opting to pursue a bachelor's degree program prior to application to veterinary school should see the animal science program of study. Consult with an advisor prior to entrance into this major.	

**RECOMMENDED SCHEDULE**

\*This program fulfills all requirements for application to veterinary school and a B.S. in Animal Science

**First Year - First Semester**

CHEM 121—General Chemistry.....	4
MATH 128—Precalculus and Trigonometry (5 credits) <b>OR</b>	
MATH 181—(4 credits + 1 credit elective acceptable).....	5
ENG 101—Composition I.....	3
ANSC 100—Elements of Livestock Production (Fall Only)	3
Directed Elective.....	1
TOTAL.....	16

**First Year - Second Semester**

CHEM 122—General Chemistry.....	4
Fine Arts.....	3
ENG 102—Composition II.....	3
APST 207—Practical Statistics (3 credits)* <b>OR</b>	
APST 270—Introduction to Statistical Methods (Recommended/Required for ANSC Major) (4 credits)*	3-4
BIOL 190—Cell & Molecular Biology.....	3
TOTAL.....	16-17

\*Take 2 credits elective if APST 207 taken. Take 1 credit elective if APST 270 taken.

**Second Year - First Semester**

BIOL 191—Organismal Biology.....	3
BIOL 192—Biological Investigation.....	2
CHEM 241—Organic Chemistry I <b>OR</b>	
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
ANSC 211—Fundamentals of Animal Nutrition.....	3
CH 201—Ancient and Medieval Cultures.....	3
Free Elective.....	1-2
TOTAL.....	15-16

**Second Year - Second Semester**

Core Social Science.....	3
CHEM 242—Organic Chemistry II <b>OR</b>	
CHEM 342—Organic Chemistry for Scientists and Professionals II.....	3
CHEM 220L—Organic Chemistry Lab* <b>OR</b>	
CHEM 345—Organic Chemistry Lab*.....	1-2
ANSC 325—Animal Genetics (Spring Only) <b>OR</b>	
BIOL 300—Principles of Genetics.....	3
CH 202—The Modern World.....	3
COM 113—Fundamentals of Speech Communication.....	3
TOTAL.....	16-17

\*Take 1 credit elective if CHEM 220L taken. Take no credits elective if CHEM 345 taken.

**Third Year - First Semester**

BCH 400—Introductory Biochemistry.....	4
ANSC 406—Advanced Nutrition Management (Fall Only).....	4
PHYS 151R—General Physics I and Laboratory.....	4
CH 203—American Experiences and Constitutional Change.....	3
Free elective.....	0-1
TOTAL.....	15-16

**Third Year - Second Semester**

VM 328—Veterinary Physiology and Applied Anatomy (Spring Only).....	4
BIOL 251—General Microbiology (Spring Only).....	4
PHYS 152 R—General Physics II and Laboratory.....	3
BIOL 368—Parasitology.....	3
ANSC 400—Seminar.....	1
Free elective.....	1
TOTAL.....	16

**Fourth Year - First Semester**

VM 481—Animals in Human Culture (Fall Only) <b>OR</b>	
ANSC 415—Ethics and Economics of Biotechnology.....	3
ANSC 309—Physiology of Reproduction (Fall Only).....	3
ANSC 203—Meat Technology (Fall Only).....	3
ANSC 327—Animal Physiology: Cells to Systems (Fall Only).....	3
Directed Elective.....	3
Free Elective.....	1
TOTAL.....	16

**Fourth Year - Second Semester**

Acceptable Capstone/Diversity Course.....	3
ANSC Production Course (ANSC 410, 411 R, or 418) (Spring Only); <b>OR</b>	
ANSC 416—Internship.....	3
ANSC 413—Range-Livestock Interaction (Spring Only).....	3
ANSC Production Course (ANSC 410, 411 R, or 418) (Spring Only).....	3
VM 470—Agro-Bioterrorism; Agriculture & Public Health.....	3
VM 475—Diseases of Domestic Animals.....	3
TOTAL.....	18

## BIOCHEMISTRY AND MOLECULAR BIOLOGY

Howard Medical Sciences  
(775) 784-6031

### Undergraduate Curriculum

An undergraduate major emphasizing biochemistry and molecular biology is offered. The program provides the student with a well-rounded general education emphasizing the biological and chemical sciences and provides specific training in the major field through a sequence of biochemistry and molecular biology courses taken primarily during the student's junior and senior years. A minor in biochemistry is also available.

The bachelor of science degree with a major in biochemistry and molecular biology prepares students for medical school and other professional schools, graduate school, and for careers in life, agricultural and medical sciences. Active areas of research by department faculty include molecular biology, biochemistry and physiology of plants, insects and humans. Students with a specific interest in any of these areas should contact the department as early as possible for advisement.

### Bachelor of Science Biochemistry and Molecular Biology Major

<b>I. UNIVERSITY CORE CURRICULUM REQUIREMENTS</b> .....	<b>39-44</b>
NOTE: Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".	
<b>A. English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
NOTE: Students who place in ENG 102 are not required to complete ENG 101.	
<b>B. Mathematics—4 credits</b>	
MATH 181—Calculus I .....	4
<b>C. Natural Sciences—8 credits—Select one sequence:</b>	
CHEM 121-122—General Chemistry I, II OR	
CHEM 201-202—General Chemistry for Scientists and Engineers I, II.....	8
<b>D. Social Sciences—3 credits</b>	
Refer to the "Social Sciences" section of the Core Curriculum chapter in this catalog.....	3
<b>E. Fine Arts—3 credits</b>	
Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....	3
<b>F. Core Humanities—9 credits</b>	
CH 201—Ancient and Medieval Cultures.....	3
CH 202—The Modern World .....	3
CH 203—American Experiences and Constitutional Change.....	3
<b>G. Capstone Courses—6 credits</b>	
ANSC 415—Ethics and Economics of Biotechnology .....	3
BCH 408—Senior Thesis II.....	3
<b>H. Diversity—3 credits</b>	
Refer to the "Capstone" section of the Core Curriculum chapter of this catalog for diversity courses.	
<b>II. ADDITIONAL COLLEGE REQUIREMENTS</b> .....	<b>0</b>
<b>III. MAJOR REQUIREMENTS</b> .....	<b>70</b>
BIOL 190—Intro to Cell and Molecular Biology .....	3
BIOL 191—Introduction to Organismal Biology.....	3
BIOL 300—Principles of Genetics .....	3
BIOL 315 R—Cell Biology .....	3
BCH 110—Success Strategies in Biochemistry (required of entering fall freshmen only).....	2

BCH 121—Current Issues in Biochemistry and Molecular Biology (required of freshmen only).....	1
BCH 303—Biochemical Analysis.....	2
BCH 400—Introductory Biochemistry.....	4
BCH 403—Biochemistry Laboratory .....	2
BCH 405—Molecular Biology .....	3
BCH 406—Molecular Biology Lab.....	3
BCH 407—Senior Thesis I .....	3
BCH 408—Senior Thesis II (see Core Curriculum Capstone requirement).....	3
BCH 413—Molecular Biophysics .....	3
BCH 417—Metabolic Regulation.....	3
BCH 420—Proseminar .....	1
BCH 421—Proseminar .....	1
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
CHEM 342—Organic Chemistry for Scientists and Professionals II.....	3
CHEM 345—Organic Chemistry Laboratory .....	2
(CHEM 347 accepted with advisor's approval)	
CHEM 425—Biophysical Chemistry.....	3
MATH 182—Calculus II .....	4
PHYS 151 R—General Physics I and Lab OR	
PHYS 180 and 180L—Physics for Scientists and Engineers I and Lab.....	4
PHYS 152 R—General Physics II and Lab OR	
PHYS 181 and 181L—Physics for Scientists and Engineers II and Lab.....	4
APST 270—Introduction to Statistical Methods .....	4
Upper division ANSC, BIOL, CHEM elective.....	3
(BIOL 395 is not an acceptable elective)	

**IV. MINOR REQUIREMENTS**.....**0**

**V. ELECTIVES**.....**14-19**

**VI. TOTAL CREDITS**.....**128**

### VII. RECOMMENDED SCHEDULE

#### First Year-First Semester

CHEM 121—General Chemistry I OR	
CHEM 201—General Chemistry for Scientists & Engineers I.....	4
MATH 181—Calculus I.....	4
ENG 101—Composition I .....	3
Core Curriculum Fine Arts course .....	3
BCH 110—Success Strategies in Biochemistry .....	2
TOTAL .....	16

#### First Year-Second Semester

CHEM 122—General Chemistry II OR	
CHEM 202—General Chemistry for Scientists and Engineers II.....	4
MATH 182—Calculus II .....	4
ENG 102—Composition II.....	3
BCH 121—Current Issues in Biochemistry and Molecular Biology .....	1
BIOL 190—General Biology I.....	3
Elective .....	1
TOTAL .....	16

#### Second Year-First Semester

BIOL 191—Introduction to Organismal Biology .....	3
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
PHYS 151 R—General Physics I and Lab.....	4
APST 270—Introduction to Statistical Methods .....	4

Elective .....	2
TOTAL .....	16
<b>Second Year-Second Semester</b>	
BIOL 300—Principles of Genetics .....	3
BCH 303 Biochemical Analysis.....	2
CH 201—Ancient and Medieval Cultures.....	3
CHEM 342—Organic Chemistry for Scientists and Professionals II .....	3
PHYS 152 R—General Physics II and Lab .....	4
Elective .....	2
TOTAL .....	17
<b>Third Year-First Semester</b>	
BCH 400—Introductory Biochemistry.....	4
BCH 403—Biochemistry Laboratory.....	2
CH 202—The Modern World .....	3
CHEM 345—Organic Chemistry Laboratory .....	2
CHEM 425—Biophysical Chemistry.....	3
Elective .....	2
TOTAL .....	16
<b>Third Year-Second Semester</b>	
BCH 405—Molecular Biology.....	3
BCH 406—Molecular Biology Laboratory .....	3
CH 203—American Experiences and Constitutional Change.....	3
BIOL 315 R—Cell Biology .....	3
Elective .....	4
TOTAL .....	16
<b>Fourth Year-First Semester</b>	
ANSC 415—Biotechnology: Economic and Ethical Issues (Capstone).....	3
BCH 407—Senior Thesis I .....	3
BCH 417—Metabolic Regulation.....	3
BCH 420—Proseminar .....	1
Core Curriculum Social Science .....	3
Elective .....	3
TOTAL .....	16
<b>Fourth Year-Second Semester</b>	
BCH 408—Senior Thesis II (Capstone course) .....	3
BCH 421—Proseminar .....	1
BCH 413—Molecular Biophysics .....	3
Core Curriculum Diversity course .....	3
Biological Science elective.....	3
Elective .....	3
TOTAL .....	16

## Minor in Biochemistry—18 credits

Students majoring in another field may minor in biochemistry by completing the following:

All courses are 3 credits unless otherwise noted.

BCH 400—Introductory Biochemistry (4 credits)

BCH 403—Biochemistry Laboratory (2 credits)

BCH 405—Molecular Biology

BCH 406—Molecular Biology Laboratory

An additional **TWO** courses in the physical sciences, including additional biochemistry (6 credits)

## BIOTECHNOLOGY

### Biotechnology - Combined B.S./M.S. Degree

The College of Agriculture, Biotechnology and Natural Resources offers a unique, focused education program leading to a combined BS and MS degree in Biotechnology. The BS/MS program employs an accelerated curriculum that allows students to complete 124 undergraduate level credits and 30 graduate level credits (15 credits must be at the 700 level or higher) in 5 years. Students

begin graduate level coursework in their 4th year. The program culminates in a non-thesis professional degree suitable for students pursuing research careers in Biotechnology in industrial, academic, private or governmental settings. The curriculum reflects the multidisciplinary nature of the field of Biotechnology and provides a comprehensive background balancing theory, technical skills, and research.

During their first three years of undergraduate study, students from Animal Biotechnology, Biochemistry and Molecular Biology or Biology will prepare for entry into the upper level curriculum of the Biotechnology program while pursuing the normal course of study from their home departments. The required additional coursework has been worked into a Recommended Schedule of Study which is listed for each of the three majors. Students can identify themselves as Biotechnology majors as early as their freshman year in order to receive specialized advisement. However, they must apply in their junior year for entry into the graduate level curriculum (years 4 and 5). Students who do not continue in the program after the third year will be able to finish their BS degrees in their original home departments in their fourth year. During the summer session between years 3 and 4 and between 4 and 5 the students will be involved in research or internship programs. This practical research/ internship experience, combined with the multidisciplinary Core Curriculum and advanced course work are key elements of this accelerated program.

Credits

<b>I. UNIVERSITY CORE CURRICULUM</b>	
<b>REQUIREMENTS.....</b>	<b>39-44</b>
<b>NOTE:</b> Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".	
<b>A. English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
<b>NOTE:</b> Students who place in ENG 102 are not required to complete ENG 101.	
<b>B. Mathematics—4 credits</b>	
MATH 181—Calculus I.....	4
<b>C. Natural Sciences—8 credits</b>	
Select one sequence:	
CHEM 121/122—General Chemistry I, II <b>OR</b>	
CHEM 201/202—General Chemistry for Scientists and Engineers I, II.....	8
<b>D. Social Sciences—3 credits</b>	
Refer to the "Social Sciences" section of the Core Curriculum chapter in this catalog.....	3
<b>E. Fine Arts—3 credits</b>	
Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....	3
<b>F. Core Humanities—9 credits</b>	
CH 201—Ancient and Medieval Cultures .....	3
CH 202—The Modern World .....	3
CH 203—American Experiences and Constitutional Change.....	3
<b>G. Capstone Courses—6 credits</b>	
BIOT 777—Symposium.....	3
ANSC 415—Ethics and Economics of Biotechnology .....	3
<b>H. Diversity—3 credits</b>	
Refer to the "Diversity" section of the Core Curriculum chapter in this catalog.....	3

### II. ADDITIONAL COLLEGE REQUIREMENTS .....

Biotechnology majors are not required to fulfill the Arts and Science foreign language, second social science and humanities requirements.

