

# College of Science

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In 1913, the curriculum of the Texas State School of Mines and Metallurgy included physics and mining, engineering, mathematics, chemistry, geology, mineralogy, shop work, and drawing. From these roots, The University of Texas at El Paso's College of Science has grown to more than 117 faculty in five academic departments: Biological Sciences, Chemistry and Biochemistry, Earth, Environmental and Resource Sciences, Mathematical Sciences, and Physics.

The College of Science seeks to educate scientists and mathematicians who want to participate in the discovery, creation, application, and dissemination of knowledge, and who desire professional preparation as scientists, teachers, leaders, and informed citizens in a multicultural and global society. This is the primary mission of the College of Science.

The College of Science offers degree programs at the undergraduate and graduate levels in Bioinformatics (MS), Biological Sciences (BA, MS, PhD), Biomedical Sciences (BS), Chemistry (BA, BS, MS, PhD), Environmental Science (BS, MS), Forensic Science (BS), Geological Sciences (BA, BS, MS, PhD), Mathematical Sciences (BS, MS), and Physics (BS, MS). In addition, the College offers a Master of Arts in Teaching (MAT) in Mathematics or Science, Master of Professional Science, and doctoral (PhD) degrees in Environmental Science and Engineering, and in Materials Science and Engineering. Several academic departments also offer a Bachelor of Arts degree program. The College of Science offer Fast Track Programs in Bioinformatics, Biological Sciences, Chemistry, Geology, Mathematics, Physics, Medical Physics, and Statistics. The College of Science offers an Undergraduate and Post Bac Certificate in Pre-Health Professions. This allows students who major in a non-STEM field to prepare for health related graduate school and allows students who have graduated to do the same. The College of Science also offers graduate certificates Applied and Computational Mathematics, Applied Statistics, Big Data Analytics, Bio-Informatics, Biology, Chemistry, Geospatial Information Science and Technology, and Physics. Each of our academic departments offer a variety of opportunities for undergraduate students to engage in research experiences with faculty working on cutting-edge research with state-of-the-art instrumentation and techniques. Faculty of the College shares a commitment to the idea that teaching and research are critically important in the education of students in science. The College is proud of the large number of undergraduates who participate in research laboratories

The College of Science is committed to the success of our students and to increasing the diversity of the community of scientists and mathematicians. To that end, we strive to develop a civil and respectful atmosphere that allows all to feel welcomed in our common pursuit of discovery, innovation and integration and to participate in the free exchange of ideas necessary to advance knowledge. The Minority Access to Research Careers (MARC), the Research Initiative for Scientific Enhancement (RISE), and the Pre-Health Professions Program Medical Professions Institute (MPI) focus on providing undergraduate research experiences and career opportunities for students interested in pursuing medical and health professions and biomedical science research careers.

The College of Science recognizes the importance of educating future mathematics and science teachers and of serving the STEM educational needs of our community. Students interested in teaching high school mathematics or science enroll in a Secondary Education minor, and are supported by dedicated College of Science advising and grant-funded scholarship programs.

## Office of the Dean, College of Science, Chemistry and Computer Science

The Dean's Office for the College of Science is committed to promoting student success in the context of quality academic programs. It plays an important role in facilitating and certifying students' progress toward their degrees, and directly interacts with undergraduate students in such areas as changes of majors, formulation and adjustment of personalized degree plans, confirmation of graduating senior status, special advising for pre-professional and secondary education curricula, counseling for academic probation/suspension and re-instatement issues, and resolution of a variety of academic problems. A major navigation resource for students is the College of Science Web site, accessed through the campus utep.edu address. Generalized degree plans, samples of petition forms, a calendar of events, and information about departments and faculty can be found here.

## Undergraduate Programs

Each department of the College of Science offers the Bachelor of Science (BS) degree, subject to the general requirements listed below. Several departments also offer Bachelor of Arts (BA) degrees.

A student planning a technical career or graduate work is advised to follow the BS degree route. Either the BS or the BA degree is suitable for admission to health professional schools (Student seeking admission should refer to the *Pre-professional Programs* section).

BS programs that include course work leading to Secondary Teacher Certification are offered by each department.

## Departmental Honors Programs

The Departments of Biological Sciences, Chemistry and Biochemistry, Earth, Environmental and Resource Sciences, and Physics have departmental honors programs for qualified undergraduates. Information about these programs is found in each department's section of this catalog.

## Undergraduate Research

Students wishing to receive research training and gain valuable experience in their field(s) of interest may do so for credit or as volunteers. There are also several competitive paid opportunities through various federal and state funded research programs to which enrolled undergraduate students

can apply. Interested students should contact the Campus Office of Undergraduate Research Initiatives (COURI) for advice and detailed information. COURI also offers professional training workshops on a regular basis. These workshops prepare students for careers and advance degrees in science.

