DEPARTMENT OF BIOLOGY

The Department of Biology offers the following undergraduate degree programs:

**BS in Biology**

**BS in Biology with an emphasis in genetics**

The course requirements for each of these degree programs are on the respective program requirements worksheets (See pages 220-223).

The biology department’s webpage (http://www.lander.edu/biology) contains information about individual programs of study, a list of departmental scholarships available for students majoring in biology, a downloadable application for those scholarships, a link to on-line applications for these scholarships, and links to the home pages of biology faculty.

Students majoring in biology will gain a solid foundation in the discipline while having the flexibility to tailor the degree to their interests and career goals. Curriculum plans are available for students pursuing an emphasis in genetics as well as for those who wish to focus on cell and molecular biology or ecology and organismal biology. Additional curriculum plans are available for students interested in attending graduate school (to obtain an MS or Ph.D. degree) or one of the many professional school (to obtain a DDS, DVM, MD, OD, OT, PA, or PT degree) after graduation. In addition to specifying particular biology courses, most biology curriculum plans include recommended courses in chemistry, physics, and psychology to properly prepare students for immediate entry into the workforce or admission to graduate and professional schools. The various curriculum plans are presented as four-year registration guides on the registrar’s office webpage (http://www.lander.edu/Academics/Registrar-Office/Resources/Major-Guides.aspx).

The department also offers an honors program for outstanding biology majors as well as a minor for students majoring in other areas.

**BIOLOGY MAJOR**

Lander’s degree program in biology provides comprehensive training in the life sciences. The curriculum is based on the Core Concepts and Core Competencies put forth in AAAS’ *Vision and Change in Undergraduate Biology Education*. Students complete coursework geared toward mastering the five core concepts of biology: 1) evolution; 2) structure and function; 3) information flow, exchange, and storage; 4) pathways and transformations of energy and matter; and 5) systems. Through laboratory, research, and classroom experiences, students also accrue the following core competencies as demonstrated by their ability to 1) apply the process of science; 2) use quantitative reasoning; 3) use modeling and simulation; 4) tap into the interdisciplinary nature of science; 5) communicate and collaborate within and outside the discipline; and 6) understand the relationship between science and society.

The core concepts will be thoroughly addressed in each of the required courses and reinforced in the elective courses. To ensure exposure to all of the core concepts, students enroll in a suite of courses mapped to each of the core concepts by choosing from course groups based on the core concepts. Group 1 courses emphasize structure and function; Group 2 courses emphasize information flow, exchange, and storage; and Group 3 courses emphasize systems and the pathways and transformations of energy and matter. All courses taught in each of these groups include coverage of relevant evolutionary concepts and help students gain experience toward mastery of the core competencies described above.

The core requirements for a Bachelor of Science degree in biology are BIOL 111, BIOL 112, BIOL 299, BIOL 303, BIOL 312, BIOL 399, and BIOL 499. Further additional requirements include BIOL 213 or BIOL 214, one course from each of three concept groups (Group 1 – BIOL 308, BIOL 313, or BIOL 401; Group 2 – BIOL 307, BIOL 403, or BIOL 422; Group 3 – BIOL 306, BIOL 311, BIOL 415, or BIOL 421), and 8 hours of elective biology courses. At least 4 hours of the elective biology coursework must be at the 300-level or above. A biology major must also successfully complete CHEM 111, CHEM 112, and CHEM 221. Further additional course requirements for the emphasis in genetics include specify BIOL 307 for group 1 and include BIOL 403 (group 2 above), BIOL 412, and BIOL 498; CHEM 301; and PHYS 201 and PHYS 202 or PHYS 211 and PHYS 212.
CHEM 301 and PHYS 201 and PHYS 202 or PHYS 211 and PHYS 212 are strongly recommended and may be required for students anticipating secondary school teaching or admission to professional or graduate school.

A minimum grade of “C” must be earned in all biology courses counted toward the degree in Biology. In addition, a minimum cumulative GPA of 2.0 must be earned for all major program requirements (including CHEM and PHYS courses).

