The unique characteristics of the zoology major include:

- broad-based, yet integrated training in wide-ranging areas of biology;
- solid foundation of basic principles and processes in biology;
- flexibility and advising needed to allow students to tailor the major to their specific goals;
- wide range of opportunities for undergraduate involvement in independent research and senior thesis.

### HOW TO GET IN

#### DECLARING THE ZOOLOGY MAJOR

All students who are interested in pursuing the zoology major must schedule an appointment with a department advisor. No major declaration forms are required to declare zoology.

Note: Students in the College of Letters & Science (L&S) may be declared by a department advisor immediately. Students who are not currently in L&S need to either transfer into L&S or have permission from their school or college to pursue an additional major in zoology. Instructions for transferring into L&S are available on the L&S Student Academic Affairs website (http://saa.ls.wisc.edu).
L&S Breadth
- Humanities, 12 credits: 6 of the 12 credits must be in literature
- Social Sciences, 12 credits
- Natural Sciences, 12 credits: must include one 3+ credit course in the biological sciences; must include one 3+ credit course in the physical sciences

Liberal Arts and Science Coursework
- 108 credits
- Depth of 60 intermediate or advanced credits

Major
- Declare and complete at least one (1) major

Total Credits
- 120 credits
- UW-Madison Experience: 30 credits in residence, overall
- Minimum GPAs:
  - 2.000 in all coursework at UW-Madison
  - 2.000 in intermediate/advanced coursework at UW-Madison

NON-L&S STUDENTS PURSUING AN L&S MAJOR
Non-L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements and do not need to complete the L&S breadth and degree requirements above.

REQUIREMENTS FOR THE MAJOR
MATH, CHEMISTRY & PHYSICS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math—complete one:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 112 &amp; MATH 113</td>
<td>Algebra and Trigonometry</td>
<td>5-6</td>
</tr>
<tr>
<td>MATH 114</td>
<td>Algebra and Trigonometry</td>
<td></td>
</tr>
<tr>
<td>MATH 171 &amp; MATH 217</td>
<td>Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II</td>
<td></td>
</tr>
<tr>
<td>Chemistry—complete one:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 103</td>
<td>General Chemistry I</td>
<td>5-9</td>
</tr>
<tr>
<td>CHEM 104</td>
<td>and General Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 109</td>
<td>Advanced General Chemistry</td>
<td></td>
</tr>
<tr>
<td>Physics—complete one:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYSICS 103 &amp; PHYSICS 104</td>
<td>General Physics and General Physics</td>
<td>8-10</td>
</tr>
<tr>
<td>PHYSICS 207 &amp; PHYSICS 208</td>
<td>General Physics and General Physics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 201 &amp; PHYSICS 202</td>
<td>General Physics and General Physics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits
- 18-25

30 CREDITS IN BIOLOGY AND ZOOLOGY COURSEWORK

Introductory Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1: Introductory Biology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ZOOLOGY/BIOLOGY/BOTANY 151 & ZOOLOGY/BOTANY 152
Introductory Biology and Introductory Biology

Option 2: BIOCORE

Required courses:
- BIOCORE 381 Evolution, Ecology, and Genetics
- BIOCORE 383 Cellular Biology
- BIOCORE 485 Organismal Biology
- BIOCORE 587 Biological Interactions

Select two of the following:
- BIOCORE 382 Evolution, Ecology, and Genetics Laboratory
- BIOCORE 384 Cellular Biology Laboratory
- BIOCORE 486 Organismal Biology Laboratory

Option 3: Animal Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOOLOGY/BIOLOGY 101 &amp; ZOOLOGY/BIOLOGY 102</td>
<td>Animal Biology and Animal Biology Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits
- 10-18