## Bachelor of Science Degree Requirements

Requirements for the BS and BA degrees in all Science departments and programs require completion of the University Core Curriculum components for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Social and Behavioral Sciences, Component Area Option, as described elsewhere in this catalog. In addition to these, the College of Science has specific requirements associated with Core Curriculum components (see degree plans for requirements).

The BS degree in all science disciplines requires a minimum of 120 semester hours of credit including a minimum of 37 upper-division (junior and senior) semester hours. A GPA of 2.0 must be achieved in all course work at UTEP and in all course work in the major department. In addition, a grade of C or better must be achieved in the following courses: all courses used to fulfill the University Core Curriculum requirements, all lower-division courses in the major and minor; and all lower-division MATH and STAT courses. Additionally, some departments require a grade of C or better in required upper-division courses that are prerequisites for later courses in a sequence. Receipt of a grade of "D" in an elective course in the major, or in a required terminal course in the major that is not a pre-requisite for another course, may delay award of the degree if its receipt causes the overall or major GPA to drop below 2.0

## Major Fields

The College of Science offers BS degrees in the following disciplines: Biochemistry, Biomedical Sciences, Cellular and Molecular Biochemistry, Chemistry, Environmental Science, Forensic Science, Geological Sciences, Mathematics, Microbiology, and Physics. The specific requirements for these disciplines and various options can be found in the academic department sections of this catalog.

Students planning to obtain a degree in the College of Science must major in one of the above fields. Students planning to enter medical or dental schools normally obtain a BS or BA degree in science and, for this reason, should declare a subject-major field (Pre-Medical and Pre-Dental are not major fields).

## Double Majors

Double majors are not permitted in the College of Science without the permission of the Dean. Dual Degrees in different colleges do not require the permission of the Dean.

## Second Baccalaureate Degrees

Students who have earned a baccalaureate degree at an accredited institution can be eligible to enroll as candidates for a second baccalaureate degree in the College of Science. This degree will be awarded upon satisfactory completion of all Bachelor of Science degree requirements in the College of Science. Students seeking a second baccalaureate degree must complete at least 24 semester hours, specified by the department, following the award of the first baccalaureate degree. Students can petition the Dean of Science to reserve up to nine (9) semester hours taken during the last semester of the initial degree work for credit toward the second BS degree. Students cannot obtain a second baccalaureate degree in the same academic department as the first degree.

## Advising in the College of Science

All students enrolled in the College of Science must be advised prior to registration. Students who are on academic probation, suspension, or have a GPA below 2.30 are advised by the College of Science Associate Dean. Those students with Excess Hours (over 130) are also advised by the Associate Dean.

CAPP Degree Evaluation is an advising tool used by both students and advisors to evaluate course work against degree requirements. CAPP produces a report reflecting academic progress toward completion of an undergraduate or graduate degree in a student's declared or proposed major. The CAPP degree evaluation report shows how the University of Texas at El Paso courses, transfer courses, and courses in progress apply toward degree requirements. You can initiate a degree evaluation, view results, and print evaluation reports via Goldmine.

Students planning a career in Clinical Laboratory Science, Nursing, Physical Therapy, Pharmacy, or other allied health fields are referred to the *College of Health Sciences* section of this catalog and should be advised in that College.

## Pre-Health Professional Advising

Many College of Science students seek pre-professional advising for the medical professions from the Medical Professions Institute (MPI) (<https://www.utep.edu/science/mpi/>), which houses the Pre-Health Professions (PHP) Advisor. Students should seek advice from the PHP Advisor as early as possible in their academic career. While health professions school (e.g. Medical School, Dental School, Veterinary School, etc.) truly do not care what degree a student has pursued as an undergraduate, it is essential to make sure that coursework required by the professional school (often referred to pre-requisite coursework) is completed in a timely manner and that the student also acquire all the experiential and community engagement hours that is expected in a competitive applicant. Most of the undergraduate degrees offered by the College of Science include in the degree plan, the pre-requisite coursework expected by medical, dental, and veterinary schools. Pharmacy Schools, Physician Assistant Programs, and other health professional schools will have similar, but perhaps, more or less requirements depending on the specific programs. For more information

about pre#health professions advising, contact the Director of the Medical Professions Institute, Dr. Gail L Arnold, glarnold@utep.edu, or schedule an appointment by calling or visiting the CORE offices (915-747-8027, 100 Bell Hall).

## Forensic Science Program

The BS in forensic science is a multidisciplinary program with two tracks: biology (DNA) and chemistry. It consists of 86 semester hours in mathematics and science courses. Students must have a GPA of at least 2.5 to declare this major.

