

# 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:

Code	Title	Semester Credit Hours
BIOL 111	Introductory Biology I	4
BIOL 112	Introductory Biology II	4
BIOL 213	Molecular Cell Biology	3
BIOL 214	Genes, Ecology and Evolution	3
CHEM 119	Fundamentals of Chemistry I	4
CHEM 120	Fundamentals of Chemistry II	4
CHEM 227 & CHEM 237	Organic Chemistry I and Organic Chemistry Laboratory	4
CHEM 228 & CHEM 238	Organic Chemistry II and Organic Chemistry Laboratory	4
Select one of the following:		4
MATH 147	Calculus I for Biological Sciences	
MATH 151	Engineering Mathematics I	
MATH 171	Calculus I	
Select one of the following:		3-4
MATH 148	Calculus II for Biological Sciences	
MATH 152	Engineering Mathematics II	
MATH 172	Calculus II	
STAT 201	Elementary Statistical Inference	
<b>Total Semester Credit Hours</b>		<b>37-38</b>

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, 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) ([http://admissions.tamu.edu/transfer/apply/?\\_ga=2.156153723.1190088441.1615999771-1217340481.1615999771](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 (ZOO), 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 Arts and Sciences

\* 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 through 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](mailto: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](mailto: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](mailto: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:

Code	Title	Semester Credit Hours
<b>Social and Behavioral Science</b>		
PBSI 107	Introduction to Psychology	3
	or SOCI 205 or Introduction to Sociology	
<b>Biology Electives</b>		
BIOL 318	Chordate Anatomy	4

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
<b>Free Electives</b>		
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
HLTH 335	Human Diseases	3
HLTH 354	Medical Terminology for the Health Professions	3
PBSI 107	Introduction to Psychology	3
	or SOCI 205 or Introduction to Sociology	
URPN 370	Health Systems Planning	3
<b>International and Cultural Diversity</b>		
HLTH 236	Introduction to Health Disparities and Diversity	3
HLTH 334	Women's Health	3
<b>Total Semester Credit Hours</b>		<b>60</b>

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 School 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 Secondary Education (SEED). Courses should include:

Code	Title	Semester Credit Hours
<b>Social and Behavioral Science</b>		
INST 210	Understanding Special Populations	3
INST 222	Foundations of Education in a Multicultural Society	3
<b>Biology Electives</b>		
	Upper-level BIOL courses, including two writing intensive courses ( <a href="http://catalog.tamu.edu/undergraduate/course-descriptions/biol/">http://catalog.tamu.edu/undergraduate/course-descriptions/biol/</a> )	14
<b>Free Electives</b>		
RDNG 372	Reading and Writing across the Middle Grades Curriculum	3
	or RDNG 465 or Reading in the Middle and Secondary Grades	
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		
<b>Total Semester Credit Hours</b>		<b>32</b>

## 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:

Code	Title	Semester Credit Hours
<b>Biology Electives</b>		
BIOL 335	Invertebrate Zoology	4
BIOL 440	Marine Biology	4
	Related ZOOLOG research or field experience ( <a href="http://catalog.tamu.edu/undergraduate/course-descriptions/zool/">http://catalog.tamu.edu/undergraduate/course-descriptions/zool/</a> )	3
<b>Free Electives</b>		
ECCB 311	Ichthyology	3
OCNG 251	Oceanography	3
WFSC 425	Marine Fisheries	3
<b>Total Semester Credit Hours</b>		<b>20</b>

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:

Code	Title	Semester Credit Hours
<b>Communication</b>		
ENGL 210	Technical and Professional Writing	3
<b>Biology Electives</b>		
	Select one of the following:	3-4
BIOL 335	Invertebrate Zoology	
BIOL 357	Ecology	
BIOL 358	Ecology Laboratory	
BIOL 440	Marine Biology	
BIOL 467	Integrative Animal Behavior	
ECCB 462	Amazon River Tropical Biology	
<b>Free Electives</b>		
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
ECCB 311	Ichthyology	

ECCB 401	General Mammalogy
ECCB 402	General Ornithology
PLPA 301	Plant Pathology
& PLPA 303 and Plant Pathology Laboratory	

**Total Semester Credit Hours** **20-21**

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

Liberal Education Requirements of the University, College or State

Code	Title	Semester Credit Hours
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )		6
Communication ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a> )		6
Language, philosophy and culture ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a> )		3
Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )		6
Social and behavioral sciences ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences</a> )		3
Creative arts ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a> )		3
International and cultural diversity ( <a href="http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/">http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/</a> )		0-3
Cultural Discourse ( <a href="http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/">http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/</a> )		0-3
<b>Total Semester Credit Hours</b>		<b>27-33</b>

## 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

Criscione, 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  
PHD, University of Texas Southwestern Medical Center, 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  
PHD, Purdue University - West Lafayette, 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/arts-and-sciences/biology/ba/>)
- Bachelor of Science in Biology (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/bs/>)
- Bachelor of Science in Microbiology (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/microbiology-bs/>)
- Bachelor of Science in Molecular and Cell Biology (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/molecular-cell-biology-bs/>)
- Bachelor of Science in Zoology (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/zoology-bs/>)

## Minors

- Bioinformatics Minor (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/bioinformatics-minor/>)
- Biology Minor (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/minor/>)
- Pre-Medicine Minor (<http://catalog.tamu.edu/undergraduate/arts-and-sciences/biology/pre-medicine-minor/>)