### III. MAJOR REQUIREMENTS.....

#### A. Animal Biotechnology courses—3 credits

ANSC 415—Ethics and Economics of Biotechnology - (Capstone Requirement)	
ANSC 729—Advanced Biotechniques .....	3
<b>B. Biochemistry courses—13-18 credits**</b>	
BCH 303—Biochemical Analysis <b>OR</b>	
BIOL 192—Principles of Biological Investigation .....	2
BCH 400—Introductory Biochemistry.....	4
BCH 403—Biochemistry Laboratory <b>OR</b>	
BIOL 395—Laboratory in Genetics & Cell Biology .....	2
BCH 405—Molecular Biology.....	3
BCH 406—Molecular Biology Lab.....	3
BCH 705 R—Molecular Genetics.....	3
<b>C. Biology courses—12-16 credits**</b>	
BIOL 190—Introduction to Cell & Molecular Biology.....	3
BIOL 191—Introduction to Organismal Biology.....	3
BIOL 192—Principles of Biological Investigation <b>OR</b>	
BCH 303—Biochemical Analysis.....	2
BIOL 300—Principles of Genetics.....	3
BIOL 315 R—Cell Biology .....	3
BIOL 395—Laboratory in Genetics and Cell Biology <b>OR</b>	
BCH 403—Biochemistry Laboratory.....	2
<b>D. Biotechnology—18 credits</b>	
BIOT 447—Research .....	6
BIOT 495—Seminar.....	2
BIOT 607—Laboratory .....	4
BIOT 647—Research .....	6
BIOT 777—Symposium - Major Capstone (3 credits met by Capstone requirements)	
<b>E. Chemistry courses—8 credits</b>	
Select <b>ONE</b> sequence:	
CHEM 241/242—Organic Chemistry I & II <b>OR</b>	
CHEM 341 /342—Organic Chemistry for Scientists and Professionals I & II.....	6
<b>AND</b>	
CHEM 345—Organic Chemistry Laboratory <b>OR</b>	
CHEM 347—Laboratory Techniques of Organic Chemistry I.....	2
<b>F. Mathematics courses—4 credits</b>	
APST 270—Introduction to Statistical Methods .....	4
<b>G. Microbiology courses—2 credits</b>	
MICR 700—Biotechnology Today and Tomorrow.....	2
<b>H. Physics courses—8 credits</b>	
PHYS 151 R—General Physics I and Lab.....	4
PHYS 152 R—General Physics II and Lab .....	4
**Upon approval of advisor - see recommended schedules	
<b>IVa. GRADUATE ELECTIVES.....</b>	<b>5</b>
Students must consult with program advisor for the selection of appropriate elective course(s).	
<b>IVb. UNDERGRADUATE ELECTIVES.....</b>	<b>33-38</b>
<b>V. TOTAL CREDITS.....</b>	<b>154</b>
<b>VI. RECOMMENDED SCHEDULE</b>	
For students entering through Animal Biotechnology	
<b>First Year - First Semester</b>	
ANSC 100—Elements of Livestock Production (Fall Only)3	
ANSC 101—Introduction to Biotechnology (Fall Only).....	2
CHEM 121—General Chemistry I <b>OR</b>	
CHEM 201—General Chemistry for Scientists and Engineers I .....	4
MATH 181—Calculus I.....	4
ENG 101—Composition I.....	3
TOTAL .....	16

<b>First Year - Second Semester</b>	
CHEM 122—General Chemistry II <b>OR</b>	
CHEM 202—General Chemistry for Scientists and Engineers II.....	4
MATH 182—Calculus II .....	4
ENG 102—Composition II.....	3
BIOL 190—Introduction to Cell & Molecular Biology.....	3
Elective .....	2
TOTAL .....	16
<b>Second Year - First Semester</b>	
APST 270—Introduction to Statistical Methods .....	4
BIOL 191—Introduction to Organismal Biology.....	3
CHEM 241—Organic Chemistry I <b>OR</b>	
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	3
CH 201—Ancient and Medieval Cultures.....	3
Core Social Sciences .....	3
TOTAL .....	16
<b>Second Year - Second Semester</b>	
ANSC 325—Animal Genetics (Spring Only).....	3
BCH 303—Biochemical Analysis (Spring Only).....	2
CH 202—The Modern World (Core Humanities) .....	3
CHEM 242—Organic Chemistry II <b>OR</b>	
CHEM 342—Organic Chemistry for Scientists and Professionals II (Spring Only).....	3
CHEM 345—Organic Chemistry Laboratory <b>OR</b>	
CHEM 347—Laboratory Techniques of Organic Chemistry I (Spring Only).....	2
Core Fine Arts.....	3
TOTAL .....	16
<b>Third Year - First Semester</b>	
ANSC 316—Internship <b>OR</b>	
ANSC 416—Internship .....	1-3
ANSC 327—Animal Physiology: Cells to Systems.....	3
BCH 400—Introductory Biochemistry.....	4
BCH 403—Biochemistry Laboratory (Fall Only).....	2
BIOL 315 R—Cell Biology .....	3
Elective .....	1
TOTAL .....	14-16
<b>Third Year - Second Semester</b>	
BCH 405—Molecular Biology (Spring Only) .....	3
BCH 406—Molecular Biology Laboratory (Spring Only) ..	3
CH 203—American Experiences and Constitutional Change.....	3
BIOL 251—General Microbiology .....	3
Diversity Elective.....	4
TOTAL .....	16
<b>Fourth Year - First Semester</b>	
ANSC 415—Ethics and Economics of Biotechnology .....	3
BIOT 447—Research .....	4
BIOT 495—Seminar.....	1
PHYS 151 R—General Physics I and Lab.....	4
Core Curriculum Social Science .....	3
TOTAL .....	15
<b>Fourth Year - Second Semester</b>	
BIOT 447—Research .....	4
BIOT 495—Seminar.....	1
PHYS 152 R—General Physics II and Lab .....	4
Diversity Elective.....	3
Elective .....	2
TOTAL .....	14
<b>Fourth Year - Summer Semester (1st Session)</b>	
BIOT 647—Research .....	3
<b>Fourth Year - Summer Semester (2nd Session)</b>	
BIOT 647—Research .....	3

**Fifth Year - First Semester**

BIOT 607—Biotechnology Laboratory (Fall Only).....	4
BCH 705 R—Molecular Genetics (Fall Only).....	3
MICR 700—Biotechnology Today and Tomorrow (Fall Only) .....	2
Graduate Elective .....	3
TOTAL .....	12

**Fifth Year - Second Semester**

ANSC 729—Advanced Biotechniques (Spring Only) .....	3
BIOT 777—Biotechnology Symposium (Spring Only) .....	3
CMB 710—Molecular Cell Biology .....	4
Graduate Elective (with approval of advisor).....	2
TOTAL .....	12

**RECOMMENDED SCHEDULE**

For students entering through Biochemistry and Molecular Biology

**First Year - First Semester**

BCH 110—Success Strategies in Biochemistry .....	2
CHEM 121—General Chemistry I OR CHEM 201—General Chemistry for Scientists & Engineers I .....	4
MATH 181—Calculus I.....	4
ENG 101—Composition I .....	3
Core Fine Arts.....	3
TOTAL .....	16

**First Year - Second Semester**

BCH 121—Current Issues in Biochemistry and Molecular Biology .....	1
BIOL 190—Introduction to Cell & Molecular Biology.....	3
CHEM 122—General Chemistry II OR CHEM 202—General Chemistry for Scientists & Engineers II.....	4
ENG 102—Composition II.....	3
MATH 182—Calculus II .....	4
TOTAL .....	15

**Second Year - First Semester**

APST 270—Introduction to Statistical Methods .....	4
BIOL 191—Introduction to Organismal Biology.....	3
CHEM 341—Organic Chemistry for Scientists and Professionals I (Fall Only).....	3
PHYS 151 R—General Physics I and Lab OR PHYS 180 / PHYS 180L—Physics for Scientists and Engineers I and Laboratory.....	4
Elective .....	2
TOTAL .....	16

**Second Year - Second Semester**

BCH 303—Biochemical Analysis (Spring Only).....	2
BIOL 300—Principles of Genetics .....	3
CH 201—Ancient and Medieval Cultures (Core Humanities).....	3
CHEM 342—Organic Chemistry for Scientists and Professionals II (Spring Only).....	3
PHYS 152 R—General Physics II and Lab OR PHYS 181 / PHYS 181 L—Physics for Scientists and Engineers II and Laboratory .....	4
TOTAL .....	15

**Third Year - First Semester**

BCH 400—Introductory Biochemistry.....	4
BCH 403—Biochemistry Laboratory (Fall Only).....	2
CH 202—The Modern World .....	3
CHEM 345—Organic Chemistry Lab.....	2
CHEM 425—Biophysical Chemistry.....	3
Elective .....	3
TOTAL .....	17

**Third Year - Second Semester**

BCH 405—Molecular Biology (Spring Only) .....	3
BCH 406—Molecular Biology Laboratory (Spring Only) ..	3
BIOL 315 R—Cell Biology .....	3
CH 203—American Experiences and Constitutional Change.....	3
Elective .....	4
TOTAL .....	16

**Fourth Year - First Semester**

ANSC 415—Ethics and Economics of Biotechnology .....	3
BIOT 447—Research .....	4
BIOT 495—Seminar.....	1
Elective .....	3
TOTAL .....	11

**Fourth Year - Second Semester**

BIOT 447—Research .....	4
BIOT 495—Seminar.....	1
Diversity Elective.....	3
Biological Science Elective .....	3
Biological Science Elective .....	3
Elective .....	2
TOTAL .....	16

**Fourth Year - Summer Semester (1st Session)**

BIOT 647—Research .....	3
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**Fourth Year - Summer Semester (2nd Session)**

BIOT 647—Research .....	3
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**Fifth Year - First Semester**

BIOT 607—Biotechnology Laboratory (Fall Only).....	4
BCH 705 R—Molecular Genetics (Fall Only).....	3
MICR 700—Biotechnology Today and Tomorrow (Fall Only) .....	2
Graduate Elective .....	3
TOTAL .....	12

**Fifth Year - Second Semester**

ANSC 729—Advanced Biotechniques (Spring Only) .....	3
BIOT 777—Biotechnology Symposium (Spring Only) .....	3
CMB 710—Molecular Cell Biology .....	4
Graduate Elective (with approval of advisor).....	2
TOTAL .....	12

**RECOMMENDED SCHEDULE**

For students entering through Biology

**First Year - First Semester**

CHEM 121—General Chemistry I OR CHEM 201—General Chemistry for Scientists & Engineers I .....	4
MATH 128—Pre-calculus and Trigonometry .....	5
ENG 101—Composition I .....	3
Core Fine Arts.....	3
TOTAL .....	15

**First Year - Second Semester**

BIOL 190—Introduction to Cell & Molecular Biology.....	3
CHEM 122—General Chemistry II OR CHEM 202—General Chemistry for Scientists & Engineers II.....	4
ENG 102—Composition II.....	3
MATH 181—Calculus I.....	4
Core or General Elective.....	3
TOTAL .....	17

**Second Year - First Semester**

BIOL 191—Introduction to Organismal Biology .....	3
BIOL 192—Principles of Biological Investigation.....	2
CH 201—Ancient and Medieval Cultures (Core Humanities).....	3

CHEM 241—Organic Chemistry I OR  
 CHEM 341—Organic Chemistry for Scientists and  
 Professionals I.....3  
 PHYS 151 R—General Physics I and Lab.....4  
 TOTAL.....15

**Second Year - Second Semester**  
 BIOL 300—Principles of Genetics .....3  
 CH 202—The Modern World .....3  
 CHEM 242—Organic Chemistry II OR  
 CHEM 342—Organic Chemistry for Scientists and  
 Professionals II (Spring Only).....3  
 PHYS 152 R—General Physics II and Lab .....4  
 Core or General Elective.....3  
 TOTAL .....16

**Third Year - First Semester**  
 BIOL 315 R—Cell Biology .....3  
 BIOL 314—Ecology and Population Biology OR  
 BIOL 316—Comparative Animal Physiology .....3  
 CHEM 345—Organic Chemistry Laboratory .....2  
 STAT 152—Introduction to Statistics (3 credits) OR  
 APST 270—Introduction to Statistical Methods  
 (4 credits) .....3-4  
 Core or General Elective.....3  
 TOTAL .....14-15

**Third Year - Second Semester**  
 BIOL 395—Laboratory in Genetics and Cell Biology.....2  
 CH 203—American Experiences and Constitutional  
 Change .....3  
 Upper Division Biology Elective.....3  
 Upper Division Biology Elective.....3  
 General or Diversity Elective .....3  
 General Elective.....3  
 TOTAL .....17

**Fourth Year - First Semester**  
 ANSC 415—Ethics and Economics of Biotechnology .....3  
 BCH 400—Introductory Biochemistry.....4  
 BIOT 447—Research .....3  
 BIOT 495—Seminar.....1  
 Free Elective.....3  
 TOTAL .....14

**Fourth Year - Second Semester**  
 BCH 405—Molecular Biology (Spring Only) .....3  
 BCH 406—Molecular Biology Laboratory (Spring Only).....3  
 BIOT 447—Research .....3  
 BIOT 495—Seminar.....1  
 Biological Science Elective .....3  
 Elective .....3  
 TOTAL .....16

**Fourth Year - Summer Semester (1st Session)**  
 BIOT 647—Research .....3

**Fourth Year - Summer Semester (2nd Session)**  
 BIOT 647—Research .....3

**Fifth Year - First Semester**  
 BIOT 607—Biotechnology Laboratory (Fall Only).....4  
 BCH 705 R—Molecular Genetics (Fall Only).....3  
 MICR 700—Biotechnology Today and Tomorrow  
 (Fall Only) .....2  
 Graduate Elective .....3  
 TOTAL .....12

**Fifth Year - Second Semester**  
 ANSC 729—Advanced Biotechniques (Spring Only).....3  
 BIOT 777—Biotechnology Symposium (Spring Only).....3  
 CMB 710—Molecular Cell Biology .....4  
 Graduate Elective (with approval of advisor).....2  
 TOTAL .....12

## NATURAL RESOURCES AND ENVIRONMENTAL SCIENCE

100D Knudtsen Resource Center  
 (775) 784-1896/(775) 784-6763

The Department of Natural Resources and Environmental Science offers four majors: Environmental Science, Wildlife Ecology and Conservation, Forest and Rangeland Management , and Ecohydrology. The department also offers minors in the same four areas.

