

# Department of Chemistry and Biochemistry

**Web Site:** <http://www.twu.edu/chemistry-biochemistry>

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## Undergraduate Degrees Offered

- B.S. in Biochemistry with American Chemical Society Certification (<http://catalog.twu.edu/archives/2015-2016/undergraduate/arts-sciences/chemistry-biochemistry/biochemistry-acs>)
- B.S. in Biochemistry (for Pre-Health Majors) (<http://catalog.twu.edu/archives/2015-2016/undergraduate/arts-sciences/chemistry-biochemistry/biochemistry-bs>)
- B.S. in Chemistry (<http://catalog.twu.edu/archives/2015-2016/undergraduate/arts-sciences/chemistry-biochemistry/chemistry-bs>)
- B.S. in Chemistry with American Chemical Society Certification (<http://catalog.twu.edu/archives/2015-2016/undergraduate/arts-sciences/chemistry-biochemistry/chemistry-bs-american-chemical-society-certification>)

The Department of Chemistry and Biochemistry (<http://www.twu.edu/chemistry-biochemistry>) offers programs leading to the B.S. in Biochemistry and in Chemistry, both with or without certification by the American Chemical Society (ACS), and to the M.S. in Chemistry. The ACS certified degrees are recommended to those students interested in pursuing advanced degrees in chemistry or biochemistry. The BS in Biochemistry is recommended for those students interested in pursuing careers in the health related professions. Academic minors are offered in chemistry and in general science. Teacher certification to teach general science and physical science in secondary schools is also offered.

The objectives of the undergraduate chemistry program are to lead the student to

1. achieve an understanding of the chemical and physical behavior of material substances and of the energy changes accompanying this behavior and
2. to prepare students for advanced degrees, teaching, or professional careers in the sciences. The programs offered prepare the students for graduate studies in chemistry or biochemistry, admission to medical, dental, or pharmacy school, or a career as a professional chemist or teacher.

Graduates are employed as chemists, scientists, and managers in research, development, and production positions in a variety of settings and fields including: pharmaceuticals, cosmetics, food products, forensics, agricultural chemicals, medical research, and environmental law enforcement. Others go on to earn masters and doctoral degrees. Pre-professional graduates have successfully

earned medical/dental/pharmacy degrees from medical/dental/pharmacy schools in and outside of Texas.

Students who have taken advanced chemistry courses in high school may earn advanced placement credit for CHEM 1113. Advanced placement may be earned by a satisfactory score on the Advanced Placement Examination in Chemistry or on a departmentally-administered examination.

For more information about the Department, please visit the Department's home page [www.twu.edu/chemistry-biochemistry](http://www.twu.edu/chemistry-biochemistry).

## Course Load

Recommended course loads for both chemistry and biochemistry majors are 14-18 semester credit hours per semester, but students are ultimately responsible for developing individual course load plans with their academic advisors. When determining course loads, students should be prepared to spend a minimum of two hours outside of class for each lecture period and at least one-half hour outside of class for laboratories in order to be successful in these courses.

## Special Requirements for Majors

Only courses in which a grade of C or better is earned may be counted toward a departmental major. In addition, to register for any course required for the major, a grade of C or better in any of its prerequisites is required. Finally, any course required for the degree cannot be taken more than two times in order to achieve a passing grade (C or better). All students pursuing the ACS certified degree must also register for CHEM 4983 (Undergraduate Research) and CHEM 4991 (Senior Thesis). A paper describing the research project must be written and approved by the ACS for certification.

## Graduate Courses

Please refer to the Graduate Catalog (<http://catalog.twu.edu/archives/2015-2016/graduate>) for information regarding graduate courses.

Minors

## Chemistry Minor

A minor in Chemistry requires a minimum of 19 semester credit hours, six of which must be advanced (3000 or 4000 level). In addition to the courses listed below, an additional 3 credit hours must be taken from the following list: CHEM 3313, CHEM 3334, CHEM 3411 with CHEM 3413, or CHEM 3632 with CHEM 3633.

## Chemistry Minor, Required Courses

CHEM 1111	General Chemistry Laboratory I	1
CHEM 1113	General Chemistry I	3
CHEM 1121	General Chemistry Laboratory II	1
CHEM 1123	General Chemistry II	3
CHEM 2211	Organic Chemistry Laboratory I	1
CHEM 2213	Organic Chemistry I	3
CHEM 3221	Organic Chemistry Laboratory II	1
CHEM 3223	Organic Chemistry II	3

## General Science Minor

The minor in General Science requires 18 hours, six of which must be advanced. These must be divided among three of the following: biology, chemistry, physics and science courses. If the major is biology or chemistry, the hours must be divided between two of the remaining three.

