

## COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE IN BIOLOGY<sup>1,2</sup>

1. THE GENERAL EDUCATION AND TOTAL UNIVERSITY CREDIT REQUIREMENTS MUST BE MET (see Note 1 below). 128 total minimum credits are required for graduation. 36 of these must be upper division credits.
2. COURSES IN BIOLOGICAL SCIENCES: NUMBER OF CREDITS

|  |                                   |    |
|--|-----------------------------------|----|
| BIOL 1101  | Biology I                         | 4  |
| BIOL 1102  | Biology II                        | 4  |
| BIOL 2206/2207   | Cell Biology                      | 4  |
| BIOL 2209  | General Ecology                   | 4  |
| BIOL 2221  | Introductory Microbiology and Lab | 4  |
| or   |                                   |    |
| BIOL 2235  | General Microbiology and Lab      | 4  |
| BIOL 3315  | Introduction to Biometry Lab      | 1  |
| BIOL 3358  | General Genetics                  | 3  |
| BIOL 4417  | Organic Evolution                 | 3  |
| BIOL 4491,4492   | Seminar                           | 2  |
| Additional upper division course work in Biological Sciences, <sup>3</sup>   |                                   | 21 |
| which must include at least 6 credits in   |                                   |    |
| Botany (BIOL 4404, 4405, 4406, 4408, 4412, 4442, or 4489)  |                                   |    |
| and at least 6 credits in  |                                   |    |
| Zoology (BIOL 3303, 3310, 3314, 3324, 4419, 4420, 4423, 4426, 4427, 4428, 4429, 4431, 4435, 4438, 4440, 4441, 4443, 4449, 4456, 4459, 4470, 4486, or 4495) |                                   |    |
3. COURSES IN MATHEMATICS
 

|           |                             |   |
|-----------|-----------------------------|---|
| MATH 1160 | Brief Calculus <sup>4</sup> | 4 |
| MATH 3350 | Statistics <sup>5</sup>     | 3 |
4. COURSES IN CHEMISTRY
 

|                |   |   |
|----------------|---|---|
| CHEM 1111      | General Chemistry I                     | 5 |
| CHEM 1112      | General Chemistry II                    | 4 |
| CHEM 3301,3303 | Organic Chemistry I, Lab <sup>6,7</sup> | 4 |
5. COURSES IN PHYSICS
 

|                |                                     |   |
|----------------|-------------------------------------|---|
| PHYS 1111,1113 | General Physics I, Lab <sup>6</sup> | 4 |
|----------------|-------------------------------------|---|

### Notes:

1. Students pursuing a Bachelor of Science degree must satisfy goals 1, 2, 3, 4, and 5; two of goals 6, 7, and 8; and three of goals 9, 10, 11, and 12. Goal 10 may be satisfied by either 10A or 10B. A maximum of 8 credits of BIOL 4481/4482 may be applied to this degree program.
2. Students may select courses in the College of Education to meet the requirements for teacher certification while completing a degree in the College of Arts and Sciences. Such students must apply for admission to the Teacher Education Program. See the Teacher Education Program in the University Bulletin for requirements in the College of Education.
3. Biology electives must include upper division course work in both botany and zoology. Students should consult with their advisors and with the current departmental list of course rotations to determine which semesters and years biology electives will be offered. CHEM 3302/3304 may be counted towards required upper division credits in Biological Sciences. BIOL 4481 and BIOL 4482 can be counted as upper division botany or zoology credits only if approved by the department.
4. Students may take MATH 1170 in place of MATH 1160. MATH 1160 has a prerequisite of MATH 1143. MATH 1170 has a prerequisite of MATH 1147. Prerequisites for both classes may be satisfied by the Mathematics placement exam.
5. The requirement for Statistics may be satisfied by taking MATH 2253 or MATH 3350 for students enrolled prior to Fall 2007. Starting Fall 2007, students must take MATH 3350 (listed as MATH 399 for Fall 2007 only) with BIOL 3315L.
6. Students who plan to apply to graduate or professional programs in the biological or medical sciences are strongly advised to take a full year of Organic Chemistry (add CHEM 3302, 3304) and a full year of Physics (add PHYS 1112, 1114). These classes are required by many graduate and professional programs.
7. CHEM 3302/3304 may be counted towards required upper division credits in Biological Sciences.