It is the student’s responsibility to be knowledgeable of the schedule of offerings and to plan carefully so that all requirements for the degree can be fulfilled by the desired graduation date. Required courses for the biology degree are normally offered according to the following schedule:

<table>
<thead>
<tr>
<th>Each Fall</th>
<th>Each Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>BIOL 112</td>
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<td>BIOL 202</td>
<td>BIOL 203</td>
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<td>BIOL 213</td>
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<td>BIOL 303</td>
<td>BIOL 214</td>
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<td>BIOL 307</td>
<td>BIOL 299</td>
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<td>BIOL 311</td>
<td>BIOL 303</td>
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<td>BIOL 312</td>
<td>BIOL 306</td>
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<td>BIOL 403</td>
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<tr>
<td></td>
<td>BIOL 422</td>
</tr>
<tr>
<td></td>
<td>BIOL 499</td>
</tr>
</tbody>
</table>

**BIOLOGY DEGREE WITH AN EMPHASIS IN GENETICS**

The genetics emphasis is designed for students interested in careers in genetics or biomedical science. Beginning with the solid foundation in biological sciences provided by the standard Bachelor of Science in biology, this program includes additional coursework and experiences in biochemistry, animal development and genetics. All students in the emphasis will complete a laboratory research project in genetics, the results of which will be presented in a public seminar.

**Biology Honors Program**

Students majoring in biology will qualify for a BS with Honors in Biology if the following requirements are met:

1. Successful completion of the program for the BS in Biology or the BS in Biology with an emphasis in genetics;
2. Completion of an additional 5 hours of biology coursework at the 300 level or above;
3. Cumulative grade point average of 3.5 in all biology courses;
4. Cumulative overall grade point average of 3.5 or better; and
5. Completion of a laboratory or field research project in which:
   a) The research proposal is approved by a majority of the biology faculty. (*This would normally occur in the fall semester of the junior year.*)
   b) The research is of sufficient quality to justify four semester hours credit (BIOL 407, BIOL 408, BIOL 409, BIOL 410, or BIOL 412).
   c) The research results are presented as follows:
      1. by public seminar at Lander University
      2. at a scientific meeting and/or by submission of a paper for publication in an appropriate scientific journal.
Transfer students may graduate with Honors in Biology if they fulfill the above requirements and have a 3.5 GPA overall and in biology from their former institution(s) and complete their last 60 hours, including at least 20 hours of biology, at Lander University

**BIOLOGY MINOR**

A minor in biology includes BIOL 111 and BIOL 112, and either BIOL 213 or BIOL 214 plus an additional minimum of 7 hours of 300- or 400-level biology courses. Advisors and prospective minors should note that most biology courses have prerequisites and/or co-requisites which must be met. A grade of “C” or better is required in all biology courses taken for the minor.

**PRE-PROFESSIONAL CURRICULA**

Lander’s biology department offers curriculum plans in the following areas: pre-medicine, pre-dentistry, pre-optometry, pre-veterinary medicine, pre-pharmacy, pre-physical therapy, pre-occupational therapy, and pre-physician assistant.

The goals of these curriculum plans are to:

1. provide a well-respected and rigorous core curriculum that will make students who are applying to professional schools highly competitive;
2. offer the full variety of courses that are required or recommended for acceptance into most professional schools; and
3. help students navigate the application procedures and timelines specific to their professional-school goals.

These curriculum plans are presented as four-year registration guides available on the registrar’s office webpage (http://www.lander.edu/Academics/Registrar-Office/Resources/Major-Guides.aspx).
2018-2019 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: BIOLOGY

GENERAL EDUCATION REQUIREMENTS
(For approved courses see the General Education section.)

A. Humanities and Fine Arts
(6 hours selected from 2 different disciplines) 6

B. Behavioral and Social Perspectives
(6 hours selected from 2 different disciplines) 6

C. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines, 1 lab science required)
CHEM 111 4
MATH 211 3

D. Core Academic Skills
ENGL 101 3
ENGL 102 3
MATH 121 or MATH 123 or MATH 141 3-4
Foreign Language 3
LINK 101 1
FALS 101 (15 FALS-approved events) 0

E. General Education Electives
CHEM 112 4

A sufficient number of additional General Education Electives must be taken to meet a total of 42 hours of General Education Requirements.
(Select from categories A, B, or C; Global Issues and Cultures; Foreign Language; or courses approved for category E)

Δ Global Issues and Cultures: Students are required to take at least one of these courses prior to graduation.