### Bachelor of Science Ecohydrology Major

Ecohydrology is a cross-disciplinary science that integrates ecology with the hydrologic sciences by focusing on the interactions between components of the hydrologic cycle and the distribution, structure, function, and dynamics of biological systems. The Ecohydrology undergraduate degree prepares students for surface water oriented careers in hydrology, watershed science, geographic information system applications for hydrologic analysis, water quality assessment, ecology of aquatic systems, and management and restoration. Students learn about the relationships between hydrologic mechanisms and ecological patterns and processes in watersheds and aquatic systems. The curriculum provides students with the option of meeting the requirements for federal positions as a hydrologist (OPM 1315 Series) and is designed to provide physical scientists with a strong secondary emphasis in ecology. The degree provides theoretical and practical training, with students acquiring skills needed for 1) field investigations of water resources; 2) analysis and interpretation of data; 3) reporting, including writing and presentation; and 4) analysis using models, including application of geographic information systems.

#### I. UNIVERSITY CORE CURRICULUM

REQUIREMENTS.....36-41

**NOTE:** Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".

- A. **English—3-8 credits**  
 Refer to the "English" section of the Core Curriculum chapter in this catalog.....3-8  
**NOTE:** Students who place in ENG 102 are not required to complete ENG 101.
- B. **Mathematics—4 credits**  
 MATH 181—Calculus I .....4
- C. **Natural Sciences—8 credits**  
 CHEM 121—General Chemistry I .....4  
 CHEM 122—General Chemistry II.....4  
**NOTE:** CHEM 201 and CHEM 202 are acceptable.
- D. **Social Sciences—3 credits**  
 RECO 100—Society and the Economic Value of Nature OR  
 RECO 202—Natural Resources, Environment and the  
 Economy .....3
- E. **Fine Arts—3 credits**  
 Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....3
- F. **Core Humanities—9 credits**  
 CH 201—Ancient and Medieval Cultures .....3  
 CH 202—The Modern World .....3  
 CH 203—American Experiences and Constitutional  
 Change.....3
- G. **Capstone Courses—6 credits**  
 NRES 467—Regional and Global Issues in Natural  
 Resources and Environmental Science OR  
 NRES 400—International Issues for Water Development..3  
 And ONE of the following:.....3  
 RECO 466—Natural Resource and Environmental  
 Economics

GEOG 464—Race, Gender and the Environment	GEOG 312—Cartography.....	3
PSC 403C—Environmental Policy	GEOG 407—Advanced GIS Analysis.....	3
PHIL 480—Science, Technology and Society	GEOG 409—GIS Design Studio.....	3
PHYS 400—Energy: Principles, Sources and Problems	GEOG 411—Modeling Using Geographic Information Systems.....	3
<b>H. Diversity—3 credits</b>	GEOG 421—Climatology.....	3
NRES 211—Conservation, Humans and Biodiversity.....	NRES 310—Wildlife Ecology and Management.....	3
NOTE: Required as part of Ecology offerings, below.	NRES 341—Principles of Range Management.....	3
<b>II. ADDITIONAL COLLEGE REQUIREMENTS.....</b>	NRES 345—Range and Forest Plants.....	5
<b>III. MAJOR REQUIREMENTS.....</b>	NRES 405—Silviculture and Regional Silviculture.....	5
<b>A. General Requirements—21-22 credits</b>	NRES 421—Conservation Biology.....	3
APST 270—Introduction to Statistical Methods (4 credits) OR	NRES 422—Soil Physics.....	3
STAT 152—Introduction to Statistics (3 credits) OR	NRES 432—Environmental Toxicology.....	3
MATH 352/STAT 352—Probability and Statistics (3 credits).....	NRES 441—Ecology and Management of Invasive Plants.....	3
GEOG 101—General Geology.....	NRES 485—Special Topics (Field Methods in Hydrology).....	3
BIOL 190—Introduction to Cell & Molecular Biology.....	NRES 485—Special Topics (Limnology Lab).....	1
BIOL 191—Introduction to Organismal Biology.....	NRES 493—Range and Forest Ecology.....	3
NRES 100—Principles of Environmental and Natural Resource Sciences.....	NRES 494—Range and Forest Administration and Policy.....	3
NRES 210—Environmental Pollution.....	NRES 495—Fire Ecology and Management (if not applied to Ecology Minor).....	3
NRES 412 OR PSC 403E—Environmental Law.....	NRES 497—Forest and Range Soils.....	3
<b>B. Ecology Requirements—19 credits</b>	NRES 498—Rangeland Restoration Ecology.....	3
Students must take the following courses:	MATH 285—Differential Equations*.....	3
BIOL 314—Ecology and Population Biology.....	PHYS 181—Physics for Scientists and Engineers II*.....	3
NRES 440—Wetland Ecology and Management.....	*These classes are required for those who wish to qualify as hydrologists for federal positions.	
*NRES 211—Conservation, Humans and Biodiversity.....	<b>IV. ELECTIVES.....</b>	<b>3-10</b>
*NOTE: Also listed as a DIVERSITY class under University Requirements.	<b>V. TOTAL CREDITS.....</b>	<b>128</b>
Students must take 3 of the following 4 courses:	<b>VI. RECOMMENDED SCHEDULE</b>	
BIOL 420—Aquatic Ecology.....	<b>STARTING FALL OF ODD YEARS:</b>	
NRES 484—Limnology: Study of Inland Waters.....	<b>First Year - Fall Semester:</b>	
NRES 421—Conservation Biology.....	ENG 101—Composition I.....	3
NRES 495—Fire Ecology and Management.....	MATH 181—Calculus I.....	4
<b>C. Hydrology Requirements—30 credits</b>	CHEM 121—General Chemistry I.....	4
GE 484—Groundwater Hydrology.....	NRES 100—Principles of Natural Resources and Environmental Science.....	3
GEOG 205—Applications of Geographic Information Systems OR	NRES 211—Conservation, Humans and Biodiversity.....	3
GEOG 210 R—Introduction to Geotechnology.....	TOTAL.....	17
MATH 182—Calculus II.....	<b>First Year - Spring Semester</b>	
MATH 283 R—Calculus III.....	ENG 102—Composition II.....	3
NRES 295—Principles of Ecohydrology.....	MATH 182—Calculus II.....	4
NRES 322—Soils.....	CHEM 122—General Chemistry II.....	4
NRES 414—Hydrologic Fluid Dynamics.....	GEOG 101—General Geology.....	3
NRES 482—Small Watershed Hydrology.....	BIOL 190—Introduction to Cell and Molecular Biology.....	3
PHYS 180—Physics for Scientists and Engineers I.....	TOTAL.....	17
<b>D. Technical Electives—12 credits</b>	<b>Second Year - Fall Semester</b>	
Students must select at least 12 credits from the following courses:	RECO 100—Society and the Economic Value of Nature OR	
APST 412—Applied Geographic Information Systems.....	RECO 202—Natural Resources, Environment and the Economy.....	3
APST 470—Linear Regression and Time Series.....	CH 201—Ancient and Medieval Cultures.....	3
ATMS 117—Meteorology.....	MATH 283 R—Calculus III.....	4
BIOL 251—Microbiology.....	BIOL 191—Introduction to Organismal Biology.....	3
CHEM 220A—Introductory Organic Chemistry OR	NRES 295—Principles of Ecohydrology.....	3
CHEM 241—Organic Chemistry I OR	TOTAL.....	16
CHEM 341—Organic Chemistry for Scientists and Professionals I.....	<b>Second Year - Spring Semester</b>	
CEE 364 R—Engineering Hydrology.....	CH 202—The Modern World.....	3
CEE 390 R—Fundamentals of Environmental Engineering Design.....	APST 270—Introduction to Statistical Methods OR	
CEE 404—Open Channel Flow.....	STAT 152—Introduction to Statistics OR	
CEE 418—Principles of Water Quality Modeling.....	MATH 352/STAT 352—Probability and Statistics.....	3
GEOG 416—Environmental Geochemistry.....	BIOL 314—Ecology and Population Biology.....	3

NRES 322—Soils.....	3
PHYS 180—Physics for Scientists and Engineers I.....	3
TOTAL.....	15
<b>Third Year - Fall Semester</b>	
Core Fine Arts.....	3
BIOL 420—Aquatic Ecology (odd years).....	3
CH 203—American Experiences and Constitutional Change.....	3
GEOG 205—Applications of Geographic Information Systems.....	3
NRES 482—Small Watershed Hydrology.....	3
TOTAL.....	15
<b>Third Year - Spring Semester</b>	
NRES 210—Environmental Pollution.....	3
NRES 440—Wetland Ecology and Management.....	4
NRES 412—Environmental Law.....	3
Technical Electives.....	6
TOTAL.....	16
<b>Fourth Year - Fall Semester</b>	
GE 484—Groundwater Hydrology.....	3
NRES 400—International Issues for Water Development.....	3
NRES 414—Hydrologic Fluid Dynamics.....	3
NRES 484—Limnology: Study of Inland Waters.....	3
Technical Elective.....	3
TOTAL.....	15
<b>Fourth Year - Spring Semester</b>	
Capstone Elective.....	3
NRES 441—Ecology and Management of Invasive Plants.....	3
Technical Elective.....	3
General Electives.....	6
TOTAL.....	15

**STARTING FALL OF EVEN YEARS:****First Year - Fall Semester:**

ENG 101—Composition I.....	3
MATH 181—Calculus I.....	4
CHEM 121—General Chemistry I.....	4
NRES 100—Principles of Natural Resources and Environmental Science.....	3
NRES 211—Conservation, Humans and Biodiversity.....	3
TOTAL.....	17

**First Year - Spring Semester**

ENG 102—Composition II.....	3
MATH 182—Calculus II.....	4
CHEM 122—General Chemistry II.....	4
GEOG 101—General Geology.....	3
BIOL 190—Introduction to Cell and Molecular Biology.....	3
TOTAL.....	17

**Second Year - Fall Semester**

RECO 100—Society and the Economic Value of Nature OR RECO 202—Natural Resources, Environment and the Economy.....	3
CH 201—Ancient and Medieval Cultures.....	3
MATH 283 R—Calculus III.....	4
BIOL 191—Introduction to Organismal Biology.....	3
NRES 295—Principles of Ecohydrology.....	3
TOTAL.....	16

**Second Year - Spring Semester**

CH 202—The Modern World.....	3
APST 270—Introduction to Statistical Methods OR STAT 152—Introduction to Statistics OR MATH 352/STAT 352—Probability and Statistics.....	3
BIOL 314—Ecology and Population Biology.....	3
NRES 322—Soils.....	3
PHYS 180—Physics for Scientists and Engineers I.....	3

TOTAL.....	15
<b>Third Year - Fall Semester</b>	
Core Fine Arts.....	3
BIOL 420—Aquatic Ecology (odd years).....	3
CH 203—American Experiences and Constitutional Change.....	3
NRES 400—International Issues for Water Development.....	3
NRES 482—Small Watershed Hydrology.....	3
TOTAL.....	15
<b>Third Year - Spring Semester</b>	
NRES 210—Environmental Pollution.....	3
NRES 440—Wetland Ecology and Management.....	4
NRES 412—Environmental Law.....	3
Technical Electives.....	6
TOTAL.....	16
<b>Fourth Year - Fall Semester</b>	
GE 484—Groundwater Hydrology.....	3
GEOG 205—Applications of Geographic Information Systems.....	3
NRES 414—Hydrologic Fluid Dynamics.....	3
NRES 484—Limnology: Study of Inland Waters.....	3
Technical Elective.....	3
TOTAL.....	15
<b>Fourth Year - Spring Semester</b>	
Capstone Elective.....	3
NRES 441—Ecology and Management of Invasive Plants.....	3
Technical Elective.....	3
General Electives.....	6
TOTAL.....	15

**Bachelor of Science****Environmental Science Major**

The major in Environmental Science is highly relevant to global and regional issues being faced today, including climate change, pollution, urbanization and resource use and extraction. This major provides students with a scientific background in the physical and biological sciences followed by courses that integrate these sciences in addressing environmental issues. The program also requires students to develop an understanding of social values and political implications associated with environmental decision making. Excellent employment opportunities for environmental scientists exist within the private sector, non-profit organizations, and local, state and national agencies. This major also prepares students for attaining graduate degrees in environment-related fields.

**I. UNIVERSITY CORE CURRICULUM****REQUIREMENTS.....39-44**

**NOTE:** Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".

- A. English—3-8 credits**  
Refer to the "English" section of the Core Curriculum chapter in this catalog.....3-8  
**NOTE:** Students who place in ENG 102 are not required to complete ENG 101.
- B. Mathematics—3-4 credits**  
MATH 181—Calculus I OR  
MATH 176—Calculus for Business and Social Science...3-4
- C. Natural Sciences—8 credits**  
CHEM 121—General Chemistry I.....4  
CHEM 122—General Chemistry II.....4  
**NOTE:** CHEM 201 and CHEM 202 are acceptable.
- D. Social Sciences—3 credits**  
RECO 100—Society and the Economic Value of Nature....3
- E. Fine Arts—3 credits**

Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....	3	BIOL 192—Principles of Biological Investigation (2 credits)	
<b>F. Core Humanities—9 credits</b>		BCH 400—Introductory Biochemistry (4 credits)	
CH 201—Ancient and Medieval Cultures .....	3	BIOL 251—General Microbiology (4 credits)	
CH 202—The Modern World .....	3	CHEM 241—Organic Chemistry I OR	
CH 203—American Experiences and Constitutional Change.....	3	CHEM 341—Organic Chemistry for Scientists and Professionals I	
<b>G. Capstone Courses—6 credits</b>		CHEM 242—Organic Chemistry II OR	
NRES 467—Regional and Global Issues in Natural Resources and Environmental Science OR		CHEM 342—Organic Chemistry for Scientists and Professionals II	
NRES 400—International Issues for Water Development..3		MATH 182—Calculus II (4 credits)	
And <b>one</b> of the following:.....	3	PHYS 151 R—General Physics OR	
RECO 466—Natural Resource and Environmental Economics		PHYS 180—Physics for Scientist and Engineers I (3-4 credits)	
ENG 491A—Major Texts of the Environmental Movement		PHYS 400—Energy: Principles, Sources and Problems*	
GEOG 464—Race, Gender and the Environment		<b>Earth</b>	
PSC 403C—Environmental Policy		CEE 390 R—Fundamentals of Environmental Engineering Design	
PHIL 480—Science, Technology and Society		CEE 417—Introduction to Environmental Quality and Analysis	
PHYS 400—Energy: Principles, Sources and Problems		CEE 453—Environmental Microbiology	
<b>H. Diversity—3 credits</b>		GEOG 405 R—GIS I: Geographic Information Systems and Science	
NRES 211—Conservation, Humans and Biodiversity .....	3	GEOG 472—Geography of Arid Lands	
<b>II. ADDITIONAL COLLEGE REQUIREMENTS.....</b>	<b>0</b>	GEOG 371—Geology of Natural Resources (2 credits)	
<b>III. MAJOR REQUIREMENTS.....</b>	<b>34</b>	NRES 422—Soil Physics	
All courses are 3 credits unless otherwise noted.		NRES 430—Analysis of Environmental Contaminants	
APST 270—Introduction to Statistical Methods (4 credits)		NRES 431—Analysis of Environmental Contaminants Lab (1 credit)	
BIOL 190—Introduction to Cell and Molecular Biology		NRES 432—Environmental Toxicology	
BIOL 191—Introduction to Organismal Biology I		NRES 433—Environmental Chemicals	
ENG 321—Expository Writing		NRES 497—Forest and Range Soils	
GEOG 210 R—Introduction to Geotechnology		<b>Air and Water</b>	
GEOG 101—General Geology		ATMS 117—Meteorology	
NRES 100—Principles of Natural Resources and Environmental Science		ATMS 412—Introduction to Air Pollution	
NRES 210—Environmental Pollution		BIOL 420—Aquatic Ecology	
NRES 295—Principles of Ecohydrology		GEOG 121—Climate Change and It's Environmental Impacts (4 credits)	
NRES 322—Soils		GEOG 321—Understanding Climate (4 credits)	
NRES 412—Environmental Law OR		GEOG 438—Western Water Resources and Management	
PSC 403E—Environmental Law		GEOG 416—Environmental Geochemistry	
<b>IV. MINOR REQUIREMENTS.....</b>	<b>0</b>	NRES 400—International Issues for Water Development*	
<b>V. TECHNICAL ELECTIVES – 32-33</b>		NRES 440—Wetland Ecology and Management (4 credits)	
Students must select at least 32 credits from the following list, including at least 3 credits from each category. 25 credits of coursework must be upper-division courses. Some courses listed below have pre-requisites. All courses are 3 credits unless otherwise noted.		NRES 482—Small Watershed Hydrology	
<b>Human Interactions and Policy</b>		NRES 484—Limnology: Study of Inland Waters	
GEOG 305—Community Environmental Problems		NRES 485—Special Topics (Limnology Lab – 1 credit)	
GEOG 454—Urban Landscape Analysis		<b>Plants and Animals</b>	
GEOG 456—Land Use Planning		ANSC 408—Rangeland Ecosystems (5 credits)	
GEOG 464—Race, Gender, and the Environment*		ANSC 413—Range-Livestock Interactions	
NRES 467—Regional and Global Issues in Natural Resources and Environmental Science*		BCH 410—Plant Physiology	
NRES 494—Range and Forest Administration and Policy		BIOL 314—Ecology and Population Biology	
PHIL 480—Science, Technology, and Society*		BIOL 321—Marine Biology	
PSC 403B—Energy, Politics & Policy		BIOL 430—Field Ornithology (1 credit)	
PSC 403C—Environmental Policy*		BIOL 433—Ornithology	
PSC 403D—Global Environmental Policy		BIOL 434 R—Mammalogy (4 credits)	
RECO 240—Environmental Economics		BIOL481—Principles of Animal Behavior	
RECO 340—Natural Resource Economics		GEOG 434—Biogeography	
RECO 466—Natural Resource and Environmental Economics*		NRES 310—Wildlife Ecology and Management (4 credits)	
<b>Basic Science</b>		NRES 341—Principles of Range Management	
		NRES 345—Range and Forest Plants (5 credits)	
		NRES 402—Forest Management (5 credits)	
		NRES 405—Silviculture and Regional Silviculture (5 credits)	
		NRES 407—Forest and Range Measurements (5 credits)	
		NRES 421—Conservation Biology	
		NRES 441—Ecology and Management of Invasive Plants	
		NRES 488—Dynamics and Management of Wildlife Populations	

NRES 495—Fire Ecology and Management  
 NRES 498—Rangeland Restoration Ecology

Additional Technical Electives .....6-7  
 General Electives .....6-7  
 TOTAL ..... 16

\*= if not selected as a capstone course

**VI. ELECTIVES.....17-23**  
 Select courses in consultation with your advisor, or select from one of the three minors below: Forest and Rangeland Management, Wildlife Ecology and Conservation, and Ecohydrology.

**VII. TOTAL CREDITS.....128**

**VI. RECOMMENDED SCHEDULE ENVIRONMENTAL SCIENCE**

**First Year - Fall Semester:**

ENG 101—Composition I .....3  
 MATH 181—Calculus I .....4  
 CHEM 121—General Chemistry I .....4  
 NRES 100—Principles of Env. & Nat. Res. Sciences .....3  
 Core Fine Arts .....3  
 TOTAL ..... 17

**First Year - Spring Semester:**

ENG 102—Composition II .....3  
 CHEM 122—General Chemistry II .....4  
 RECO 100—Society & Econ. Value of Nature .....3  
 GEOL 101—General Geology .....3  
 General Elective.....3  
 TOTAL ..... 16

**Second Year - Fall Semester:**

CH 201—Ancient & Medieval Cultures .....3  
 BIOL 190—Intro to Cell & Molecular Biology .....3  
 NRES 211—Conservation, Biodiversity and Humans .....3  
 APST 270—Intro to Statistical Methods.....4  
 NRES 295—Principles of Ecohydrology.....3  
 TOTAL ..... 16

**Second Year - Spring Semester:**

CH 202—The Modern World .....3  
 BIOL 191—Introduction to Organismal Biology .....3  
 NRES 210 Environmental Pollution .....3  
 GEOG 210 R—Introduction to Geotechnology.....3  
 General Elective.....3  
 TOTAL ..... 15

**Third Year - Fall Semester:**

CH 203—American Experiences and Constitutional Change ..... 3  
 NRES 322—Soils.....3  
 BIOL 314—Ecology and Population Biology ..... 3  
 Technical Elective – Basic Science .....3-4  
 Technical Elective – Human Interactions and Policy.....3  
 TOTAL ..... 15-16

**Third Year - Spring Semester:**

ENG 321—Expository Writing .....3  
 NRES 412—Environmental Law .....3  
 Technical Electives – Plants and Animals .....3-5  
 General Electives .....5-7  
 TOTAL ..... 16-17

**Fourth Year - Fall Semester:**

NRES Capstone.....3  
 Technical Elective – Air and Water .....3-4  
 Additional Technical Electives .....7-9  
 General Electives .....0-3  
 TOTAL ..... 16

**Fourth Year - Spring Semester:**

Major Capstone .....3

**Bachelor of Science**

**Wildlife Ecology and Conservation Major**

The Wildlife Ecology and Conservation major provides a solid, multidisciplinary foundation for science-based decision making in wildlife ecology and conservation biology. Students acquire a strong background in basic science (e.g., biology, chemistry, and mathematics) as well as courses addressing critical issues in management, restoration and conservation of wildlife and other biological resources. This major is designed for students interested in pursuing careers focused on the ecology and management of wildlife and other biota. Coursework will develop skills needed to evaluate impacts of human activities on natural and managed biological systems. Graduating seniors are prepared for graduate study or may enter the work force directly. Wildlife ecology and conservation biology are growing areas of regional, state, and national priority. Hence, the employment outlook is extremely promising for students interested in working for state and federal agencies, private consulting firms, and non-profit organizations. The curriculum can be designed to assure qualification as a federal wildlife biologist and/or certification by The Wildlife Society. Students interested in qualifying under the federal U.S. Office of Personnel Management Standards should notify their advisor and consult the website at <http://www.opm.gov/qualifications/sec-iii/a/0400-NDX.HTM>

**I. UNIVERSITY CORE CURRICULUM**

**REQUIREMENTS.....40-45**

**NOTE:** Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".

**A. English—3-8 credits**

Refer to the "English" section of the Core Curriculum chapter in this catalog.....3-8

**NOTE:** Students who place in ENG 102 are not required to complete ENG 101.

**B. Mathematics—4 credits**

MATH 181—Calculus I .....4

**C. Natural Sciences—8 credits**

CHEM 121—General Chemistry I .....4

CHEM 122—General Chemistry II.....4

**NOTE:** CHEM 201 and CHEM 202 are acceptable.

**D. Social Sciences—3 credits**

RECO 100—Society and the Economic Value of Nature **OR**  
 RECO 202—Natural Resources, Environment and the Economy .....3

**E. Fine Arts—3 credits**

Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....3

**F. Core Humanities—9 credits**

CH 201—Ancient and Medieval Cultures .....3

CH 202—The Modern World .....3

CH 203—American Experiences and Constitutional Change.....3

**G. Capstone Courses—7 credits**

BIOL 415—Evolution .....4

Select **ONE** of the following:.....3

RECO 466—Natural Resource and Environmental Economics

NRES 400—International Issues for Water Development

NRES 467—Regional and Global Issues in Natural Resources and Environmental Science

NRES 494—Range and Forest Administration and Policy

PSC 403C—Environmental Policy

VM 481—Animals in Human Cultures

<b>H. Diversity—3 credits</b>	
NRES 211—Conservation, Humans and Biodiversity .....	3
<b>II. ADDITIONAL COLLEGE REQUIREMENTS.....</b>	<b>0</b>
<b>III. MAJOR REQUIREMENTS.....</b>	<b>70-75</b>
APST 270—Introduction to Statistical Methods .....	4
APST 470—Linear Regression and Time Series <b>OR</b>	
APST 463—Design and Analysis of Experiments.....	3
BIOL 190—Introduction to Cell and Molecular Biology.....	3
BIOL 191—Introduction to Organismal Biology I.....	3
BIOL 300—Principles of Genetics .....	3
BIOL 314—Ecology and Population Biology.....	3
BIOL 394—Laboratory in Ecology and Population	
Biology .....	2
NRES 100—Principles of Natural Resources and	
Environmental Science .....	3
NRES 210—Environmental Pollution.....	3
NRES 310—Wildlife Ecology and Management.....	4
NRES 421—Conservation Biology .....	3
NRES 488—Dynamics and Management of Wildlife	
Populations.....	3
<b>Physiology and Behavior— —6-7 credits</b>	
Select <b>TWO</b> from the following list	
BIOL 316—Comparative Animal Physiology .....	3
BCH 410—Plant Physiology (BIOL 330 or organic	
chemistry prerequisites).....	3
BIOL 481—Principles of Animal Behavior .....	3
NRES 406 R - Ecophysiology of Forest & Range Plants.....	4
<b>Organisms— —6-8 credits</b>	
Select <b>TWO</b> from the following list	
BIOL 430—Field Ornithology* <b>AND</b>	
BIOL 433—Ornithology* .....	4
BIOL 431—Ichthyology.....	2
BIOL 432—Herpetology*.....	4
BIOL 434 R—Mammalogy*.....	4
BIOL 437—Entomology.....	3
<b>Plant Biology—6-8 credits</b>	
Select <b>TWO</b> from the following list	
NRES 345—Range and Forest Plants.....	5
NRES 441—Ecology and Management of Invasive Plants	
BIOL 330—Plant Biology .....	3
<b>Technical Electives—15 credits</b>	
Select either the minor in Environmental Science, Forest and	
Rangeland Management, or Ecohydrology, or 15 credits (12	
from upper division courses) from technical areas including	
biology, natural resources and environmental science,	
chemistry, geology, mathematics, etc.	
<b>IV. MINOR REQUIREMENTS.....</b>	<b>0</b>
<b>V. ELECTIVES.....</b>	<b>8-19</b>
* Students interested in certification by the Wildlife Society	
should take:	
• COM 101—Oral Communication	
• ENG 321—Expository Writing	
• and courses with an asterisk in the above lists.	
<b>VI. TOTAL CREDITS.....</b>	<b>128</b>
<b>VII. RECOMMENDED SCHEDULE - WILDLIFE ECOLOGY &amp;</b>	
<b>CONSERVATION</b>	
<b>First Year - Fall Semester:</b>	
ENG 101—Composition I .....	3
CHEM 121—General Chemistry .....	4
MATH 181—Calculus I .....	4
NRES 100—Principles of Natural Resources and	
Environmental Science .....	3
BIOL 191—Introduction to Organismal Biology .....	3
TOTAL.....	17
<b>First Year - Spring Semester:</b>	
ENG 102—Composition II .....	3
CHEM 122—General Chemistry II .....	4
BIOL 190—Introduction to Cell and Molecular Biology.....	3
RECO 202—Natural Resources, Environment & the	
Economy <b>OR</b>	
RECO 100—Society and the Economic Value of Nature.....	3
General Elective .....	3
TOTAL.....	16
<b>Second Year - Fall Semester:</b>	
NRES 211—Conservation, Humans, & Biodiversity .....	3
CH 201—Ancient and Medieval Cultures .....	3
APST 270—Introduction to Statistical Methods .....	4
BIOL 314—Ecology & Population Biology .....	3
General Elective.....	3
TOTAL.....	16
<b>Second Year - Spring Semester:</b>	
CH 202—The Modern World .....	3
NRES 210—Environmental Pollution .....	3
BIOL 300—Principles of Genetics .....	3
BIOL 394—Laboratory in Ecology & Population Biology ..	2
Core Curriculum Fine Arts .....	3
General Elective .....	3
TOTAL.....	17
<b>Third Year - Fall Semester:</b>	
CH 203—American Experiences and Constitutional	
Change .....	3
Upper Division Statistics (APST 470—Linear Regression	
and Time Series) <b>OR</b> Technical Elective .....	3
Physiology, Organisms, & Plant Biology Course	
Requirements .....	6-8
Technical Elective .....	3
TOTAL.....	15-17
<b>Third Year - Spring Semester:</b>	
NRES 310—Wildlife Ecology & Management .....	4
Physiology, Organisms, & Plant Biology Course	
Requirements .....	6-8
Upper Division Statistics (APST 463*—Design and Analysis	
of Experiments) <b>OR</b> Technical Elective .....	3
General Elective .....	3
TOTAL.....	16-18
<b>Fourth Year - Fall Semester:</b>	
NRES 421—Conservation Biology .....	3
NRES 488—Dynamics & Management of Wildlife	
Populations .....	3
Physiology, Organisms, & Plant Biology Course	
Requirements .....	3-4
Technical Elective .....	3
Capstone (NRES 400, NRES 467, NRES 494, PSC 403C or	
VM 481) .....	3
TOTAL.....	15-16
<b>Fourth Year - Spring Semester:</b>	
BIOL 415—Evolution (Capstone) .....	4
Physiology, Organisms, & Plant Biology Course	
Requirements .....	3-4
Technical Electives .....	6
General Elective .....	3
TOTAL.....	16-17

## Bachelor of Science Forest and Rangeland Management Major

Students in the Forest and Rangeland Management major are interested in the ecology and management of forest and rangeland resources. The curriculum provides a solid, multidisciplinary foundation for science-based decision making in natural resource management. Coursework addresses critical issues in vegetation ecology and management, sustainability and restoration of forest and rangeland resources, watershed integrity, wildlife habitat, forage and wood production, and conservation of natural ecosystems. Graduating seniors are prepared for graduate study or may enter employment with state and federal agencies, private firms, and non-profit organizations that own and manage forests and rangelands. Students interested in qualifying under the federal U.S. Office of Personnel Management should notify their advisor and consult the website at <http://www.opm.gov/qualifications/sec-iii/a/0400-NDX.HTM>

### I. UNIVERSITY CORE CURRICULUM REQUIREMENTS.....39-45

NOTE: Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".