## Upper Division Botany Courses

|           |                               |
|-----------|-------------------------------|
| BIOL 4404 | Plant Physiology              |
| BIOL 4405 | Plant Form and Function       |
| BIOL 4406 | Plant Diversity and Evolution |
| BIOL 4408 | Plant Ecology                 |
| BIOL 4412 | Systematic Botany             |
| BIOL 4442 | Plant and Animal Interactions |
| BIOL 4489 | Field Ecology                 |

## Upper Division Zoology Courses

|           |   |
|-----------|---|
| BIOL 3303 | Principles of Animal Physiology                                       |
| BIOL 3310 | Invertebrate Zoology  |
| BIOL 3314 | Comparative Vertebrate Anatomy  |
| BIOL 3324 | Developmental Biology   |
| BIOL 4419 | Mammalian Histology   |
| BIOL 4420 | Musculo-Skeletal Anatomy  |
| BIOL 4423 | General Parasitology (reflects proposed change in title)              |
| BIOL 4426 | Herpetology   |
| BIOL 4427 | Ichthyology   |
| BIOL 4428 | Veterinary and Medical Entomology (reflects proposed change in title) |
| BIOL 4429 | Regional Anatomy and Histology  |
| BIOL 4431 | General Entomology  |
| BIOL 4435 | Vertebrate Paleontology   |
| BIOL 4438 | Ornithology   |
| BIOL 4440 | Human Gross Anatomy   |
| BIOL 4441 | Mammalogy   |
| BIOL 4443 | Endocrinology   |
| BIOL 4449 | Human Physiology  |
| BIOL 4456 | Human Physiology II   |
| BIOL 4459 | Fish Ecology  |
| BIOL 4470 | Cross-Sectional Anatomy   |
| BIOL 4481 | Independent Problems  |
| BIOL 4482 | Independent Problems  |
| BIOL 4486 | Human Systemic Physiology   |
| BIOL 4495 | Ethology  |

### Note:

BIOL 4481 and BIOL 4482 can be counted as upper division botany or zoology credits only if approved by the department.

