

DIVISION OF BIOLOGY

Web Site: <http://www.twu.edu/biology/>

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The Division of Biology offers undergraduate programs in Biology and Medical Laboratory Sciences and graduate programs in Biology, Biotechnology, and Molecular Biology.

Graduate Degrees Offered

- M.S. in Biology (<https://catalog.twu.edu/graduate/arts-sciences/biology/biology-ms/>)
- M.A.T. (Interdisciplinary) (<https://catalog.twu.edu/graduate/professional-education/mat-graduate-interdisciplinary-degree/>)
- P.S.M. in Biotechnology (<https://catalog.twu.edu/graduate/arts-sciences/biology/professional-science-master-biotechnology/>)
- Ph.D. in Molecular Biology (<https://catalog.twu.edu/graduate/arts-sciences/biology/molecular-biology-phd/>)

Students in the Division of Biology can obtain a graduate degree with an emphasis in molecular biology, microbiology, virology, neurobiology, genetics, botany, or science education. The primary objectives of the division are to provide education and training to prepare students to enter a career in research, industry, or teaching. Within the division, there are opportunities for both teaching and research assistantships.

The doctoral degree is offered through the Federation of North Texas Area Universities.

Minors

Master's level: 6 approved graduate semester credit hours of biology.

Doctoral level: 12 approved graduate semester credit hours of biology.

Faculty

*AHMED, SHAZIA A., Clinical Professor of Biology, B.S., University of Karachi; M.S., University of Karachi; Ph.D., Texas Woman's University

*AVERITT, DAYNA L., Associate Professor of Biology; Division Head of Biology, B.A., University of Texas at Austin; M.S., Georgia State University; Ph.D., Georgia State University

*BERGEL, MICHAEL, Associate Professor of Biology, B.Sc., The Hebrew University of Jerusalem; M.Sc., The Hebrew University of Jerusalem; Ph.D., The Hebrew University of Jerusalem

*BERGER, MARY, Assistant Clinical Professor of Biology, B.S., University of Texas Health Science Center, San Antonio; Ph.D., University of Texas Health Science Center

*BIGGERS, AMANDA, Senior Lecturer of Biology, B.S., Texas Tech University; M.Ed., Texas A&M University-College Station; Ph.D., Iowa State University

*BROWER, CHRISTOPHER, Associate Professor of Biology, B.S., Northeastern Oklahoma State University; M.S., University of Oklahoma Health Sciences Center; Ph.D., University of Oklahoma Health Sciences Center

*DAVIS, ANN M., Lecturer II of Biology; Division Head of Biology, B.A., Rice University; Ph.D., Southwestern Medical Center

*ELROD, DIANA, Senior Lecturer of Biology; Division Head of Environmental Science, B.S., University of Arkansas at Little Rock; M.S., University of Memphis; Ph.D., University of North Texas

*FAURE, LIONEL, Associate Clinical Professor of Biology, B.S., University of Victor Segalen Bordeaux, France; M.S., University of Victor Segalen Bordeaux, France; Ph.D., University of Victor Segalen Bordeaux, France

*GUMIENNY, TINA, Associate Professor of Biology, B.S., Texas A&M University; Ph.D., State University of New York-Stony Brook

*HAMMETT, AMY JO, Associate Clinical Professor of Biology, B.S., Texas Woman's University; Ph.D., Texas A&M University

*HANSON, LAURA K., Associate Professor of Biology, B.S., University of Washington; Ph.D., Cornell University

*HYNDS, DIANNA L., Professor of Biology; Division Lead of Biology, B.S., Hillsdale College; Ph.D., Ohio State University-Columbus

*KOTTEGODA, SAMANTHI, Lecturer II of Biology, B.S., University of Kelaniya-Sri Lanka; M.S., University of Illinois at Chicago; Ph.D., North Carolina State University

*LYBRAND, ZANE R., Assistant Professor of Biology, B.S., Texas A&M University-College Station; Ph.D., Texas A&M University-College Station

*MAIER, CAMELIA G., Professor of Biology, B.S., University of Bucharest; M.S., University of North Texas; Ph.D., University of North Texas

*MILLS, NATHANIEL C., Professor of Biology, B.S., Western Kentucky University; Ph.D., Vanderbilt University