#### A. English—3-8 credits

Refer to the "English" section of the Core Curriculum chapter in this catalog.....3-8

NOTE: Students who place in ENG 102 are not required to complete ENG 101.

#### B. Mathematics—4 credits

MATH 181—Calculus I .....4

#### C. Natural Sciences—8 credits

CHEM 121—General Chemistry I .....4

CHEM 122—General Chemistry II.....4

NOTE: CHEM 201 and CHEM 202 are acceptable.

#### D. Social Sciences—3 credits

RECO 100—Society and the Economic Value of Nature OR  
RECO 202—Natural Resources, Environment and  
the Economy.....3

#### E. Fine Arts—3 credits

Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....3

#### F. Core Humanities—9 credits

CH 201—Ancient and Medieval Cultures.....3

CH 202—The Modern World .....3

CH 203—American Experiences and Constitutional  
Change.....3

#### G. Capstone Courses—6-7 credits

NRES 400—International Issues for Water Development  
OR

NRES 467—Regional and Global Issues in Natural  
Resources and Environmental Science OR

NRES 494—Range and Forest Administration and Policy  
Select ONE of the following:.....3-4

RECO 466—Natural Resource and Environmental  
Economics (3 credits)

BIOL 415—Evolution (4 credits)

PSC 403C—Environmental Policy (3 credits)

VM 481—Animals in Human Cultures (3 credits)

#### H. Diversity—3 credits

NRES 211—Conservation, Humans and  
Biodiversity .....3

### II. ADDITIONAL COLLEGE REQUIREMENTS.....0

### III. MAJOR REQUIREMENTS.....42

APST 270—Introduction to Statistical Methods .....4

APST 412—Applied Geographic Information Systems OR

NRES 451—Remote Sensing of Natural Resources.....3

BIOL 190—Introduction to Cell and Molecular Biology.....3

BIOL 191—Introduction to Organismal Biology I.....3

NRES 100—Principles of Natural Resources and  
Environmental Science.....3

NRES 210—Environmental Pollution.....3

NRES 295—Principles of Ecohydrology .....3

NRES 310—Wildlife Ecology and Management.....4

NRES 322—Soils.....3

NRES 345—Range and Forest Plants .....5

NRES 407—Forest and Range Measurements.....5

NRES 493—Range and Forest Ecology .....3

### IV. MINOR REQUIREMENTS.....0

### V. SPECIALIZATIONS (SELECT ONE)

#### A. FOREST MANAGEMENT.....27-29

NRES 401—Forest Operations.....4

NRES 402—Forest Management .....5

NRES 405—Silviculture and Regional Silviculture.....5

NRES 406 R - Ecophysiology of Forest & Range Plants .....4

NRES 497—Forest and Range Soils .....3

#### Select AT LEAST 6 credits from the following:

RECO 332—Economics of Public Lands Resources.....3

NRES 341—Principles of Range Management .....3

NRES 421—Conservation Biology .....3

NRES 422—Soil Physics.....3

NRES 440—Wetland Ecology and Management  
(BIOL 314 prerequisite).....4

NRES 441—Ecology and Management of Invasive Plants3

NRES 460—Rangeland Resource Management .....3

NRES 461—Forest Resources Management.....3

NRES 482—Small Watershed Hydrology .....4

NRES 488—Dynamics and Management of Wildlife  
Populations.....3

NRES 494—Range and Forest Administration and Policy3

NRES 495—Fire Ecology and Management.....3

NRES 498—Rangeland Restoration Ecology.....3

#### B. RANGELAND MANAGEMENT .....24-30

NRES 341—Principles of Range Management.....3

NRES 441—Ecology and Management of Invasive Plants3

NRES 498—Rangeland Restoration Ecology.....3

GEOL 101—General Geology .....3

#### Select ONE of the following courses:

ANSC 406—Advanced Nutrition Management  
(CHEM 220 prerequisite).....4

ANSC 410—Sheep Production.....3

ANSC 413—Range-Livestock Interactions.....3

#### Select ONE of the following courses:

BCH 410—Plant Physiology (BIOL 330 or organic  
chemistry prerequisites).....3

NRES 406 R - Ecophysiology of Forest & Range Plants .....4

#### Select AT LEAST 6 credits from the following:

RECO 332—Economics of Public Lands Resources.....3

BIOL 415—Evolution (BIOL 300 prerequisite) .....4

NRES 401—Forest Operations.....4

NRES 402—Forest Management .....5

NRES 405—Silviculture and Regional Silviculture.....5

NRES 421—Conservation Biology .....3

NRES 422—Soil Physics.....3

NRES 440—Wetland Ecology and Management  
(BIOL 314 prerequisite).....4

NRES 460—Rangeland Resource Management .....3

NRES 482—Small Watershed Hydrology .....4

NRES 488—Dynamics and Management of  
Wildlife Populations .....3

NRES 494—Range and Forest Administration and Policy	3
NRES 495—Fire Ecology and Management	3
NRES 497—Forest and Range Soils	3
GEOL 441—Advanced Geomorphology (GEOL 202, 203, 211, and 212 prerequisites)	3

#### V. ELECTIVES .....12-23

Select courses in consultation with your advisor, or select from **one** of the **three** minors: Environmental Science, Wildlife Ecology and Conservation, or Ecohydrology

#### VI. TOTAL CREDITS.....128

#### VII. RECOMMENDED SCHEDULE

##### FOREST MANAGEMENT SPECIALIZATION

###### First Year - Fall Semester

ENG 101 - Composition I	3
MATH 181 - Calculus I	4
CHEM 121 - General Chemistry I	4
NRES 100 - Principles of Natural Resources and Environmental Science	3
Elective	3
TOTAL	17

###### First Year - Spring Semester

ENG 102 - Composition II	3
CHEM 122 - General Chemistry II	4
BIOL 190 - Introduction to Cell and Molecular Biology	3
Core Curriculum Fine Arts Course	3
RECO 100 - Society and the Economic Value of Nature OR RECO 202 - Natural Resources, Environment and the Economy (Preferred)	3
TOTAL	16

###### Second Year - Fall Semester

BIOL 191 - Introduction to Organismal Biology	3
NRES 211 - Conservation, Biodiversity and Humans	3
APST 270 - Introduction to Statistical Methods	4
CH 201 - Ancient and Medieval Cultures	3
NRES 295—Principles of Ecohydrology	3
TOTAL	16

###### Second Year - Spring Semester

NRES 210 - Environmental Pollution	3
CH 202 - The Modern World	3
CH 203 - American Experiences and Constitutional Change	3
Elective	6
TOTAL	15

###### Third Year - Fall Semester

NRES 322 - Soils	3
NRES 345 -Range and Forest Plants	5
NRES 310 - Wildlife Ecology & Management	4
<b>AND (even years)</b>	
NRES 401 - Forest Operations	
<b>OR (odd years)</b>	
NRES 407 - Forest and Range Measurements	5
TOTAL	16-17

###### Third Year - Spring Semester

NRES 341 – Principles of Range Management	3
NRES 494 - Range and Forest Administration & Policy (Capstone)	3
<b>AND (even years)</b>	
NRES 405 - Silviculture & Regional Silviculture	5
NRES 493 - Range and Forest Ecology	3
NRES 497 - Forest and Range Soils	3
<b>OR (odd years)</b>	
NRES 402 - Forest Management	5

NRES 451 - Remote Sensing of Natural Resources	3
NRES 495 - Fire Ecology and Management	3
TOTAL	17

###### Fourth Year - Fall Semester

PSC 403C - Environmental Policy (Capstone)	3
Elective	8

###### **AND (even years)**

NRES 401 -Forest Operations	4
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###### **OR (odd years)**

NRES 407 - Forest and Range Measurements	5
TOTAL	15-16

###### Fourth Year - Spring Semester

NRES 406 R -Ecophysiology of Forest and Range Plants	4
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###### **AND (even years)**

NRES 405 - Silviculture & Regional Silviculture	5
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NRES 493 - Range and Forest Ecology	3
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NRES 497 - Forest and Range Soils	3
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###### **OR (odd years)**

NRES 402 - Forest Management	5
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NRES 451 - Remote Sensing of Natural Resources	3
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NRES 495 - Fire Ecology and Management	3
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TOTAL	15
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#### VIII. RECOMMENDED SCHEDULE

##### RANGELAND MANAGEMENT SPECIALIZATION

###### First Year - Fall Semester

ENG 101 - Composition I	3
MATH 181 - Calculus I	4
CHEM 121 - General Chemistry I	4
NRES 100 - Principles of Natural Resources and Environmental Science	3
Core Curriculum Fine Arts Course	3
TOTAL	17

###### First Year - Spring Semester

ENG 102 - Composition II	3
CHEM 122 - General Chemistry II	4
BIOL 190 - Introduction to Cell and Molecular Biology	3
GEOL 101 - General Geology	3
RECO 100 – Society and the Economic Value of Nature OR RECO 202 - Natural Resources, Environment and the Economy (Preferred)	3
TOTAL	16

###### Second Year - Fall Semester

BIOL 191 - Introduction to Organismal Biology	3
NRES 211 -Conservation, Biodiversity and Humans	3
NRES 295 –Ecohydrology	3
CH 201 - Ancient and Medieval Cultures	3
Elective	3
TOTAL	15

###### Second Year - Spring Semester

NRES 210 - Environmental Pollution	3
APST 270 – Introduction to Statistical Methods	4
CH 202 - The Modern World	3
CH 203 - American Experiences and Constitutional Change	3
Elective	3
TOTAL	16

###### Third Year - Fall Semester

NRES 345 - Range and Forest Plants	5
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###### **AND (even years)**

NRES 310 - Wildlife Ecology & Management	4
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NRES 322 - Soils	3
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Elective	2
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###### **OR (odd years)**

NRES 407 - Forest and Range Measurements	5
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NRES 498 - Rangeland Restoration Ecology .....	3
Elective .....	3
TOTAL .....	14-16

**Third Year - Spring Semester**

NRES 341 - Principles of Rangeland Management.....	3
NRES 494 - Range and Forest Administration & Policy (Capstone) .....	3

**AND (even years)**

NRES 493 - Range and Forest Ecology.....	3
NRES 497 - Forest and Range Soils.....	3
ANSC 413 - Range Livestock Interactions .....	3
NRES 441 - Ecology & Management of Invasive Plants .....	3

**OR (odd years)**

NRES 451 - Remote Sensing of Natural Resources.....	3
NRES 460 - Rangeland Resource Management.....	3
Elective .....	4
TOTAL .....	16-18

**Fourth Year - Fall Semester**

VM 481 - Animals in Human Cultures (Capstone) .....	3
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**AND (even years)**

NRES 310 - Wildlife Ecology and Management.....	4
NRES 322 - Soils .....	3
Elective .....	6

**OR (odd years)**

NRES 407 - Forest and Range Measurements .....	5
NRES 498 - Rangeland Restoration Ecology.....	3
Elective .....	5
TOTAL .....	16

**Fourth Year - Spring Semester**

NRES 406 R - Ecophysiology of Forest and Range Plants ..	4
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**AND (even years)**

NRES 493 - Range and Forest Ecology.....	3
NRES 497 - Forest and Range Soils.....	3
ANSC 413 - Range Livestock Interactions .....	3
NRES 441 - Ecology & Management of Invasive Plants .....	3

**OR (odd years)**

NRES 451 - Remote Sensing of Natural Resources.....	3
NRES 460 - Rangeland Resource Management.....	3
Elective .....	6
TOTAL .....	16

**Minors in Natural Resources and Environmental Science**

Students majoring in another field may minor in any of the following:

**Minor in Ecohydrology—20 credits**

All courses are 3 credits unless otherwise noted.

GEOL 101—General Geology
NRES 295—Principles of Ecohydrology
NRES 322—Soils
NRES 440—Wetland Ecology and Management (4 credits)
NRES 482—Small Watershed Hydrology (4 credits)
NRES 484—Limnology: Study of Inland Waters OR
BIOL 420—Aquatic Ecology

**Minor in Environmental Science—21 credits**

All courses are 3 credits unless otherwise noted.

CHEM 241—Organic Chemistry I
NRES 210—Environmental Pollution
NRES 211—Conservation, Biodiversity and Humans

NRES 295—Principles of Ecohydrology
NRES 322—Soils
NRES 432—Advanced Environmental Toxicology
<b>Select ONE of the following:</b>
NRES 400—International Issues for Water Development
NRES 467—Regional and Global Issues in Natural Resources and Environmental Science

**Minor in Forest and Rangeland Management—20 credits**

All courses are 3 credits unless otherwise noted.

NRES 322—Soils
NRES 341—Principles of Range Management
NRES 405—Silviculture and Regional Silviculture (5 credits)
<b>Select AT LEAST 9 credits from the following:</b>
NRES 310—Wildlife Ecology and Management (4 credits)
NRES 345—Range and Forest Plants (5 credits)
NRES 401—Forest Operations (4 credits)
NRES 402—Forest Management (5 credits)
NRES 406 R - Ecophysiology of Forest & Range Plants (4 credits)
NRES 407—Forest and Range Measurements (5 credits)
NRES 421—Conservation Biology
NRES 422—Soil Physics
NRES 441—Ecology and Management of Invasive Plants
NRES 460—Rangeland Resource Management
NRES 461—Forest Resources Management
NRES 493—Range and Forest Ecology
NRES 497—Forest and Range Soils
NRES 498—Rangeland Restoration Ecology

**Minor in Wildlife Ecology and Conservation—19-20 credits**

All courses are 3 credits unless otherwise noted.