1 BOTANY/BIOLOGY 130 is recommended, but not required for students pursuing Option 3.

Zoology Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOOLOGY 299</td>
<td>Directed Studies in Zoology</td>
<td>1-3</td>
</tr>
<tr>
<td>ZOOLOGY 300</td>
<td>Invertebrate Biology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY 301</td>
<td>Invertebrate Biology and Evolution Lab</td>
<td>2</td>
</tr>
<tr>
<td>ZOOLOGY/ENTOM 302</td>
<td>Introduction to Entomology</td>
<td>4</td>
</tr>
<tr>
<td>ZOOLOGY 303</td>
<td>Aquatic Invertebrate Biology</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY/ENVIR ST 315 &amp; ZOOLOGY 316</td>
<td>Limnology-Conservation of Aquatic Resources and Laboratory for Limnology-Conservation of Aquatic Resources</td>
<td>4-5</td>
</tr>
<tr>
<td>ZOOLOGY/F&amp;W ECOL 335</td>
<td>Human/Animal Relationships: Biological and Philosophical Issues</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY/ENTOM/M M &amp; I/PATH-BIO 350</td>
<td>Parasitology</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY/M M &amp; I/PATH-BIO 351</td>
<td>Parasitology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>ZOOLOGY/ENVIR ST/F&amp;W ECOL 360</td>
<td>Extinction of Species</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY/ENTOM 371</td>
<td>Medical Entomology</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY/ANTHRO/BOTANY 410</td>
<td>Evolutionary Biology</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY 425</td>
<td>Behavioral Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY 430</td>
<td>Comparative Anatomy of Vertebrates</td>
<td>5</td>
</tr>
</tbody>
</table>
ZOOLOGY/BOTANY 459 Ecological Techniques for Field Monitoring 1-2
ZOOLOGY/BOTANY/F&W ECOL 460 General Ecology 4
GENETICS 466 Principles of Genetics 3
ZOOLOGY 470 Introduction to Animal Development 3
ZOOLOGY/BOTANY/ENTOM 473 Plant-Insect Interactions 3
ZOOLOGY 504 Modeling Animal Landscapes 3-5
ZOOLOGY/BOTANY/ENVIR ST/F&W ECOL 510 Ecology of Fishes 5
ZOOLOGY/BOTANY/ENVIR ST/F&W ECOL 511 Ecology of Fishes Lab 5
ZOOLOGY/AN SCI/F&W ECOL 520 Ornithology and Birds of Southern Wisconsin 6
ZOOLOGY/PSYCH 523 Neurobiology 3
ZOOLOGY/ENTOM 530 Insect Behavior 3
ZOOLOGY 535 Ecosystem Analysis 3
ZOOLOGY/ENTOM 540 Theoretical Ecology 3
ZOOLOGY/GEOSCI 542 Invertebrate Paleontology 3
ZOOLOGY/PSYCH 550 Animal Communication and the Origins of Language 3
ZOOLOGY 555 Laboratory in Developmental Biology 3
ZOOLOGY/GENETICS/MD GENET 562 Human Cytogenetics 2
ZOOLOGY/F&W ECOL/LAND ARC 565 Principles of Landscape Ecology 2
ZOOLOGY 570 Cell Biology 3
ZOOLOGY 603 Endocrinology 3-4
ZOOLOGY 604 Computer-based Gene and Disease/Disorder Research Lab 2
ZOOLOGY 611 Comparative and Evolutionary Physiology 3
ZOOLOGY 612 Comparative Physiology Laboratory 2
ZOOLOGY/NEURODPT/NTP/PHYSIOL 616 Lab Course in Neurobiology and Behavior 4
ZOOLOGY/ANTHRO/ NTP/PSYCH 619 Biology of Mind 3
ZOOLOGY/NTP 620 Neuroethology Seminar 2
ZOOLOGY/ENTOM/GENETICS 624 Molecular Ecology 3
ZOOLOGY/BIOCHEM/PHMCOL-M 630 Cellular Signal Transduction Mechanisms 3
ZOOLOGY/BOTANY/GENETICS 645 Modeling in Population Genetics and Evolution 3
ZOOLOGY/BOTANY/ENVIR ST/F&W ECOL 651 Conservation Biology 3
ZOOLOGY/F&W ECOL 660 Climate Change Ecology 3
ZOOLOGY/BOTANY/F&W ECOL 672 Historical Ecology 2
ZOOLOGY 677 Internship in Ecology 2
ZOOLOGY 681 Senior Honors Thesis & ZOOLOGY 682 Senior Honors Thesis 1-6
ZOOLOGY 691 Senior Thesis & ZOOLOGY 692 Senior Thesis 1-6
ZOOLOGY 698 Directed Study 1-6
ZOOLOGY 699 Directed Studies in Zoology 1-6
Total Credits 12-20