*PIERCE, STEPHANIE, Assistant Clinical Professor of Biology, B.S., Texas A&M University-College Station; Ph.D., University of Texas-Southwestern Medical Center at Dallas

*PISLARIU, CATALINA, Associate Professor of Biology, B.S., University of Bucharest, Romania; M.S., Ghent University, Belgium; Ph.D., University of North Texas

*SINHA, SUSHMITA, Assistant Professor of Biology, M.S., Ambedkar University, India; Ph.D., Sanjay Gandhi Postgraduate Institute of Medical Sciences, India

*SPENCER, JULIET, Professor of Biology; Interim Dean of the College of Arts and Sciences, B.S., Worcester Polytechnic Institute, Ph.D., University of Virginia

*TENNAKON, DEEPANI, Lecturer II of Biology, B.S., Texas A&M University-College Station; Ph.D., Texas A&M University-College Station

Courses

Contact hours identified in the course descriptions are based on a 15-week term. Students who enroll in Summer or mini-terms are expected to meet the same total number of contact hours as a 15-week term.

BACT 6534. Advanced Molecular Techniques I. Advanced molecular biology techniques in a hypothesis-driven, hands-on approach, including recombinant DNA technologies, bioinformatics, microscopy, flow cytometry, quantitative data analysis and image processing. Two lecture and six laboratory hours a week. Credit: Four hours.

BACT 6544. Advanced Molecular Techniques II. Hands-on, hypothesis-driven advanced molecular biology techniques with a focus on RNA and proteins. Training in lab techniques to include western blotting, bioinformatics, RNA isolation, quantification, and localization of gene transcripts. Prerequisite: BACT 6534. Two lecture and six laboratory hours a week. Credit: Four hours.

BIOL 5033. Advanced Science in the Secondary Classroom. Advanced strategies for teaching high school and middle school science using science inquiry and active learning techniques. Notebooking, portfolio building, 5E lesson plan design, classroom management, cooperative learning, assessment, and technology applications. Three lecture hours a week. Credit: Three hours.

BIOL 5123. Biostatistics. Advanced studies in biometric systems, experimental design, and data analysis. Prerequisite: Twelve hours of biology and permission of instructor. Three lecture hours a week. Credit: Three hours.

BIOL 5293. Advanced Scientific Communication. Advanced writing and verbal communication skills involved in gathering, analyzing, and distributing scientific and technical information for scientific and lay audiences. Three lecture hours a week. Credit: Three hours.

BIOL 5333. Advanced Pathophysiology. Principles of pathophysiology; including normal physiology, effects of abnormalities of function, instrumentation and measurement of physiological function. Three lecture hours a week. Credit: Three hours.

BIOL 5503. Research Methods. Studies in bibliographical procedures, the selection of methods applicable to specific problems, and writing and organization of review articles. Six laboratory hours per week. Credit: Three hours.

BIOL 5543. Advanced Genome Editing and Medical Ethics. Discussion of emerging technologies at the forefront of biomedical science and public debate, including how DNA within living organisms can be altered to treat human disease and other significant problems facing society, and the ethics surrounding genome editing and its applications. Three lecture hours a week. Credit: Three hours.

BIOL 5611. Readings in Biology. Library research in selected subjects in biology. Credit: One hour.

BIOL 5613. Readings in Biology. Library research in selected subjects in biology. Credit: Three hours.

BIOL 5643. Neuroscience. A survey of the nervous system, including aspects of neural mechanisms and circuitry underlying regulation of motor behaviors, sensory and perceptual processing, neuroplasticity, and higher cognitive functions. Three lecture hours a week. Credit: Three hours.

BIOL 5663. Biology of Cancer. Organismal, tissue, cellular, and molecular causes of cancer. Three lecture hours a week. Credit: Three hours.

BIOL 5681. Seminar. Presentation of research projects, data, and research by graduate students; discussions of presentations and related literature or laboratory techniques. May be repeated for additional credit. One seminar hour a week. Credit: One hour.

BIOL 5711. Biotechnology Internship Seminar. Development of skills to identify internship opportunities and successfully obtain a biotechnology internship. Critical reflection on internship as a way to further academic goals and build professional networks. One seminar hour a week. Credit: One hour.