NRES 211—Conservation, Humans and Biodiversity
NRES 310—Wildlife Ecology and Management (4 credits)
NRES 421—Conservation Biology
NRES 488—Dynamics and Management of Wildlife Populations
<b>Select ONE from the following:</b>
BIOL 430—Field Ornithology AND
BIOL 433—Ornithology (4 credits)
BIOL 431—Ichthyology (2 credits)
BIOL 432—Herpetology (4 credits)
BIOL 434—Mammalogy (4 credits)
BIOL 437—Entomology
<b>Select ONE from the following:</b>
BIOL 316—Comparative Animal Physiology
BIOL 481—Principles of Animal Behavior

**NUTRITION**

**215 Sarah H. Fleischmann Building  
(775) 784-6440**

The department offers a bachelor of science degree in nutrition with two specializations: dietetics or nutritional sciences. The department also offers a master of science degree with a major in nutrition. Degree candidates study human anatomy, physiology, microbiology and biochemistry, and learn how each of these disciplines relates to nutrition. Students also study the effects of nutrition in health and disease as they apply to various stages of the life cycle; food science; nutrient composition of foods; and nutritional assessment, planning, intervention and evaluation. Students may also minor in nutrition.

## Career Potential

The dietetics specialization prepares students for an accredited internship program in preparation for the National Registered Dietitian Examination. The career may include work as a registered dietitian in community nutrition, hospital settings and private practice.

The nutritional science specialization prepares students for graduate work and nutrition research and is an excellent pre-med/pre-health profession major.

## Nutrition Major

The bachelor of science degree in nutrition, with either the dietetics or nutritional sciences specialization, requires a minimum of 128 credits. At least 40 credits must be earned in courses numbered 300 or 400. A maximum of 30 required or elective credits on a satisfactory/unsatisfactory (S/U) basis may be utilized as part of the credit requirements.

## Bachelor of Science Nutrition Major

### DIETETICS SPECIALIZATION

The American Dietetics Association Commission on Accreditation for Dietetics Education requires that students complete the following to become registered dietitians:

1. an undergraduate degree that includes courses comprising an approved didactic program in dietetics.
2. a post-baccalaureate, accredited internship.

The dietetics specialization consists of required and elective courses approved by the American Dietetic Association for a didactic program in dietetics (The Didactic Program in Dietetics at the University of Nevada, Reno is accredited by the American Dietetics Association Commission on Accreditation for Dietetics Education). Students who complete the dietetics degree/didactic program in dietetics are eligible upon graduation to complete the second requirement. Students who complete both of the above requirements are then eligible to take the national registration examination for dietitians and pursue employment as a registered dietitian. A variety of careers are available in the field, including clinical/hospital dietetics, administrative dietetics, community nutrition and private or consulting nutrition services.

The following courses are required for the clinical dietetics specialization:

	Credits
<b>I. UNIVERSITY CORE CURRICULUM REQUIREMENTS .....</b>	<b>37-42</b>
<b>NOTE:</b> Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy"	
<b>A. English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
<b>NOTE:</b> Students who place in ENG 102 are not required to complete ENG 101.	
<b>B. Mathematics—5 credits</b>	
MATH 128—Precalculus and Trigonometry.....	5
<b>C. Natural Sciences—8 credits</b>	
CHEM 121—General Chemistry I.....	4
CHEM 122—General Chemistry II.....	4
<b>D. Social Sciences—3 credits</b>	
PSY 101—Introduction to Psychology as a Social Science.....	3
<b>E. Fine Arts—3 credits</b>	
Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....	3
<b>F. Core Humanities—9 credits</b>	
CH 201—Ancient and Medieval Cultures .....	3
CH 202—The Modern World .....	3

CH 203—American Experiences and Constitutional Change .....	3
<b>G. Capstone Courses—6 credits</b>	
NUTR 485 R—Nutrition Research and Contemporary Issues .....	3
HDFS 438—Children and Families in a Multiethnic Society .....	3
<b>H. Diversity</b>	
HDFS 438—Children and Families in a Multiethnic Society (see capstone courses above)	

## II. MAJOR REQUIREMENTS.....66

<b>A. Natural Science Courses—19 credits</b>	
BIOL 190—Introduction to Cell and Molecular Biology .....	3
BIOL 223 and BIOL 224—Human Anatomy and Physiology I and II .....	8
BIOL 251—General Microbiology .....	4
CHEM 220A—Introductory Organic Chemistry Lecture .....	3
CHEM 220L—Introductory Organic Chemistry Lab .....	1
<b>B. Professional Courses—33 credits</b>	
NUTR 220—Food Service Systems Management .....	3
NUTR 221—Quantity Food Purchasing .....	3
NUTR 223—Principles of Nutrition.....	3
NUTR 271—Introduction to Dietetics.....	1
NUTR 326—Principles of Food Science.....	3
NUTR 370—Nutrition in the Life Cycle.....	3
NUTR 426—Medical Nutrition Therapy I.....	3
NUTR 427—Medical Nutrition Therapy II.....	3
NUTR 451—Principles of Human Nutrition and Metabolism.....	4
NUTR 452 R—Advanced Nutrition.....	4
NUTR 470—Community Nutrition .....	3
NUTR 485 R—see Core Curriculum Capstone requirement	
<b>C. Other Required Courses—14 credits</b>	
COM 113—Fundamentals of Speech Communication <b>OR</b> COM 329—Business and Professional Speaking .....	3
CHS 310—Health and Wellness Communications .....	3
HDFS 438—Children and Families in a Multiethnic Society (Capstone and Diversity)	
MGT 323—Organization and Interpersonal Behavior.....	3
NUTR 110—Success Strategies in Nutrition .....	2
PSY 210—Statistical Methods.....	3

## III. MINOR REQUIREMENTS.....0

## IV. ELECTIVES.....20-25

## V. TOTAL CREDITS.....128

## VI. RECOMMENDED SCHEDULE

<b>First Year - First Semester</b>	
ENG 101—Composition.....	3
MATH 128—Precalculus and Trigonometry.....	5
PSY 101—General Psychology .....	3
NUTR 110—Success Strategies in Nutrition (Fall Only).....	1
NUTR 220—Food Service Systems Management (Fall Only) .....	3
Elective Free elective.....	1
TOTAL .....	16
<b>First Year - Second Semester</b>	
CHEM 121—General Chemistry I.....	4
ENG 102—Composition II .....	3
NUTR 221—Quantity Food Purchasing (Spring Only).....	3
COM 113—Fundamentals of Speech Communication <b>OR</b>	

COM 329—Business and Professional Speaking .....	3
Core Fine Arts .....	3
TOTAL .....	16
<b>Second Year - First Semester</b>	
BIOL 190—Cell & Molecular Biology.....	3
BIOL 223—Human Anatomy and Physiology I.....	4
CHEM 122—General Chemistry II.....	4
CH 201—Ancient and Medieval Cultures.....	3
NUTR 271—Introduction to Dietetics (Fall Only).....	1
Free elective .....	1
TOTAL .....	16
<b>Second Year - Second Semester</b>	
BIOL 224—Human Anatomy and Physiology II.....	4
CHEM 220A—Introductory Organic Chemistry Lecture.....	3
CHEM 220L—Introductory Organic Chemistry Lab.....	1
CH 202—The Modern World .....	3
Free Electives.....	5
TOTAL .....	16
<b>Third Year - First Semester</b>	
BIOL 251—General Microbiology.....	4
MGT 323—Organization and Interpersonal Behavior.....	3
NUTR 223—Principles of Nutrition.....	3
NUTR 326—Principles of Food Science.....	3
Free Elective.....	3
TOTAL .....	16
<b>Third Year - Second Semester</b>	
NUTR 370—Nutrition in the Life Cycle (Spring Only).....	3
CH 203—American Experiences and Constitutional Change.....	3
PSY 210—Statistical Methods (APST 270 OK with adviser permission).....	3
Free Electives.....	6-7
TOTAL .....	15-16
Take 4 credit electives if PSY 210 taken. Take 3 credits electives if APST 270 taken	
<b>Fourth Year - First Semester</b>	
NUTR 426—Medical Nutrition Therapy I (Fall Only).....	3
NUTR 451—Principles of Human Nutrition and Metabolism (Fall Only).....	4
NUTR 470—Community Nutrition (Fall Only).....	4
CHS 320—Instructional Strategies in Health and Wellness (Spring Only).....	3
Free electives .....	4
TOTAL .....	18
<b>Fourth Year - Second Semester</b>	
HDFS 438—Children and Families in a Multiethnic Society .....	3
NUTR 452 R—Advanced Nutrition (Spring Only).....	3
NUTR 427—Medical Nutrition Therapy II (Spring Only).....	3
NUTR 485R—Nutrition Research and Contemporary Issues (Spring Only).....	3
Free elective .....	2
TOTAL .....	14

## Bachelor of Science Nutrition Major

### NUTRITIONAL SCIENCES SPECIALIZATION

The nutritional sciences specialization as a pre-health major provides excellent preparation for those students whose career goals include medicine, dentistry, pharmacy, physical therapy, etc. The nutritional science specialization also prepares the student for graduate work (M.S., Ph.D.) in nutrition.

I. UNIVERSITY CORE CURRICULUM REQUIREMENTS.....	Credits 39-44
NOTE: Refer to the Core Curriculum chapter of this catalog	

for information regarding the "Core English and Math Completion Policy".

A. <b>English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
NOTE: Students who place in ENG 102 are not required to complete ENG 101.	
B. <b>Mathematics—4 credits</b>	
MATH 181—Calculus I.....	4
C. <b>Natural Sciences—8 credits</b>	
CHEM 121—General Chemistry I.....	4
CHEM 122—General Chemistry II.....	4
D. <b>Social Sciences—3 credits</b>	
PSY 101—General Psychology.....	3
E. <b>Fine Arts—3 credits</b>	
Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....	3
F. <b>Core Humanities—9 credits</b>	
CH 201—Ancient and Medieval Cultures.....	3
CH 202—The Modern World .....	3
CH 203—American Experiences and Constitutional Change.....	3
G. <b>Capstone Courses—6 credits</b>	
NUTR 485 R—Nutrition Research and Contemporary Issues.....	3
Refer to the "Capstone" section of the Core Curriculum chapter in this catalog for second capstone.....	3
H. <b>Diversity—3 credits</b>	
Refer to the "Diversity" section of the Core Curriculum chapter in this catalog.	

## II. MAJOR REQUIREMENTS.....69

A. <b>Natural Science and Mathematics Courses—41 credits</b>	
BCH 303—Biochemical Analysis.....	2
BIOL 190—Introduction to Cell and Molecular Biology.....	3
BIOL 191—Introduction to Organismal Biology.....	3
BIOL 192—Principles of Biological Investigation.....	2
BIOL 223 and BIOL 224—Human Anatomy and Physiology I and II.....	8
BIOL 251—General Microbiology.....	4
CHEM 241/242/345—Organic Chemistry I, II and Organic Chemistry Lab.....	8
PHYS 151 R—General Physics I and Lab.....	4
PHYS 152 R—General Physics II and Lab.....	4
PSY 210—Statistical Methods.....	3
B. <b>Social Sciences—3 credits</b>	
Additional social science courses.....	3
C. <b>Professional Courses—23 credits</b>	
NUTR 223—Principles of Nutrition.....	3
NUTR 370—Nutrition in Life Cycle.....	3
NUTR 426—Medical Nutrition Therapy I.....	3
NUTR 427 R—Medical Nutrition Therapy II.....	3
NUTR 451—Principles of Human Nutrition and Metabolism.....	4
NUTR 452 R—Advanced Nutrition.....	4
NUTR 485 R—see Core Curriculum Capstone requirement Nutrition Elective.....	3
D. <b>First Year Experience—2 credits</b>	
NUTR 110—Success Strategies in Nutrition.....	2

## III. MINOR REQUIREMENTS.....0

## IV. ELECTIVES.....15-20

## V. TOTAL CREDITS.....128

**VII. RECOMMENDED SCHEDULE****First Year - First Semester**

ENG 101—Composition.....	3
MATH 181—Calculus I.....	4
CHEM 121—General Chemistry I.....	4
PSY 101—General Psychology.....	3
NUTR 110—Success Strategies in Nutrition (Fall Only).....	2
TOTAL.....	16

**First Year - Second Semester**

CHEM 122—General Chemistry II.....	4
ENG 102—Composition II.....	3
PHYS 151R—General Physics I and Laboratory.....	4
Free Electives.....	5
TOTAL.....	16

**Second Year - First Semester**

BIOL 190—Cell & Molecular Biology.....	3
BIOL 223—Human Anatomy and Physiology I.....	4
PHYS 152R—General Physics II and Laboratory.....	4
CHEM 241—Organic Chemistry I (Fall Only).....	3
Free Electives.....	2
TOTAL.....	16

**Second Year - Second Semester**

BIOL 191—Introduction to Organismal Biology.....	3
BIOL 224—Human Anatomy and Physiology II.....	4
CHEM 242—Organic Chemistry II (Spring Only).....	3
NUTR 223—Principles of Nutrition.....	3
CH 201—Ancient and Medieval Cultures.....	3
TOTAL.....	16

**Third Year - First Semester**

CHEM 345—Organic Chemistry Laboratory.....	2
BIOL 192—Principles of Biological Investigation.....	2
BIOL 251—General Microbiology.....	4
CH 202—The Modern World.....	3
Free Electives.....	5
TOTAL.....	16

**Third Year - Second Semester**

PSY 210—Statistical Methods (APST 270 with advisor permission).....	3
CH 203—American Experiences and Constitutional Change.....	3
BCH 303—Biochemical Analysis (Spring Only).....	2
NUTR 370—Nutrition in the Life Cycle (Spring Only).....	3
*Free Electives.....	4-5
TOTAL.....	15-16
*Take 5 credits elective if PSY 210 taken. Take 4 credits electives if APST 270 taken.	

**Fourth Year - First Semester**

NUTR 426—Medical Nutrition Therapy I (Fall Only).....	3
NUTR 451—Principles of Human Nutrition and Metabolism (Fall Only).....	4
Core Fine Arts.....	3
General Capstone Course.....	3
Nutrition Elective.....	3
Free Elective.....	1
TOTAL.....	17

**Fourth Year - Second Semester**

NUTR 427—Medical Nutrition Therapy II (Spring Only).....	3
NUTR 452 R—Advanced Nutrition (Spring Only).....	4
NUTR 485R—Nutrition Research and Contemporary Issues (Spring Only).....	3
Diversity Course.....	3
Free Electives.....	2
TOTAL.....	15

**Nutrition Minor—18 credits**

Students majoring in another field may minor in nutrition by completing 18 credits from the following list: NUTR 205, 223, 325, 370, 426, 427, 451, 452, 470.