Certificates

## Undergraduate Certificate Program in Science, Society and Sustainability

Undergraduate certificate programs are intended to provide additional opportunities to benefit TWU students. Certificate programs are distinct from regular degree programs. Each program is an integrated group of courses that meet a clearly defined need, such as:

1. meeting specific work force needs with skills and knowledge,
2. providing continuing education or accreditation for a particular profession, or
3. providing basic competency in an emerging area of interdisciplinary study.

### Science, Society and Sustainability

#### Program Description

Sustainability can be defined as using resources to meet the needs of today without jeopardizing future generations from being able to do the same. However, different disciplines have different perceptions with regard to sustainable practices. The goal of the Certificate in Science, Society and Sustainability is to integrate the principles and values of sustainable practices into all aspects of education and learning in order to enable our students to address the social, economic, cultural and environmental problems facing the new millennium.

#### Program Requirements

The certificate requires 15 credits of upper division courses (i.e., 3000 and 4000 level) in an organized and integrated course of study. Students will be responsible for any prerequisites for courses required for the certificate. A capstone course requiring a civic engagement component addressing a local sustainability issues is also required.

#### Coursework:

The first course serves as a foundation for the certificate. All students pursuing the certificate will be required to take this course.

**Community Conversations in Sustainability (SCI 3013)** is a multidisciplinary, team taught course discussing all aspects of sustainability from scientific, sociological and economic points of view. Topics include the impacts of energy production, food production, industry and our modern life style on our local and global community with an emphasis on systems and possible solutions. The course is formatted as a three credit seminar.

The building block courses will examine sustainability within specific disciplines in the College of Arts and Sciences. Students would be required to take at least one 3000 or 4000 level course (3 credits each) in the three areas of focus (Natural Sciences and Mathematics; Arts, Humanities and Social Sciences; Government and Business) from a list provided by appropriate departments. This would total a minimum of 9 credits.

The synthesis course is a capstone course where students take everything they have learned and put it all together within a civic engagement project. All students pursuing the certificate will also be required to take this course. **Building Sustainable Communities (SCI 4923)** is a three credit seminar course which requires completion of a civic engagement project with a public presentation of sustainable solutions for a selected complex civic issue.

#### Benefits to Students

Upon completion of the certificate, students will be able to understand the nature of sustainability from different disciplinary points of view enabling them to make smart decisions about their careers and lifestyles. More importantly, it will give them critical thinking and communication skills that will benefit them in their chosen careers.

#### Admissions

Please see Admission (<http://catalog.twu.edu/archives/2015-2016/undergraduate/admission-information>) section of this catalog. The same standards for admission to the University apply to the Department of Chemistry and Biochemistry.

## Faculty

### Professors

BRITT, BILLY MARK, Professor of Chemistry and Biochemistry. B.S., Millsaps College; Ph.D., University of Oregon.

JOHNSON, JAMES E., Cornaro Professor of Chemistry and Biochemistry. B.Chem., University of Minnesota, Twin Cities; M.S., University of Minnesota, Twin Cities; Ph.D., University of Missouri, Columbia.

RIGGS, CHARLES L., Professor of Fashion and Textiles; Professor of Chemistry and Biochemistry. B.S., University of North Texas; Ph.D., Oklahoma State University.

SHEARDY, RICHARD D., Professor of Chemistry and Biochemistry; Chair of the Department of Chemistry and Biochemistry. B.S., Michigan State University; Ph.D., University of Florida.

### Associate Professors

ANDERSON, MARY E., Associate Professor of Chemistry and Biochemistry. B.A., Hollins College; Ph.D., Cornell University.

JONES, RICHARD C., Associate Professor of Science Education. B.A., West Virginia University; M.A.T, University of Texas at Dallas; Ph.D., Texas A&M University.

OMARY, MANAL A., Associate Professor of Chemistry and Biochemistry. B.S., Yarmouk University; Ph.D., University of Maine, Augusta.

### Assistant Professor

MIRSALEH-KOHAN, NASRIN, Assistant Professor of Chemistry and Biochemistry. B.S., University of Tehran; M.S., Bowling Green State University; Ph.D., University of Tennessee, Knoxville.

## Lecturers

MAGUIRE, CYNTHIA F., Senior Lecturer of Chemistry and Biochemistry. B.S., University of Central Oklahoma; M.S., Texas Woman's University.

PEEBLES, LYNDA R., Senior Lecturer of Chemistry and Biochemistry. B.S., Harding University; Ph.D., University of North Texas.