BIOL 5801. Biological Research. Nature of biological investigations; methods and tools of research; survey of scientific literature. Credit: One hour.

BIOL 5803. Biological Research. Nature of biological investigations; methods and tools of research; survey of scientific literature. Credit: Three hours.

BIOL 5881. Biological Research. Continuation of BIOL 5801. Credit: One hour.

BIOL 5883. Biological Research. Continuation of BIOL 5803. Credit: Three hours.

BIOL 5901. Special Topics. Advanced studies in biology. Prerequisite: Permission of instructor. May be repeated for additional credit when topic varies. One lecture hour a week. Credit: One hour.

BIOL 5903. Special Topics. Offerings in biology, botany, microbiology, and zoology. May be repeated for additional credit. Prerequisite: Permission of instructor. Credit: Three hours.

BIOL 5911. Independent Study. Independent or tutorial work in selected areas in biology. May be repeated for additional credit. Credit: One hour.

BIOL 5913. Independent Study. Independent or tutorial work in selected areas in biology. May be repeated for additional credit. Credit: Three hours.

BIOL 5951. Internship. Significant experiential learning opportunity, typically with a company, non-profit, governmental, or community-based organization. Minimum of 150 approved internship hours a semester. Prerequisite: Permission of the instructor. Credit: One hour.

BIOL 5953. Internship. Significant experiential learning internship, typically with a company, non-profit, governmental, or community-based organization. Minimum of 450 approved internship hours a semester. Prerequisite: Permission of the instructor. Credit: Three hours.

BIOL 5973. Professional Paper. Written presentation of literature and possible laboratory research in a selected area. Credit: Three hours.

BIOL 5981. The Professional Portfolio. Development of a professional portfolio by students in the Master of Arts in Teaching program demonstrating the student's growth in the Learner-Centered Competencies. Pass-fail grade only. Credit: One hour.

BIOL 5983. Thesis. Credit: Three hours.

BIOL 5993. Thesis. Prerequisite: BIOL 5983. Credit: Three hours.

BIOL 6334. Advanced Cell Biology. Survey of current understanding of biogenesis, architecture and function of cellular organelles. The cell cycle and regulation of cell growth. Prerequisite: Permission of the instructor. Four lecture hours a week. Credit: Four hours.

BIOL 6513. Molecular Biology. Survey of current understanding of DNA structure, organization, chromosome replication, gene transcription, ribosome assembly, and translation. Emphasis is on molecular processes and their regulation in both prokaryotes and eukaryotes. Prerequisites: CHEM 5613 and CHEM 5623, or permission of instructor. Three lecture hours a week. Credit: Three hours.

BIOL 6734. Advanced Genetics. A literature-based course covering theory, experimental methods, and data analysis in genetics. Prerequisites: BIOL 6513 and BIOL 6334. Four lecture hours a week. Credit: Four hours.

BIOL 6821. Research in Molecular Biology. Application of molecular studies to biological problems. May be repeated for additional credit. Credit: One hour.

BIOL 6823. Research in Molecular Biology. Application of molecular studies to biological problems. May be repeated for additional credit. Credit: Three hours.

BIOL 6831. Research in Molecular Biology. Continuation of BIOL 6821. May be repeated for additional credit. Credit: One hour.

BIOL 6833. Research in Molecular Biology. Continuation of 6823. May be repeated for additional credit. Credit: Three hours.

BIOL 6843. Health Care Genetics. Human genetics and gene abnormalities with emphasis on application of new genomic technology in medicine; includes gene expression, inheritance, consequences of mutation, recombinant DNA technology, genetic testing, gene therapy, and genomics; incorporation of sequence-based health with evidence-based practice. Three lecture hours a week. Credit: Three hours.

BIOL 6903. Special Topics. Selected studies in advanced biology. Prerequisite: Permission of instructor. May be repeated for additional credit. Credit: Three hours.

BIOL 6911. Independent Study. Independent work in selected areas of molecular biology. May be repeated for additional credit. Credit: One hour.

BIOL 6913. Independent Study. Independent work in selected areas of molecular biology. May be repeated for additional credit. Credit: Three hours.

BIOL 6983. Dissertation. Credit: Three hours.

BIOL 6993. Dissertation. Prerequisite: BIOL 6983. Credit: Three hours.