**RESOURCE ECONOMICS**

217 Fleischmann Agriculture

(775) 784-6701

**Undergraduate Curricula**

The Resource Economics department offers two majors: one in Agricultural and Applied Economics and the other in Environmental and Resource Economics. The department also offers three minors: Agribusiness, Natural Resource and Environmental Economics, and Applied Statistics.

**Bachelor of Science****Agricultural and Applied Economics Major**

The Agricultural and Applied Economics major is designed to prepare students for careers as applied economists managing agribusiness, assets, commodities, financial institutions or public agencies concerned with the use of water, land and biodiversity. It is also good preparation for graduate study in economics or law. The program is flexible, allowing students to study farms/ranching, finance, animal, crop, resource, or business management and marketing. All majors learn how to analyze consumer behavior, market prices, optimal production, risk management, policy and international economic issues. The program equips graduates with the quantitative, analytical, and communication skills needed to measure, analyze, interpret, manage, plan or predict farm, food, and resource activity and policy.

**I. UNIVERSITY CORE CURRICULUM**

Credits

**REQUIREMENTS.....36-42**

**NOTE:** Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".

**A. English—3-8 credits**

Refer to the "English" section of the Core Curriculum chapter in this catalog.....3-8

**NOTE:** Students who place in ENG 102 are not required to complete ENG 101.

**B. Mathematics—3-4 credits**

MATH 176—Introductory Calculus for Business and Social Sciences **OR**.....3

MATH 181—Calculus I (recommended).....4

**C. Natural Sciences—6 credits**

Refer to the "Natural Sciences" section of the Core Curriculum chapter in this catalog.....6

**D. Social Sciences—3 credits**

RECO 100—Society and the Economic Value of Nature **OR** ECON 102—Principles of Microeconomics.....3

**E. Fine Arts—3 credits**

Refer to the "Fine Arts" section of the Core Curriculum chapter in this catalog.....3

**F. Core Humanities—9 credits**

CH 201—Ancient and Medieval Cultures.....3

CH 202—The Modern World.....3

CH 203—American Experiences and Constitutional Change.....3

**G. Capstone Courses—6 credits**

RECO 466—Natural Resource and Environmental Economics.....3

Refer to the "Capstone" section of the Core Curriculum chapter in this catalog for second capstone course.....3

**H. Diversity—3 credits**  
 ECON 359—Economic Development **OR**  
 Refer to the “Diversity” section of the Core Curriculum  
 chapter of this catalog.....3

**II. ADDITIONAL COLLEGE REQUIREMENTS.....0**

**III. MAJOR REQUIREMENTS .....55**  
 RECO 211—Agribusiness Management.....3  
 RECO 250—Applied Quantitative Methods.....3  
 RECO 322—Risk and Uncertainty.....3  
 RECO 325—Agro-Food Marketing **OR**  
 RECO 340—Natural Resource Economics **OR**  
 RECO 468—Economic Impact Analysis.....3  
 RECO 460—International Agricultural and Resource  
 Economics **OR**  
 ECON 462—International Trade.....3  
 APST 270—Introduction to Statistical Methods.....4  
 APST 470—Linear Regression and Time Series.....3  
 ACC 201—Financial Accounting.....3  
 ACC 202—Managerial Accounting.....3  
 ECON 103—Principles of Macroeconomics.....3  
 ECON 302—Intermediate Microeconomics.....3  
 FIN 301—Principles of Managerial Finance.....3  
 IS 101—Introduction to Information Systems.....3  
 IS 201—Computer Applications.....3  
**Select THREE of the following six courses:.....9**  
 ANSC 100—Elements of Livestock Production  
 ECON 304—Money and Banking  
 ECON 440—Introduction to Mathematical Economics  
 MGT 323—Organization and Interpersonal Behavior  
 MGT 325—Legal Environment  
 NRES 341—Principles of Range Management  
**Select ONE from the following four courses:.....3**  
 COM 113—Fundamentals of Speech Communication  
 COM 315—Small Group Communication  
 COM 329—Business and Professional Speaking  
 ENG 321—Expository Writing

**IV. MINOR REQUIREMENTS.....0**

**V. ELECTIVES.....31-37**  
 18 elective credits are selected on consultation with and approval  
 from major advisor. Any RECO or APST elective courses are  
 automatically approved.

**VI. TOTAL CREDITS.....128**

**VII. RECOMMENDED SCHEDULE  
 AGRICULTURAL AND APPLIED ECONOMICS**

**First Year - Fall Semester**  
 RECO 100—Society and the Economic Value of Nature ...3  
 ACC 201—Financial Accounting.....3  
 IS 101—Information Systems.....3  
 ENG 101—Composition I.....3  
 MATH 127 R—Precalculus II (3 credits) **OR**  
 MATH 128—Precalculus and Trigonometry (5 credits) **OR**  
 Free Elective.....3-5  
 TOTAL.....15-17

**First Year - Spring Semester**  
 ACC 202—Managerial Accounting.....3  
 ENG 102—Composition II.....3  
 IS 201—Computer Applications.....3  
 MATH 181—Calculus I.....4

RECO 250—Applied Quantitative Methods.....3  
 Free Elective.....1  
 TOTAL.....17

**Second Year - Fall Semester**  
 ECON 103—Principles of Macroeconomics.....3  
 CH 201—Ancient and Medieval Cultures.....3  
 RECO 211—Agribusiness Management (even years) **OR**  
 RECO 325—Agro-Food Marketing (odd years).....3  
 Core Curriculum Natural Science A or B.....3  
 Free Elective.....3  
 Free Elective.....1  
 TOTAL.....16

**Second Year - Spring Semester**  
 APST 270—Introduction to Statistical Methods.....4  
 CH 202—The Modern World.....3  
 CH 203—American Experiences and Constitutional  
 Change.....3  
 Core Curriculum Fine Arts.....3  
 Core Curriculum Natural Science A or B.....3  
 TOTAL.....16

**Third Year - Fall Semester**  
 ECON 302—Intermediate Microeconomics.....3  
 FIN 301—Principles of Managerial Finance.....3  
 RECO 325—Agro-Food Marketing (odd years) **OR**  
 RECO 468—Economic Impact Analysis (odd years) **OR**  
 RECO 211—Agri-Business Management (even years).....3  
 Directed Field Elective.....3  
 Directed Oral or Written Communications Elective.....3  
 Free Elective.....1  
 TOTAL.....16

**Third Year - Spring Semester**  
 APST 470—Linear Regression and Time Series.....3  
 RECO 322—Risk and Uncertainty (even years) **OR**  
 RECO 340—Natural Resource Economics (odd years).....3  
 Directed Field Elective.....3  
 Free Elective.....7  
 TOTAL.....16

**Fourth Year - Fall Semester**  
 RECO 460—International Agricultural and Resource  
 Economics (even years) **OR**  
 ECON 462—International Trade (odd years).....3  
 RECO 466—Natural Resource & Environmental  
 Economics (Capstone).....3  
 RECO 468—Economic Impact Analysis (odd years) **OR**  
 ECON 440—Introduction to Mathematical Economics  
 (even years).....3  
 Free Elective.....7  
 TOTAL.....16

**Fourth Year - Spring Semester**  
 ECON 359—Economic Development.....3  
 RECO 340—Natural Resource Economics (odd years) **OR**  
 RECO 322—Risk and Uncertainty (even years).....3  
 Directed Elective.....3  
 Free Elective.....4  
 General Capstone.....3  
 TOTAL.....16

**Bachelor of Science  
 Environmental and Resource Economics  
 Major**

This major prepares students for careers concerning environment and natural resource use or conservation as managers, planners, or policy makers, for example. It is also good preparation for graduate study in economics or law. Students learn about behavioral economics and environment and resource issues at home and around the world. All majors learn to design and evaluate optimal resource use and policy,

manage risk, measure the value of things that are not transacted in markets, and conduct socio-economic impact assessments. It requires a minor so that students formally augment their economics training with a specialty in wildlife, forestry, resource or risk management or the environmental policy process. The program equips graduates with the quantitative, analytical, and communication skills to measure, analyze, and explain environmental and natural resource opportunities, threats, goals, and policies.

Credits

<b>I. UNIVERSITY CORE CURRICULUM REQUIREMENTS.....</b>	<b>36-42</b>
NOTE: Refer to the Core Curriculum chapter of this catalog for information regarding the "Core English and Math Completion Policy".	
<b>A. English—3-8 credits</b>	
Refer to the "English" section of the Core Curriculum chapter in this catalog.....	3-8
NOTE: Students who place in ENG 102 are not required to complete ENG 101.	
<b>B. Mathematics—3-4 credits</b>	
MATH 176—Introductory Calculus for Business and Social Sciences OR.....	3
MATH 181—Calculus I (recommended).....	4
<b>C. Natural Sciences—6 credits</b>	
Refer to the "Natural Sciences" section of the Core Curriculum chapter in this catalog.....	6
<b>D. Social Sciences—3 credits</b>	
RECO 100—Society and the Economic Value of Nature OR ECON 102—Principles of Microeconomics.....	3
<b>E. Fine Arts—3 credits</b>	
Refer to the "Fine Arts" section of the Core Curriculum chapter of this catalog.....	3
<b>F. Core Humanities—9 credits</b>	
CH 201—Ancient and Medieval Cultures.....	3
CH 202—The Modern World.....	3
CH 203—American Experiences and Constitutional Change.....	3
<b>G. Capstone Courses—6 credits</b>	
RECO 466—Natural Resource and Environmental Economics.....	3
PSC 403C—Environmental Policy OR	
GEOG 400—International Issues for Water Development.....	3
<b>H. Diversity—3 credits</b>	
ECON 359—Economic Development OR	
Refer to the "Diversity" section of the Core Curriculum chapter of this catalog.....	3
<b>II. ADDITIONAL COLLEGE REQUIREMENTS.....</b>	<b>0</b>
<b>III. MAJOR REQUIREMENTS.....</b>	<b>43</b>
RECO 240—Environmental Economics.....	3
RECO 250—Applied Quantitative Methods.....	3
RECO 322—Risk and Uncertainty.....	3
RECO 340—Natural Resource Economics.....	3
RECO 468—Economic Impact Analysis.....	3
APST 270—Introduction to Statistical Methods.....	4
APST 470—Linear Regression and Time Series.....	3
ECON 103—Principles of Macroeconomics.....	3
ECON 302—Intermediate Microeconomics.....	3
IS 101—Introduction to Information Systems.....	3
IS 201—Computer Applications.....	3
NRES 412—Environmental Law.....	3
Select ONE from the following three courses: 3 credits	
NRES 458—Land and Water Resource Policy.....	3
PSC 403D—Global Environmental Policy OR	

RECO 460—International Agricultural Resource Economics.....	3
Select ONE from the following five courses: 3 credits	
COM 101—Oral Communication.....	3
COM 113—Fundamentals of Speech Communication.....	3
COM 315—Small Group Communication.....	3
COM 329—Business and Professional Speaking.....	3
ENG 321—Expository Writing.....	3

**IV. MINOR REQUIREMENTS.....18-21**

Refer to the appropriate section of this catalog for the required courses for a minor.

**Recommended minors include:**

Animal Science (ANSC).....	20
Community Health Sciences (CHS).....	19
Biology (BIOL).....	20
Chemistry (CHEM).....	20-21
Civil Engineering (CEE).....	18
Economics (ECON).....	18
Environmental Engineering (CEE).....	18
Environmental Science (NRES).....	21
Foreign Languages and Literatures (FLL).....	21
Forest and Rangeland Management (NRES).....	20
Geography (GEOG).....	18
Geology (GEOL).....	19
Hydrogeology (GEOL).....	19
Journalism (JOUR).....	18
Mining Engineering (MINE).....	18
Political Science (PSC).....	21
Sociology (SOC).....	18
Wildlife Ecology and Conservation (NRES).....	19

**V. ELECTIVES.....22-31****VI. TOTAL CREDITS.....128****VII. RECOMMENDED SCHEDULE ENVIRONMENTAL AND RESOURCE ECONOMICS****First Year - Fall Semester**

RECO 100—Society and the Economic Value of Nature ...	3
IS 101—Information Systems .....	3
ENG 101—Composition I .....	3
MATH 127 R—Precalculus II (3 credits) OR	
MATH 128—Precalculus and Trigonometry (5 credits) OR	
Free Elective (3 credits).....	3-5
Core Curriculum Natural Science A or B (consistent with Minor field).....	3
TOTAL.....	15-17

**First Year - Spring Semester**

ECON 103—Principles of Macroeconomics.....	3
ENG102—Composition II .....	3
IS 201—Computer Applications .....	3
MATH 181—Calculus I.....	4
RECO 240—Environmental Economics.....	3
Free Elective.....	1
TOTAL.....	17

**Second Year - Fall Semester**

APST 270—Introduction to Statistical Methods .....	4
CH 201—Ancient and Medieval Cultures .....	3
Core Curriculum Natural Science A or B.....	3
Minor Requirement.....	3
Free Elective.....	3
TOTAL.....	16

**Second Year - Spring Semester**

CH 202—The Modern World .....	3
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CH 203—American Experiences and Constitutional Change .....	3
RECO 250—Applied Quantitative Methods.....	3
Core Curriculum Fine Arts .....	3
Free Elective .....	3
Free Elective .....	1
TOTAL .....	16

**Third Year - Fall Semester**

RECO 322—Risk and Uncertainty (even years) OR	
RECO 468—Economic Impact Analysis (odd years).....	3
ECON 302—Intermediate Microeconomics .....	3
Directed Oral or Written Communications Elective .....	3
Free Elective .....	4
Minor Requirement.....	3
TOTAL .....	16

**Third Year - Spring Semester**

APST 470—Linear Regression and Time Series .....	3
NRES 412—Environmental Law .....	3
RECO 340—Natural Resource Economics (odd years) OR	
PSC 403C—Environmental Policy (alternative Capstone even years).....	3
Free Elective .....	4
Minor Requirement.....	3
TOTAL .....	16

**Fourth Year - Fall Semester**

NRES/GEOG 400—International Issues for Water Development .....	3
RECO 460—International Agricultural and Resource Economics OR	
ECON 462—International Trade.....	3
RECO 466—Nat'l Res & Environmental Economics (Capstone).....	3
RECO 468—Economic Impact Analysis (odd years) OR	
RECO 322—Risk and Uncertainty (even years).....	3
Free Elective .....	1
Minor Requirement.....	3
TOTAL .....	16

**Fourth Year - Spring Semester**

ECON 359—Economic Development .....	3
RECO 340—Natural Resource Economics (odd years) OR	
PSC 403C—Environmental Policy (alternative capstone even years).....	3
Free Elective .....	7
Minor Requirement.....	3
TOTAL .....	16

**Agribusiness Minor—18 credits**

The minor program is designed for students who are interested in supplementing their major field with a background in agribusiness.