RECOMMEND COURSE SELECTION - B.S. of BIOLOGY

Fall Semester

Spring Semester

For Students Who Qualify to take MATH 1143 During their First Semester

| Fall Semester                                 |                       | Spring Semester |   |                      |              |
|---|-----------------------|-----------------|---|----------------------|--------------|
| Freshman Year                                 |                       |                 |   |                      |              |
| BIOL 1101/1101L                               | Biology I             | 4 cr            | BIOL 1102/1102L                               | Biology II           | 4 cr         |
| MATH 1143                                     | College Algebra       | 3 cr            | MATH 1160                                     | Brief Calculus       | 3 cr         |
| ENGL 1101                                     | English Composition   | 3 cr            | ENGL 1102                                     | English Composition  | 3 cr         |
| Goal 6, 7, or 8                               |                       | 3 cr            | COMM 1101                                     | Principles of Speech | 3 cr         |
| Goal 9, 10, 11, or 12                         |                       | <u>3 cr</u>     | Goal 6, 7, or 8                               |                      | <u>3 cr</u>  |
|   |                       | 16 cr           |   |                      | 16 cr        |
| Sophomore Year                                |                       |                 |   |                      |              |
| BIOL 2209                                     | Ecology               | 4 cr            | BIOL 2206/2207                                | Cell Biology         | 4 cr         |
| CHEM 1111                                     | General Chemistry I   | 5 cr            | CHEM 1112                                     | General Chemistry II | 4 cr         |
| Electives <sup>1</sup>                        |                       | 4 cr            | Goal 9, 10, 11, or 12                         |                      | 3 cr         |
| Goal 9, 10, 11, or 12                         |                       | <u>3 cr</u>     | Electives <sup>1</sup>                        |                      | <u>5 cr</u>  |
|   |                       | 16 cr           |   |                      | 16 cr        |
| Junior Year                                   |                       |                 |   |                      |              |
| PHYS 1111/1112 <sup>2</sup>                   | General Physics I/Lab | 4 cr            | MATH 3350 <sup>3</sup>                        | Statistics           | 3 cr         |
| CHEM 3301/3303 <sup>2</sup>                   | Organic Chemistry/Lab | 4 cr            | BIOL 3315L <sup>3</sup>                       | Biometry Lab         | 1 cr         |
| BIOL 3358                                     | Genetics              | 3 cr            | BIOL 2221 or 2235                             | Microbiology         | 4 cr         |
| Upper Division Botany Electives <sup>4</sup>  |                       | 3 cr            | Upper Division Botany Electives <sup>4</sup>  |                      | 3 cr         |
| Electives <sup>1</sup>                        |                       | <u>1 cr</u>     | Upper Division Zoology Electives <sup>4</sup> |                      | 3 cr         |
|   |                       | 15 cr           | Upper Division Biology Electives <sup>5</sup> |                      | <u>3 cr</u>  |
|   |                       |                 |   |                      | 17 cr        |
| Senior Year                                   |                       |                 |   |                      |              |
| BIOL 4417                                     | Evolution             | 3 cr            | BIOL 4492                                     | Senior Seminar       | 1 cr         |
| BIOL 4491                                     | Senior Seminar        | 1 cr            | Upper Division Biology Electives <sup>5</sup> |                      | 3 cr         |
| Upper Division Zoology Electives <sup>4</sup> |                       | 3 cr            | Electives <sup>1</sup>                        |                      | <u>12 cr</u> |
| Upper Division Biology Electives <sup>5</sup> |                       | 3 cr            |   |                      |              |
| Electives <sup>1</sup>                        |                       | <u>6 cr</u>     |   |                      |              |
|   |                       | 16 cr           |   |                      | 16 cr        |

Graduation Requirements:

To graduate in 4 years (or 8 semesters) you need to average 16 credits/semester (128/8=16)

Total Credits: 128

- General Education requirements: Goals 1, 2, 3, 4, 5; 2 of 6, 7, & 8; and 3 of 9, 10, 11, and 12
- Upper division credits: 36 minimum
- Satisfy departmental requirements

- <sup>1</sup> Electives include any biology or non-biology upper or lower division credits. Recommended electives are those that make the student more competitive.
- <sup>2</sup> Students applying to professional schools or graduate schools may need to add a second semester of organic chemistry and physics, depending on application requirements.
- <sup>3</sup> The requirement for Statistics may be satisfied by taking MATH 2253 or MATH 3350 for students enrolled prior to Fall 2007. Starting Fall 2007, students must take MATH 3350 (listed as MATH 399 for Fall 2007 only) with BIOL 3315L.
- <sup>4</sup> A minimum of 6 credits of upper division botany and 6 credits of upper division zoology are required. BIOL 4481 and BIOL 4482 can be counted as upper division botany or zoology credits only if approved by the department.
- <sup>5</sup> In addition to the 12 credits of upper division botany and zoology, 9 credits of upper division biology are required. Upper division biology includes any upper division course with a BIOL prefix including additional botany or zoology courses. Students who take CHEM 3302/3304 can count the 4 credits as upper division biology credit.

Students should consult with their advisors and with the current departmental list of course rotations to determine which semesters and years biological sciences electives will be taught.

RECOMMENDED COURSE SELECTION - B.S. of BIOLOGY

Fall Semester

Spring Semester

**For Students Who Qualify to take MATH 1160 During their First Semester**

Freshman Year

|                        |                     |             |                        |                      |             |
|------------------------|---------------------|-------------|------------------------|----------------------|-------------|
| BIOL 1101/1101L        | Biology I           | 4 cr        | BIOL 1102/1102L        | Biology II           | 4 cr        |
| CHEM 1111              | General Chemistry I | 5 cr        | CHEM 1112              | General Chemistry II | 4 cr        |
| MATH 1160              | College Algebra     | 3 cr        | ENGL 1102              | English Composition  | 3 cr        |
| ENGL 1101              | English Composition | 3 cr        | COMM 1101              | Principles of Speech | 3 cr        |
| Electives <sup>1</sup> |                     | <u>1 cr</u> | Electives <sup>1</sup> |                      | <u>2 cr</u> |
|                        |                     | 16 cr       |                        |                      | 16 cr       |

Sophomore Year

|                             |                         |             |                             |              |             |
|-----------------------------|-------------------------|-------------|-----------------------------|--------------|-------------|
| BIOL 2209 <sup>2</sup>      | General Ecology         | 4 cr        | BIOL 2206/2207 <sup>2</sup> | Cell Biology | 4 cr        |
| CHEM 3301/3303 <sup>3</sup> | Organic Chemistry I/Lab | 4 cr        | BIOL 2221 or 2235           | Microbiology | 4 cr        |
| Goal 6, 7, or 8             |                         | 3 cr        | Goal 6, 7, or 8             |              | 3 cr        |
| Goal 9, 10, 11, or 12       |                         | 3 cr        | Goal 9, 10, 11, or 12       |              | 3 cr        |
| Electives <sup>1</sup>      |                         | <u>2 cr</u> | Electives <sup>1</sup>      |              | <u>2 cr</u> |
|                             |                         | 16 cr       |                             |              | 16 cr       |

Junior Year

|   |                       |             |   |                          |             |
|---|-----------------------|-------------|---|--------------------------|-------------|
| PHYS 1111/1112 <sup>3</sup>                   | General Physics I/Lab | 4 cr        | MATH 3350 <sup>5</sup>                        | Statistics               | 3 cr        |
| Upper Division Botany Electives <sup>4</sup>  |                       | 3 cr        | BIOL 3315 <sup>5</sup>                        | Introduction to Biometry | 1 cr        |
| Upper Division Zoology Electives <sup>4</sup> |                       | 3 cr        | BIOL 3358                                     | Genetics                 | 3 cr        |
| Upper Division Biology Electives <sup>6</sup> |                       | 3 cr        | Upper Division Botany Electives <sup>4</sup>  |                          | 3 cr        |
| Goal 9, 10, 11, or 12                         |                       | <u>3 cr</u> | Upper Division Zoology Electives <sup>4</sup> |                          | 3 cr        |
|   |                       | 16 cr       | Upper Division Biology Electives <sup>6</sup> |                          | <u>3 cr</u> |
|   |                       |             |   |                          | 16 cr       |

Senior Year

|   |                |             |                        |                |              |
|---|----------------|-------------|------------------------|----------------|--------------|
| BIOL 4417                                     | Evolution      | 3 cr        | BIOL 4492              | Senior Seminar | 1 cr         |
| BIOL 4491                                     | Senior Seminar | 1 cr        | Electives <sup>1</sup> |                | <u>15 cr</u> |
| Upper Division Biology Electives <sup>6</sup> |                | 3 cr        |                        |                |              |
| Electives <sup>1</sup>                        |                | <u>9 cr</u> |                        |                |              |
|   |                | 16 cr       |                        |                | 16 cr        |

Graduation Requirements:

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Total Credits: 128

- General Education requirements: Goals 1, 2, 3, 4, 5; 2 of 6, 7, & 8; and 3 of 9, 10, 11, and 12
- Upper division credits: 36 minimum
- Satisfy departmental requirements

- Electives include any biology or non-biology upper or lower division credits. Recommended electives are those that make students more competitive.
- Cell biology and Ecology can be switched between fall and spring semesters.
- Students applying to professional schools or graduate schools may need to add a second semester of organic chemistry and physics, depending on application requirements.
- A minimum of 6 credits of upper division botany and 6 credits of upper division zoology are required. BIOL 4481 and BIOL 4482 can be counted as upper division botany or zoology credits only if approved by the department.
- The requirement for Statistics may be satisfied by taking MATH 2253 or MATH 3350 for students enrolled prior to Fall 2007. Starting Fall 2007, students must take MATH 3350 (listed as MATH 399 for Fall 2007 only) with BIOL 3315L.
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