Approved Upper-level Biological Coursework Not in the Department of Integrative Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTHRO 458</td>
<td>Primate Behavioral Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 501</td>
<td>Introduction to Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 507</td>
<td>General Biochemistry I</td>
<td></td>
</tr>
<tr>
<td>BMOLCHEM 314</td>
<td>Introduction to Human Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMOLCHEM 503</td>
<td>Human Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BMOLCHEM 504</td>
<td>Human Biochemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENTOM 342</td>
<td>Insect Ecology</td>
<td></td>
</tr>
<tr>
<td>ENTOM 450</td>
<td>Basic and Applied Insect Ecology</td>
<td></td>
</tr>
<tr>
<td>ENVIR ST/LAND ARC 361</td>
<td>Wetlands Ecology</td>
<td></td>
</tr>
<tr>
<td>ENVIR ST 375</td>
<td>Field Ecology Workshop</td>
<td></td>
</tr>
<tr>
<td>F&amp;W ECOL 306</td>
<td>Terrestrial Vertebrates: Life History and Ecology</td>
<td></td>
</tr>
<tr>
<td>F&amp;W ECOL/SURG SCI 548</td>
<td>Diseases of Wildlife</td>
<td></td>
</tr>
<tr>
<td>F&amp;W ECOL/ENTOM/M&amp;ENVTOX/PL PATH/SOIL SCI 606</td>
<td>Colloquium in Environmental Toxicology</td>
<td></td>
</tr>
<tr>
<td>GENETICS 545</td>
<td>Genetics Laboratory</td>
<td></td>
</tr>
<tr>
<td>GENETICS 566</td>
<td>Advanced Genetics</td>
<td></td>
</tr>
<tr>
<td>KINES 338</td>
<td>Human Anatomy Laboratory</td>
<td></td>
</tr>
<tr>
<td>M M &amp; I 341</td>
<td>Immunology</td>
<td></td>
</tr>
<tr>
<td>M M &amp; I/MICROBIO/PATHTH-BIO 528</td>
<td>Immunology</td>
<td></td>
</tr>
<tr>
<td>MICROBIO 303</td>
<td>Biology of Microorganisms</td>
<td></td>
</tr>
<tr>
<td>MICROBIO 304</td>
<td>Biology of Microorganisms Laboratory</td>
<td></td>
</tr>
</tbody>
</table>
Zoology, B.A.

- PATH-BIO/HORT 500: Molecular Biology Techniques
- PHYSIOL 335: Physiology
- PSYCH 449: Animal Behavior
- PSYCH 450: Primates and Us: Insights into Human Biology and Behavior
- PSYCH 454: Behavioral Neuroscience
- PSYCH 455: Laboratory in Behavioral Neuroscience
- SOIL SCI/ENTOM/F&W ECOL/M&ENVTOX/PL PATH 606: Colloquium in Environmental Toxicology

3 A maximum of 6 credits of approved upper-level biological coursework not in the Department of Integrative Biology count toward the 30 credits required for the major.

4 Only 3 credits of PHYSIOL 335 Physiology count toward approved upper-level biological coursework not in ZOOLOGY.

RESIDENCE AND QUALITY OF WORK

2.000 GPA in all ZOOLOGY and major courses

2.000 GPA on 15 upper-level major credits, taken in residence

15 credits in ZOOLOGY, or courses that count for the major, taken on the UW–Madison campus

3 ZOOLOGY 300–699 and intermediate/advanced BIOCORE are considered upper level in the major.

HONORS IN THE MAJOR

Students may declare Honors in the Zoology Major in consultation with the Zoology undergraduate advisor(s).

HONORS IN THE ZOOLOGY MAJOR REQUIREMENTS

To earn a B.A. or B.S. with Honors in the Major in Zoology students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 overall university GPA
- Earn a 3.500 GPA in all courses that count toward the major
- Complete 12 credits, taken for Honors, with individual grades of B or better. Select 6 credits from the following list:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOOLOGY/ANTHRO/BOTANY 410</td>
<td>Evolutionary Biology</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY/BOTANY/F&amp;W ECOL 460</td>
<td>General Ecology</td>
<td>4</td>
</tr>
<tr>
<td>GENETICS 466</td>
<td>Principles of Genetics</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY 470</td>
<td>Introduction to Animal Development</td>
<td>3</td>
</tr>
<tr>
<td>ZOOLOGY 504</td>
<td>Modeling Animal Landscapes</td>
<td>3-5</td>
</tr>
<tr>
<td>ZOOLOGY/ENVIR ST 510 &amp; ZOOLOGY/ENVIR ST 511</td>
<td>Ecology of Fishes and Ecology of Fishes Lab</td>
<td>5</td>
</tr>
</tbody>
</table>

ZOOLOGY/AN SCI/F&W ECOL 520 & ZOOLOGY/AN SCI/F&W ECOL 521: Ornithology and Birds of Southern Wisconsin

ZOOLOGY/PSYCH 523: Neurobiology

ZOOLOGY/PSYCH 550: Animal Communication and the Origins of Language

ZOOLOGY 570: Cell Biology

ZOOLOGY 603: Endocrinology

ZOOLOGY 611: Comparative and Evolutionary Physiology

ZOOLOGY/BOTANY/ENVIR ST/F&W ECOL 651: Conservation Biology

And complete a two-semester Senior Honors Thesis in ZOOLOGY 681 Senior Honors Thesis and ZOOLOGY 682 Senior Honors Thesis, for a total of 6 credits.

1 A written thesis proposal must be approved by the thesis mentor and the departmental advisor.

By the beginning of the senior year, each honors student will develop a written thesis proposal that must first be approved by the thesis mentor and then by a department advisor. Two semesters of Senior Honors Thesis (ZOOLOGY 681 and ZOOLOGY 682, 6 total credits) must be taken; the first semester can be done during the summer, especially for students doing field research. Completion of ZOOLOGY 682 requires a written thesis approved and graded by the thesis mentor.

UNIVERSITY DEGREE REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
<th>Total Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residency</td>
<td>Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. &quot;In residence&quot; means on the UW–Madison campus with an undergraduate degree classification. &quot;In residence&quot; credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.</td>
<td></td>
</tr>
<tr>
<td>Quality of Work</td>
<td>Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.</td>
<td></td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

1. Understand the principles of genetics.
2. Understand the principles of cellular biology.
3. Understand the principles of physiology.
4. Understand the principles of ecology.
5. Understand the principles of evolution.
6. Understand current issues in biology.
7. Provide solid connections to related disciplines of chemistry, physics and mathematics.
8. Understand how scientific information is obtained.
10. Understand the interrelationship of humans and natural systems.
11. Develop quantitative reasoning skills (ability to solve problems requiring mathematic/statistical reasoning).
12. Develop critical thinking skills (ability to identify a problem, identify the information needed to solve the problem, and develop methods for solving the problem).
13. Develop skills to effectively communicate scientific information through oral presentations.
14. Develop skills to effectively communicate scientific information through written reports.
15. Develop skills to critically evaluate scientific information.
16. Develop an ability to engage in scientific inquiry.
17. Develop an ability to plan scientific experiments.
18. Access scientific information from various electronic and print sources.
19. Apply scientific knowledge to societal issues.
20. Appreciate the diversity of life.
21. Build a strong foundation for potential graduate study.
22. Develop a sense of competence in the field of study.

Such plans can involve reviewing relevant literature in the area, developing a proposal for independent research, and/or conducting an experiment in the mentor’s study area.

Students interested in doing in-depth research as undergraduates in an area of interest can elect to do a Senior Thesis or Senior Honors Thesis (see below). Students should contact a department advisor at the beginning of their junior year to explore possible research areas.

A maximum of 10 credits of directed study (ZOOLOGY 299, ZOOLOGY 698, ZOOLOGY 699), senior thesis (ZOOLOGY 691, ZOOLOGY 692), or senior honors thesis (ZOOLOGY 681, ZOOLOGY 682) will count toward the 30 credits required for the major.

SENIOR THESIS

Students interested in making a longer-term commitment to a research project may consider undertaking a senior thesis. Students should contact a department advisor during their junior year to explore possible research areas in zoology.

Zoology Senior Thesis Requirements:

- approval of a department advisor;
- completion of ZOOLOGY 691 and ZOOLOGY 692, a two-semester thesis research sequence, during the senior year (6 credits).

It is recommended that candidates for the senior thesis take ZOOLOGY 699 during second semester junior year to prepare for the thesis.

SENIOR THESIS AND DISTINCTION IN THE MAJOR

Upon recommendation of the department to the dean, Distinction in the Major is granted at graduation to students not earning Honors in the Major who have done superior work in the major. In addition to the requirements for a senior thesis, to graduate with Distinction in the Zoology Major, students must maintain an overall GPA of 3.300 and a GPA of 3.500 in all zoology courses in the major.

CAREERS

The Department of Zoology encourages our majors to begin working on their career exploration and preparation soon after arriving on campus. We partner with the L&S Career Services office to help you leverage the academic skills learned in your major and liberal arts degree, explore and try out different career paths, participate in internships, prepare for the job search and/or graduate school applications, and network with professionals in the field (alumni and employers).

Letters & Science graduates are in high demand by employers and graduate programs. It is important to us that our students are career ready at the time of graduation, and we are committed to your success.

Career Resources:

- Why the liberal arts? (http://ls.wisc.edu/about/why-liberal-arts)
- Set up a Career Advising Appointment (http://careers.ls.wisc.edu/Undergraduate-Advising.htm)
- L&S Career Services (http://careers.ls.wisc.edu/students.htm): We launch our students higher, sooner
- INTER-LS 210 L&S Career Development: Taking Initiative (1 credit, targeted to first- and second-year students)
- Learn how we’re transforming career preparation: L&S Career Initiative (http://ls.wisc.edu/about/lsci?p=careerinitiative.html)
PEOPLE

FACULTY

Professors Hardin (chair, jdhardin@wisc.edu), Bement, Blair, Carpenter, Gammie, Halloran, Ives, Lee, Newmark, Porter, Ritters, Stanley, Stretton, Turner and Vander Zanden

Associate Professors Amann, Damschen, Grinblat, McIntyre and Orrock

Assistant Professors Sharma and Wolman

Adjunct Professor Peckarsky