All courses are 3 credits unless otherwise noted.	
RECO 100—Society and the Economic Value of Nature OR	
ECON 102—Principles of Microeconomics	
RECO 211—Agribusiness Management	
RECO 250—Applied Quantitative Methods	
RECO 322—Risk and Uncertainty	
RECO 325—Agro-Food Marketing	
RECO 460—International Agricultural and Resource Economics OR	
RECO 468—Economic Impact Analysis	

**Natural Resource and Environmental Economics Minor—18 credits**

This minor is designed for students who want to broaden their skill set to include economics and managerial techniques. The minor augments basic applied economics with environmental and

resource topics such as risk management, cost/benefit analysis, economic impact assessment, exhaustible resources, environmental externalities, and policy.

All courses are 3 credits unless otherwise noted.

RECO 100—Society and the Economic Value of Nature OR	
ECON 102—Principles of Microeconomics	
RECO 240—Environmental Economics	
RECO 322—Risk and Uncertainty	
ECON 302—Intermediate Microeconomics	
RECO 340—Natural Resource Economics	
RECO 466—Natural Resource and Environmental Economics OR	
RECO 468—Economic Impact Analysis	

**Applied Statistics Minor—19-21 credits**

The applied statistics minor provides a foundation for the use of statistical methods as a scientific tool for estimation and hypothesis testing. By emphasizing applications in the physical, life and behavioral sciences, this minor should complement degree programs in most disciplines. Equivalent course work from other departments, e.g., EPY 440, ECON 262 R, STAT 152, MATH/STAT 352 or PSY 210, may be substituted for APST 270. Contact the undergraduate advisor in the department of Resource Economics for further details.

**Required Courses**

All courses are 3 credits unless otherwise noted.	
MATH 181—Calculus I (recommended) OR	
MATH 176—Introductory Calculus for Business and Social Sciences (3-4 credits)	
One other MATH/STAT course (3-4 credits)	
RECO 250—Applied Quantitative Methods	
APST 270—Introduction to Statistical Methods (4 credits)	
APST 463—Design and Analysis of Experiments	
APST 470—Linear Regression and Time Series	

**GRADUATE OFFERINGS**

Both major-minor and area of emphasis programs are available at the graduate level. The master's programs include both Plan A (requiring the completion of a thesis) and Plan B (non-thesis). Students must earn 30 credits to complete Plan A and 32 credits to complete Plan B.

The graduate plan of study is developed by the student and the advisory committee. The study program must meet the minimum requirements listed in the Graduate School section of this catalog. Students must also meet any additional requirements specified by the advisory committee or the related department(s).

The doctor of philosophy degree is primarily a research degree with a course of study determined by the student and an advisory committee. The program must meet the minimum requirements listed in the Graduate School section of this catalog.

Graduate research assistantships are available. Applications should be submitted to the appropriate department.

**Master's and Doctoral Programs**

The College of Agriculture, Biotechnology and Natural Resources offers five master of science degree programs. Programs requiring a thesis are available with majors in resource and applied economics, animal science, natural resources and environmental science, biochemistry and nutrition. The college also participates in the interdisciplinary programs of cellular and molecular biology, hydrologic sciences and environmental sciences and health. Non-thesis programs are available in resource and applied economics, animal science, and natural resources and environmental science. The College also houses a novel five year B.S./M.S. degree program in biotechnology. Students may also specialize in occupational education in a cooperative program with the College of Education. The course of study leads to a master of education degree with a major in secondary education.

The College of Agriculture, Biotechnology and Natural Resources

offers a doctoral degree in Economics, biochemistry and participates in other doctoral degree programs jointly with other colleges. The joint degree offerings include: Cell and Molecular Biology (in the College of Agriculture, Biotechnology and Natural Resources, the College of Science, as well as the School of Medicine); ecology, evolution and conservation biology (College of Agriculture, Biotechnology and Natural Resources, College of Science and the Desert Research Institute); environmental sciences (College of Agriculture, Biotechnology and Natural Resources, the College of Science, and the School of Community Health Sciences), and hydrologic sciences (Colleges of Agriculture, Biotechnology and Natural Resources, College of Engineering, College of Science and the Desert Research Institute). For information about programs and course requirements, refer to the Interdisciplinary and Special Programs section of this catalog.

### **Master's in Resource and Applied Economics**

The Resource Economics department offers a master's degree in resource and applied economics.

Two study plans are available to students pursuing the master's of science degree. Plan A requires students to write a thesis. Plan B requirement includes additional coursework. A professional paper is optional for Plan B students. For further information please visit the department's website at <http://www.ag.unr.edu/re>

The department also participates in the interdisciplinary graduate program in hydrological sciences. For further information please refer to the Interdisciplinary and Special Programs section of this catalog or contact the Department of Hydrologic Sciences.

### **Ph.D. in Economics**

The Ph.D. program in Economics requires a total of 72 credits and consists of three parts: a core training in microeconomics theory and quantitative methods (year one); a field training in resource economics and related topics (year two); and a choice of one of two additional specializations—Quantitative Methods or Regional Economic Development. The program can be completed in four to five years.

Students who do not pass the first year progression (core) exams or decide to exit the Ph.D. program after their first year for other reasons can still earn the Master's degree by completing all relevant courses during their second year.

Additional information and a detailed curriculum for the Ph.D. program are given at [http://www.cabnr.unr.edu/re/phd\\_info.htm](http://www.cabnr.unr.edu/re/phd_info.htm)

### **Master's Degree - Animal Science Major**

Students who pursue the master's degree in animal science must fulfill the requirements of the Graduate School and their advisory committee. The degree may be obtained either with or without completing a thesis requirement. The thesis may be written on research completed in nutrition, physiology, production, management, meats and general animal science. The number and nature of graduate examinations are determined by the student's advisory committee.

Students in the nonthesis program must meet the following requirements: have at least five years professional experience in agriculture related to animal science or complete an approved professional project. The project is selected by the student and the advisor for approval by the student's advisory committee.

The professional project is designed to train the degree candidate for increased proficiency in the livestock industry. It may comprise: either a field study carried out under the direction of the advisor or other appropriate university staff member, or a full-time progressive agricultural program, which gives the student experience in administration and other activities of the livestock industry. The student, who may receive a salary for work performed, must continue the project for at least one semester or for three months during the summer. Following completion of the project, students must submit a detailed written report of the work experience.

Degree candidates must select an approved topic appropriate to their major and write a professional paper incorporating and interpreting

pertinent literature. In completing the paper, students earn three graduate-level credits. The literature review and the professional project report may be incorporated into one paper, if appropriate.

### **Biochemistry Major**

A departmental graduate program leading to master of science and doctor of philosophy degrees in biochemistry is offered at the university. Faculty conduct research in the areas of human, animal, plant and insect biochemistry and molecular biology, ranging from gene control to protein structure. Research at the university's Department of Biochemistry and Molecular Biology utilizes state-of-art technologies including genomics, proteomics, crystallography and bioinformatics.

Candidates for admission to the program must meet the Graduate School's admission criteria, as well as certain additional requirements in chemistry, biochemistry, and molecular biology. Students who have not taken one or more of the above courses, but who meet the remaining requirements, may be admitted to the program with the understanding that such courses will be completed during the first year of graduate study.

The program of study for the Ph.D. requires a minimum of 72 credits, which can include a minimum of 35 credits in course work which includes 1 credit of comprehensive examination. The curriculum includes a core of biochemistry courses and electives in biochemistry and other life and physical sciences. Up to 37 dissertation credits are required. Students, in consultation with their advisor and graduate committee, select a study program that satisfies the program requirements and is consistent with their interests.

Students participate in a variety of educational experiences, including first-year research rotations, seminars and a yearly program retreat. All degree candidates present a final seminar on their dissertation research and provide an oral defense of their work.

**Graduate fellowships are available on a competitive basis. To ensure full consideration, fellowship applications for fall admissions should be completed by February 1.**

### **Biotechnology**

See listings under the Department of Biochemistry and the School of Veterinary Medicine.

### **Master's in Natural Resources and Environmental Science**

The master of science degree in Natural Resources and Environmental Science is offered by the Department of Natural Resources and Environmental Science. To ensure consideration for admission to the program, students must have a minimum overall grade-point average of 3.0, a GRE score of 1000 (500 on both verbal and quantitative) and strong letters of recommendation. Specific programs of study are developed through the collegial interaction of the student with his/her Graduate Advisory Committee. The program emphasizes the functioning of range, forest and aquatic ecosystems. Students study in the areas of: (1) wildlife and conservation biology, (2) environmental science (including watershed science), and (3) forest and rangeland ecology and management. Brief descriptions of current research programs for individual faculty are available at the department's web site <http://www.ag.unr.edu/ers/>. Prospective students should correspond with potential faculty whose research interests mirror their own interests early in the application process because admittance to the program requires a graduate faculty advisor and because most graduate assistantships are through the research grants of individual faculty.

Master of science and doctor of philosophy degrees may be earned in Environmental Sciences in an interdisciplinary program. For further information, refer to the Interdisciplinary and Special Programs section of this catalog.

Master of science and doctor of philosophy degrees may be earned in Hydrologic Sciences in an interdisciplinary program. For further information, refer to the Interdisciplinary and Special Programs section of this catalog.

A doctor of philosophy degree in Ecology, Evolution and Conservation Biology is available in an interdisciplinary program. For further information, refer to the Interdisciplinary and Special Programs section of this catalog.

## Nutrition Major

The purpose of the Nutrition Graduate Program is to provide students with a post-baccalaureate education (i.e., Master of Science) that:

1. Strengthens and advances core nutrition knowledge such that students are competent in the areas of nutritional biochemistry/physiology, and have an in-depth understanding of clinical and epidemiological applications of this knowledge as it relates to nutrition status assessment, and the prevention and treatment of disease; and
2. Provides opportunities such that students may develop proficiency in a more defined area that links nutrition with other biological or behavioral sciences (e.g., toxicology, molecular biology, epidemiology, human development). This will be accomplished through elective course work and completion of research/scholarly efforts that culminate in a written document (i.e., thesis or professional paper).

The program serves as an introduction to scholarly activity for those who wish to pursue doctoral training or research careers, and provides courses and other opportunities that serve to advance the knowledge of the nutrition profession.

### Admission Criteria

Students who seek admission to the program should have a cumulative grade-point average of at least 3.0, and have completed the following undergraduate courses (or equivalent courses, as determined by the nutrition department):

CHEM 121—General Chemistry I  
 CHEM 220A, 220L—Introductory Organic Chemistry  
 BIOL 223, 224—Human Anatomy and Physiology  
 BIOL 251—General Microbiology  
 MATH 128—Precalculus and Trigonometry  
 NUTR 223—Principles of Nutrition  
 NUTR 451—Principles of Human Nutrition and Metabolism **OR**  
 BCH 400—Introductory Biochemistry  
 NUTR 452 R—Advanced Nutrition

### Requirements

Plan A students must complete 32 credits, including 6 credits of thesis (NUTR 797 or equivalent). A thesis is a scientific document that describes the background, methods, results and conclusions of an original research activity.

Plan B students must complete 35 credits, including 3 credits of professional paper (NUTR 796 or equivalent). A professional paper here refers to a critical analysis of existing knowledge on a specified nutrition topic/problem that is written in a style suitable for a scientific journal.

Students enrolled in Plans A and B must complete and earn a “B” or better (i.e., 3.0) in each of the following core nutrition courses (total of 13 credits):

NUTR 725—Nutrition and Health.....3  
 NUTR 726—Seminar in Nutrition.....1  
 NUTR 730—Macronutrients.....3  
 NUTR 732—Nutrition Assessment Techniques.....3  
 NUTR 735—Micronutrients.....3

Students who fail to earn a “B” or better in one or more of the core nutrition courses have the option of re-enrolling in the course(s) the next time it is offered. There are no substitutions available for these classes.

Other required courses for both Plans A and B are listed below. (The selection among these course offerings should be made in consultation with the Advisory/Examining Committee members.)

1. Graduate-level research methods course (3 credits). Students may select a research course among the following approved courses:
  - CEP 700—Introduction to Educational Research
  - EL 785—Survey Research in Education
  - EECB 750—Research Design in Ecology (same as BIOL 750)
  - NUTR 685 R—Nutrition Research and Contemporary Issues
  - SOC 737—Survey Research Methods
2. Graduate-level statistics course (3 credits). Students may select a statistics course among the following approved courses:
  - APST 663—Design and Analysis of Experiments
  - CEP 640—Educational Measurements and Statistics
  - CEP 740—Advanced Educational Measurements and Statistics
  - CHS 780—Research Methods and Applied Biostatistics
3. Graduate-level seminar course (1 credit). In addition to NUTR 726 (1 credit) listed previously, all students must complete a second graduate seminar course. This requirement may be fulfilled by completing an additional semester of NUTR 726 or by enrolling in a graduate seminar related to their area of specialization/interest.
4. To fulfill the remaining credit hours, students may complete other elective courses that are directed toward developing proficiency in the students’ selected area of specialization/interest.

### Graduate Advisory/Examining Committee Membership

All graduate Advisory/Examining Committees must have a minimum of three faculty members. At least two must be members of the Nutrition Program Graduate Faculty, including the committee chair, and at least one must be a faculty member from the Department of Nutrition. The committee must also include one member external to the Nutrition Program Graduate Faculty to provide representation from the Graduate School.

### Application

Students are admitted to the program on a competitive basis. Prospective students should submit a completed application to the Graduate School, a letter indicating career goals and research interests, GRE and TOEFL results, official transcripts, and three letters of reference. The application to the Graduate School must be accompanied by a \$60 non-refundable payment. Students should submit these documents by Feb. 1. They may also apply for graduate assistantships, which offer both teaching and research experiences.

### Hydrologic Sciences

Master of science and doctor of philosophy degrees may be earned in hydrology and hydrogeology in an interdisciplinary program. For specific program information, refer to the Interdisciplinary and Special Programs section of this catalog or you can contact the Graduate Program of Hydrologic Sciences at: (775) 784-6469 or <http://www.hydro.unr.edu>.

Examination procedures for the degrees are given in the Graduate School section of this catalog.