TOTAL GENERAL EDUCATION REQUIREMENTS 42

MAJOR PROGRAM CORE REQUIREMENTS

BIOL 111 4
BIOL 112 4
BIOL 299 1
BIOL 303 3
BIOL 312 4
BIOL 399 1
BIOL 499 1

MAJOR PROGRAM ADDITIONAL REQUIREMENTS

Organismal diversity (BIOL 213 or BIOL 214) 4
Group 1 (BIOL 308 or BIOL 313 or BIOL 401) 4
Group 2 (BIOL 307 or BIOL 403 or BIOL 422) 4
Group 3 (BIOL 306 or BIOL 311 or BIOL 415 or BIOL 421) 4
CHEM 221 4
MAJOR PROGRAM ELECTIVES*

<table>
<thead>
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<th>Course</th>
<th>Hours</th>
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</thead>
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<td>BIOL 200-level or above</td>
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<tr>
<td>BIOL 300-level or above</td>
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<tr>
<td>TOTAL MAJOR PROGRAM REQUIREMENTS</td>
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</table>

ADDITIONAL ELECTIVES 32

TOTAL FOR BS DEGREE 120

*No more than 4 hours of 200-level elective biology courses will be counted toward major program requirements.

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses http://www.lander.edu/Academics/Registrar-Office/Resources/Major-Guides.aspx.
2018-2019 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: BIOLOGY
EMPHASIS: GENETICS

GENERAL EDUCATION REQUIREMENTS
(For approved courses see the General Education section.)

A. Humanities and Fine Arts
   (6 hours selected from 2 different disciplines) 6

B. Behavioral and Social Perspectives
   (6 hours selected from 2 different disciplines) 6

C. Scientific and Mathematical Reasoning
   (7 hours selected from 2 different disciplines, 1 lab science required)
   CHEM 111 4
   MATH 211 3

D. Core Academic Skills
   ENGL 101 3
   ENGL 102 3
   MATH 121, MATH 123, or MATH 141 3-4
   Foreign Language 3
   LINK 101 1
   FALS 101 (15 FALS-approved events) 0

E. General Education Electives
   CHEM 112 4

   A sufficient number of additional General Education Electives must be taken to meet a total of 42 hours of General Education Requirements.
   (Select from categories A, B, or C; Global Issues and Cultures; Foreign Language; or courses approved for category E)

A Global Issues and Cultures: Students are required to take at least one of these courses prior to graduation.

TOTAL GENERAL EDUCATION REQUIREMENTS 42

MAJOR PROGRAM CORE REQUIREMENTS

BIOL 111 4
BIOL 112 4
BIOL 299 1
BIOL 303 3
BIOL 312 4
BIOL 399 1
BIOL 499 1

MAJOR PROGRAM ADDITIONAL REQUIREMENTS

Organismal diversity (BIOL 213 or BIOL 214) 4
Group 1 (BIOL 308 or BIOL 313 or BIOL 401) 4
Group 2 (BIOL 307) 4
Group 3 (BIOL 306 or BIOL 311 or BIOL 415 or BIOL 421) 4
CHEM 221 4
MAJOR PROGRAM EMPHASIS REQUIREMENTS

<table>
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<th>Course Code</th>
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</thead>
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<tr>
<td>BIOL 412</td>
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</tr>
<tr>
<td>BIOL 498</td>
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<tr>
<td>CHEM 301</td>
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<td>PHYS 201 or PHYS 211</td>
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</tr>
<tr>
<td>PHYS 202 or PHYS 212</td>
<td>4</td>
</tr>
</tbody>
</table>

TOTAL MAJOR PROGRAM REQUIREMENTS  58

ADDITIONAL ELECTIVES  20

TOTAL FOR BS DEGREE  120

*No more than 4 hours of 200-level elective biology courses will be counted toward major program requirements.

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses