DEPARTMENT OF BIOLOGY

No one really knows what the world will be like 50 years from now, but it is certain that biologists will be at the forefront of science attempting to find solutions to many of the world’s problems and to find answers to intriguing questions about animals, plants and microbes at the molecular, cellular, organismal and ecosystem levels. Biologists will be concerned with pollution of the environment, cause and cure of disease, population control, recurring food shortages, preservation of species and many other aspects resulting from the impact of technological changes on life forms. Those who are astounded by the array of living things on the earth and who seek challenging, creative work should consider a career in biology or in a biology-related field. The Department of Biology offers six distinct four-year curricula which lead to the baccalaureate degree. These are the Bachelor of Arts in Biology, Bachelor of Science in Biology, Bachelor of Science in Molecular and Cell Biology, Bachelor of Science in Microbiology, Bachelor of Science in Neuroscience (Molecular and Cellular Neuroscience Track), and Bachelor of Science in Zoology. The curricula are designed to maximize postbaccalaureate opportunities in:

1. professional schools of medicine, veterinary medicine and dentistry;
2. allied health schools of physical and occupational therapy, physician assistant programs, optometry, pharmacy, and nursing;
3. graduate education leading to teaching and research careers in universities, in industry or in state or national agencies;
4. teaching at junior high or high school levels and
5. jobs in biotechnology, research laboratories, pharmaceutical companies and field biology.

The Department of Biology degree plans will enable students to complete all entrance requirements for graduate and professional schools as well as medical technology, pharmacy, optometry, nursing, physical therapy, and other paramedical and health support fields.

Advising

Because some careers in biology require advanced and/or specialized training, it is essential to take advantage of advising opportunities. In the Department of Biology, there are professional advisors in the Biology Undergraduate Programs Office. The advisor may be consulted prior to each registration period and as the student needs. Questions regarding registration, degree checks, transfer of courses, advanced placements and other academic matters are handled in the Office of Undergraduate Programs. Students with special interests in graduate study should consult the graduate advisor. Information concerning entrance to professional schools of medicine, dentistry and other health related fields is available from the Office of Professional School Advising.

Requirements for all Baccalaureate Degrees in the Department of Biology

Each student seeking a baccalaureate degree in the Department of Biology is required to master a common body of knowledge in science. In addition, the student must take courses essential to a liberal education. Students will note that the first two years of all curricula offered by the Department of Biology are similar. Electives must include a 3 hour international and cultural diversity elective and a 3 hour cultural discourse elective required for graduation. Students must also take at least two writing-intensive courses in biology. Other requirements for graduation are listed in the Texas A&M University Student Rules and this catalog.

Students in the Department of Biology must make a grade of C or better in BIOL 111 and BIOL 112. Additionally, students may have only one D in courses within the major used to satisfy required or directed electives for a given degree plan. It is required that the freshman and sophomore level biology, chemistry and math courses be completed before the start of the 5th full semester and before enrollment in any junior or senior level science.

Common Body of Knowledge

To assure that students have sufficient prerequisite training for advanced courses, Biology majors must complete a series of courses comprising a Common Body of Knowledge (CBK) prior to their junior year (5th full semester) and enrollment in upper level BIOL courses. A Biology student will be admitted into upper level Biology classes when he or she has met the following criteria:

Completion of a set of CBK courses (37-38 hours) before the student’s 5th full semester to include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 11</td>
<td>Introductory Biology I</td>
<td>4</td>
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<tr>
<td>BIOL 12</td>
<td>Introductory Biology II</td>
<td>4</td>
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<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
<td>3</td>
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<tr>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 119</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 120</td>
<td>Fundamentals of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 238</td>
<td>Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
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Select one of the following:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
<td>4</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td></td>
</tr>
<tr>
<td>MATH 171</td>
<td>Calculus I</td>
<td></td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td></td>
</tr>
<tr>
<td>MATH 172</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td>STAT 201</td>
<td>Elementary Statistical Inference</td>
<td></td>
</tr>
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</table>

Total Semester Credit Hours 37-38

A student must be in good academic standing with an overall grade point average of a 2.0 or better overall and in the major.

Process

Students will be audited by the department to monitor progress of the CBK. Students failing to complete the CBK within the first four full semesters (two full semesters for Transfer Students) at Texas A&M University may be blocked and forced to change majors or be required to meet with an academic advisor to see if they can be successful in the major. Students registering for upper-level Biology classes without completing the CBK, or without approval of the Undergraduate Advising Office, will be dropped from the roster.
Transfer Students

1. Transfer from within Texas A&M University: The Biology Department will accept changes of major from other departments at Texas A&M upon completion of AT LEAST one semester of an applicable BIOL course taken at Texas A&M and AT LEAST one semester of an applicable CHEM course taken at Texas A&M, with a minimum 2.5 grade point average overall for courses taken at Texas A&M, and a 2.5 grade point average in BIOL courses taken at Texas A&M, and a 2.5 or better grade point average in CHEM courses taken at Texas A&M. Students still must complete the CBK before being admitted to upper level BIOL courses.

2. Transfer students from other institutions to Biology must have completed the following:
   a. A minimum of 24 accredited college hours including prescribed coursework
   b. Prescribed coursework:
      i. Eight hours of General Biology (TAMU BIOL 111 and BIOL 112 or Texas Common Course Numbers BIOL 1406 and 1407) with B's or better, and
      ii. Eight hours of General Chemistry (TAMU CHEM 119 and CHEM 120 or Texas Common Course Numbers CHEM 1411 and CHEM 1412) with B's or better, and
      iii. Four hours of Calculus (TAMU MATH 147 or MATH 151 or MATH 171 and four hours of Calculus II (TAMU MATH 148 or MATH 152 or MATH 172 or three hours of Statistics STAT 201 or Texas Common Courses Numbers MATH 2413 and MATH 2414 or MATH1342) with C's or better
   c. A minimum cumulative grade point average of a 3.0
   d. A minimum Biology and Chemistry grade point average of a 3.0 in each
   e. Please refer to admissions.tamu.edu (http://admissions.tamu.edu/transfer/apply/?_ga=2.156153723.1190088441.1615999771-1217340481.1615999771)

Biology Honors Program

The Biology Department Honors Program is open to highly talented and motivated students pursuing a major in any of our degree plans. Honors students will be part of a vibrant community within the department with enriched learning experiences in both the classroom and biology research laboratories.

Honors Requirements: Students wishing to graduate with honors distinctions in either Biology (BIOL), Microbiology (MBIO), Zoology (ZOOL), or Molecular and Cellular Biology (BMCB) must earn 21 credits in Honors courses and meet the following minimum honors requirements in addition to those listed in the degree plan:

- 4 credits BIOL 111H or BIOL 112H*
- 3 credits BIOL 213H or BIOL 214H
- 3 credits at 300/400 BIOL honors or honors contract; any 600 BIOL; not to include BIOL 485H, BIOL 491H, or BIOL 495H
- 6 credits BIOL 491H
- 2 credits BIOL 495H
- 3 credits any honors course outside the College of Science

* This requirement may be waived with a score of 5 on the Biology AP exam, a score of 6 on the IB exam, or by taking an additional honors biology course at the 300 or 400 level.

Grade requirements at time of graduation:
- cumulative Texas A&M University GPA of 3.5 or higher
- cumulative honors GPA of 3.25 or higher
- no grade lower than a B in courses counting toward honors. If a student earns less than a B in an honors course, they will still receive University credit. However, they will need to take a different course to fulfill the honors requirement.
- no F*, given in cases of academic dishonesty, on the transcript

Honors recognition: All honors courses will be denoted as honors on students’ official transcripts. Furthermore, students completing the honors program will have the departmental Biology honors distinction as well as any earned university or college distinction noted on the official transcript.

Admission to the Honors Program in Biology

Incoming Freshmen: Incoming freshmen applicants should indicate their interest in the departmental honors program though the ApplyTexas site and by choosing the "Apply to any Honors Program" after August 1. Qualified applicants will be contacted by the department with further information on joining Biology Honors. Current qualifications for freshman admission are detailed on the Biology Honors website (https://www.bio.tamu.edu/wordpress/index.php/biology-honors-program/).

Students who have already completed their application and now wish to apply to the Biology Honors program can use the "Apply to any Honors Program" link at the Texas A&M Honors program site (http://honorsprograms.tamu.edu/Home/) or contact biohonors@bio.tamu.edu.

Current or transfer students: Current or transfer students with a cumulative GPA of 3.5 or better can apply for admission to the Biology Honors Program by writing a short (less than 300 word) email to the department’s Honors Director. When applying students should keep in mind that they will need to fulfill all honors requirements. Please send email to: biohonors@bio.tamu.edu.

Remaining in the program

In order to remain in the Biology Honors program, students must maintain a cumulative GPA at Texas A&M of 3.5 and honors GPA of 3.25. Students falling below these standards will be placed on probation for the next semester. Students unable to meet these standards for a second semester may be dismissed from the Biology Honors Program.

Please direct any questions to biohonors@bio.tamu.edu or the Biology Undergraduate Advising office.

Human Biology Track

This unofficial track is for students interested in pursuing professional schools including medical, dental and allied health programs (e.g., nursing, occupational therapy, optometry, pharmacy, physical therapy and physician assistant). The focus of the science courses on human biology will better prepare these students for their chosen fields. Suggested courses include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL</td>
<td>Chordate Anatomy</td>
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Social and Behavioral Science

<table>
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<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>PSYC</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>or Introduction to Sociology</td>
<td></td>
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<tr>
<td>SOCI</td>
<td>205</td>
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Biology Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
</table>
Department of Biology

BIOL 344 Embryology 4
BIOL 388 Principles of Animal Physiology 4
BIOL 445 Biology of Viruses 3
BIOL 454 Immunology 3
BIOL 456 Medical Microbiology 3

Free Electives
HLTH 335 Human Diseases 3
HLTH 354 Medical Terminology for the Health Professions 3
URPN 370 Health Systems Planning 3
PSYC 107 Introduction to Psychology 3
or SOCI 205 or Introduction to Sociology 3

BIOL 318 Chordate Anatomy 4
BIOL 344 Embryology 4
BIOL 388 Principles of Animal Physiology 4
BIOL 454 Immunology 3
BIOL 456 Medical Microbiology 3

International and Cultural Diversity
HLTH 236 Introduction to Health Disparities and Diversity 3
HLTH 334 Women's Health 3

Total Semester Credit Hours 60

Students should consult their academic advisor about the courses that best fit their career interests.

Education Track
This is for students wishing to acquire state certification to teach at the secondary level upon graduation. Students should seek advice from the advisors within their department and from the College of Education and Human Development, as well as from the advisor in charge of their teaching option. The intention is to make the best possible use of social science, humanity, free and directed electives in the Bachelor of Arts in Biology, thereby condensing as many of the certification requirements as possible into the degree plan and allowing the student to obtain a minor in Applied Learning in Science, Technology, Engineering and Mathematics (STEM). Courses should include:

<table>
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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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</thead>
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<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>INST 222</td>
<td>Foundations of Education in a Multicultural Society</td>
<td>3</td>
</tr>
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</table>

Biology Electives
Upper-level BIOL courses, including two writing intensive courses (http://catalog.tamu.edu/undergraduate/course-descriptions/biol/)

Free Electives
RDNG 372 Reading and Writing across the Middle Grades Curriculum 3
or RDNG 465 or Reading in the Middle and Secondary Grades 3
TEFB 322 Teaching and Schooling in Modern Society 3
TEFB 324 Teaching Skills II 3
TEFB 406 Science in the Middle and Secondary School 3

Student teaching

Total Semester Credit Hours 32

Marine Biology Track
This unofficial track is for students desiring a more rigorous and in-depth foundation in biological courses that apply to marine environments and ecosystems. This suggested plan is ideal for students who intend to pursue graduate studies in marine biology or serve as field biologists at national seashores or sanctuaries. Suggested courses include:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 335</td>
<td>Invertebrate Zoology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 440</td>
<td>Marine Biology</td>
<td>4</td>
</tr>
</tbody>
</table>

Related ZOOL research or field experience (http://catalog.tamu.edu/undergraduate/course-descriptions/zool/)

Free Electives
OCNG 251 Oceanography 3
WFSC 311 Ichthyology 3
WFSC 425 Marine Fisheries 3

Total Semester Credit Hours 20

Students should consult their academic advisor about the courses that best fit their career interests.

Ecology/Environmental Track
This unofficial track is particularly designed for students interested in environmental consulting, environmental protection and ecosystem evaluation. This suggested plan can be adapted to focus on particular areas or populations within an ecosystem. Suggested courses include:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>ENGL 210</td>
<td>Technical and Professional Writing</td>
<td>3</td>
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Biology Electives
Select one of the following: 3-4
- BIOL 335 Invertebrate Zoology
- BIOL 357 Ecology
- BIOL 358 Ecology Laboratory
- BIOL 440 Marine Biology
- BIOL 462/ WFSC 462 Amazon River Tropical Biology
- BIOL 467 Integrative Animal Behavior

Free Electives
CHEM 315 & CHEM 318 Fundamentals of Quantitative Analysis and Quantitative Analysis Laboratory 4
ENTO 201 General Entomology 3
MEPS 313 Introduction to Plant Physiology 3

Select one of the following: 3-4
Students should consult their academic advisor about the courses that best fit their career interests.

Liberal Education Requirements of the University, College or State

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td>American history [link]</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Communication [link]</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture [link]</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Government/Political science [link]</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral sciences [link]</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Creative arts [link]</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International and cultural diversity [link]</td>
<td>0-3</td>
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<tr>
<td></td>
<td>Cultural Discourse [link]</td>
<td>0-3</td>
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<td>Total Semester Credit Hours</td>
<td>27-33</td>
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Faculty

Adams, Amanda, Senior Lecturer
Biology
PHD, University of Western Ontario, 2013

Alexander, Michael B, Lab Instructor
Biology
PHD, Texas A&M University, 2014

Aramayo, Rodolfo A, Associate Professor
Biology
PHD, University of Georgia, 1992

Arzan Zarin, Aref, Assistant Professor
Biology
PHD, The University of Dublin, 2013

Attia, John, Lab Instructor
Biology
MS, Texas A&M University, 2019

Bell-Pedersen, Deborah, Professor
Biology
PHD, State University of New York at Albany, 1991

Beremand, Phillip D, Lab Instructor
Biology
PHD, Indiana University at Bloomington, 1979

Bernardo, Joseph, Research Associate Professor
Biology
PHD, Duke University, 1991

Blackmon, Heath L, Assistant Professor
Biology
PHD, University of Texas at Arlington, 2015

Cohn, William B, Instructional Assistant Professor
Biology
PHD, Texas A&M University, 2000

Criscone, Charles D, Professor
Biology
PHD, Oregon State University, 2005

Delmore, Kira, Assistant Professor
Biology
PHD, University of British Columbia, 2015

Dulin, Jennifer N, Assistant Professor
Biology
PHD, University of Texas Health Science Center, 2012

Epps, Sharon V, Lab Instructor
Biology
MS, Texas A&M University, 2013

Erickson, James W, Associate Professor
Biology
PHD, University of Wisconsin, Madison, 1989

Farhy, Isabella, Assistant Professor
Biology
PHD, Tel Aviv University, 2013

Fletcher, Samantha, Senior Lecturer
Biology
PHD, Texas A&M University, 2019

Garcia, Luis R, Professor
Biology
PHD, University of Texas, 1996

Gomer, Richard H, University Distinguished Professor
Biology
PHD, California Institute of Technology, 1983
Griffing, Lawrence R, Associate Professor
Biology
PHD, Stanford University, 1981

Hardin, Paul E, Distinguished Professor
Biology
PHD, Indiana University, 1987

Hawkins, Angela K, Senior Lecturer
Biology
PHD, Texas A&M University, 2018

Janes, Donna, Senior Lecturer
Biology
PHD, University of Illinois, 2004

Leboeuf, Brigitte L, Senior Lecturer
Biology
PHD, Texas A&M University, 2009

Lee, Christopher P, Senior Lecturer
Biology
BS, Texas A&M University, 1993

Lockless, Steve W, Associate Professor
Biology
PHD, University of Texas at Dallas, 2002

Lyons, Jacob I, Lab Instructor
Biology
MS, Texas State University, 2010

Mackenzie, Duncan S, Associate Professor
Biology
PHD, University of California at Berkeley, 1980

McCreedy, Dylan, Assistant Professor
Biology
PHD, Washington University, St. Louis, 2013

McKnight, Thomas D, Professor
Biology
PHD, University of Georgia, 1983

Menet, Jerome, Assistant Professor
Biology
PHD, Louis Pasteur University, 2003

Merlin, Christine, Associate Professor
Biology
PHD, University Pierre and Marie Curie, 2006

Mitchell, Angela, Assistant Professor
Biology
PHD, University of North Carolina at Chapel Hill, 2013

Moyes, Rita J, Instructional Associate Professor
Biology
PHD, Texas A&M University, 1992

Nan, Beiyan, Associate Professor
Biology
PHD, Peking University, 2007

Norton, Jerry D, Lab Instructor
Biology
PHD, University of Texas, 1994

Paredes-Sabja, Daniel, Assistant Professor
Biology
PHD, Oregon State University, 2009

Pepper, Alan E, Professor
Biology
PHD, University of California at Davis, 1990

Pilling, Darrell, Research Assistant Professor
Biology
PHD, University of Birmingham, 1995

Qin, Hongmin, Associate Professor
Biology
PHD, Institute of Microbiology, Chinese Academy of Sciences, 1999

Rao, Asha, Instructional Associate Professor
Biology
PHD, Texas A&M University, 2002

Riley, Bruce B, Professor
Biology
PHD, University of Wisconsin, Madison, 1990

Rosenthal, Gil G, Professor
Biology
PHD, The University of Texas at Austin, 2000

Roy Sarkar, Tapasree, Research Assistant Professor
Biology
PHD, Purdue University, 2008

Ryan, Kathryn J, Instructional Associate Professor
Biology
PHD, Baylor College of Medicine, 1998

Sachs, Matthew S, Professor
Biology
PHD, Massachusetts Institute of Technology, 1986

Scott, Timothy P, Professor
Biology
PHD, Texas A&M University, 1996

Siegele, Deborah A, Associate Professor
Biology
PHD, University of Wisconsin, Madison, 1989

Smith, James L, Professor
Biology
PHD, University of Florida, 2002

Smotherman, Michael S, Professor
Biology
PHD, University of California at Los Angeles, 1998

Sorg, Joseph A, Professor
Biology
PHD, University of Chicago, 2006
St. Clair, Allison, Senior Lecturer
Biology
PHD, Texas A&M University, 2017

Tag, Andrew G, Instructional Associate Professor
Biology
PHD, Texas A&M University, 2003

Taylor, Lathrop, Instructional Assistant Professor
Biology
PHD, Texas A&M University, 1985

Versaw, Wayne K, Professor
Biology
PHD, University of Wisconsin, Madison, 1995

Wicksten, Mary K, Professor
Biology
PHD, University of Southern California, 1977

Wright, Rachel N, Lab Instructor
Biology
PHD, Texas A&M University, 2011

Zoran, Mark J, Professor
Biology
PHD, Iowa State University, 1987

**Majors**

- Bachelor of Arts in Biology (http://catalog.tamu.edu/undergraduate/science/biology/ba/)
- Bachelor of Science in Biology (http://catalog.tamu.edu/undergraduate/science/biology/bs/)
- Bachelor of Science in Microbiology (http://catalog.tamu.edu/undergraduate/science/biology/microbiology-bs/)
- Bachelor of Science in Molecular and Cell Biology (http://catalog.tamu.edu/undergraduate/science/biology/molecular-cell-biology-bs/)
- Bachelor of Science in Neuroscience, Molecular and Cellular Neuroscience Track (http://catalog.tamu.edu/undergraduate/science/biology/bs-neuroscience-mcb/)
- Bachelor of Science in Zoology (http://catalog.tamu.edu/undergraduate/science/biology/zoology-bs/)

**Minors**

- Bioinformatics Minor (http://catalog.tamu.edu/undergraduate/science/biology/bioinformatics-minor/)
- Biology Minor (http://catalog.tamu.edu/undergraduate/science/biology/minor/)
- Pre-Medicine Minor (http://catalog.tamu.edu/undergraduate/science/biology/pre-medicine-minor/)