## Educator Preparation Program (Secondary Teacher Preparation Program)

Degree plans leading to certification for teaching in secondary schools (grades 7-12) are available in the following content areas: Mathematics, Mathematics/Physics (majors in Math or Physics), Science 7-12 majors in Biology, Chemistry, Environmental Science, or Geology), Life Science 7-12 (majors in Biology), Physical Science 7-12 (major in Chemistry or Physics). All majors leading to a high school teacher certification require a minor in secondary education. Before a student receives permission to minor in Secondary Education, they must have passed the UTEP Content Qualifying Exam with a score of at least 80% within two tries. Permission to take the Content Qualifying Exam is granted if students meet several criteria: overall GPA must be at least 2.75, majors GPA must be at least 2.75 and all low-division science and mathematics courses must be completed with a grade of C or better. In addition, six hours of content review must be completed prior to each attempt of the content qualifying exam. For those seeking to take the math content qualifying exam, they must also have completed MATH 1411, 1312, 3325, 3329, and STAT 3330 or STAT 3325 with a grade of C or better. Below are credit hour requirements to each of the teacher education degree plans offered by the College of Science. To declare a minor in Secondary Education, students must have satisfied the above requirements.

Type of Teacher Certification	Major	Hours required in Major	Hours required in Secondary Education	Minor Requirements	Other Course Requirements
Science 7-12	Biology	38	21		20 additional science credit hours.
Science 7-12	Chemistry	37	21		22 additional science credit hours.
Science 7-12	Geology	34	21		21 additional science credit hours.
Science 7-12	Environmental Science	32	21		23 additional science credit hours.
Life Science 7-12	Biology	38	21		20 additional science credit hours.
Mathematics 7-12	Mathematics	46	21		8 additional science credit hours.
Math/Physics 7-12	Mathematics	46	21		14 physics credit hours.
Math/Physics 7-12	Physics	31	21		19 math & 7 astronomy credit hours.
Physical Science 7-12	Chemistry	44	21		17 additional science credit hours.

## Minor in Secondary Education

Code	Title	Hours
SCED 3311	Curriculum Plan-Secondary Schl	3
RED 3342	Content Area Literacy	3
EDPC 3300	Intro to Youth Dev & Spec Ed	3
For Mathematics Majors		
SCED 4367	Teaching Math in Sec School	3
For Biological Sciences, Chemistry, Environmental Science, Geological Sciences, and Physics Majors		
SCED 4368	Teaching Science in Sec School	3
and		
SCED 3317	Multicultural Ed in Sec School	3
SCED 4691	Student Teaching in Sec School	6

## Admission to the Teacher Education

Students may apply for admission into the Educator Preparation Program (EPP) upon successful completion of the completion of the above mentioned conditions as well as other requirements set by the College of Education. See the College of Education for admission details.

## Student Teaching

Please see the College of Education for admission details.

## Degree Plans

Degree plans are the major tools by which students, their advisor, their departments, and the College of Science track academic progress. Generalized degree plans are available on-line at CAPP Degree Evaluation and at the College of Science Website.

## Lower-Division Courses

The prerequisite structure in science programs require careful attention to course sequences. These courses should be completed before the student reaches junior standing (60 semester credit hours). These and all freshman courses specified as required for the degree must be completed before senior standing (90 semester credit hours) in order to count toward the minimum hours required for the degree.

Enrollment in [MATH 1508 \(http://catalog.utep.edu/search/?P=MATH%201508\)](http://catalog.utep.edu/search/?P=MATH%201508) or equivalent is required in order to declare a major. It is to the student's advantage to continue enrolling in the other required mathematics courses since success in these courses depends largely upon what was learned in the previous course, and delaying enrollment in higher-level courses often requires considerable review.

Required Lower-Division Courses in the major and minor should be completed with a grade of C or better before enrollment in upper-division courses.

These lower-division courses are listed below. Other lower-division College of Science courses required for the various degree plans are included in brackets. These courses should also be completed with a C or better before enrolling in upper-division courses if the discipline is the minor.

## Upper-Division Courses

A minimum of 37 semester hours of upper-division course work is required. The various majors have different requirements for upper-division course work in the major and minor. Students should consult those respective sections. Upper-division courses are often *not* offered each semester or during summer sessions. Students are cautioned to plan ahead in terms of when these courses are generally offered and what prerequisites are needed.

## Dean

Dr. Robert Kirken (<http://facultyprofile.utep.edu/default.aspx?ID=rkirken>)

## Associate Dean

Dr. Michael J. Kenney (<https://expertise.utep.edu/node/34291/>), Associate Dean for Research

Dr. Deana D. Pennington (<https://expertise.utep.edu/node/26556/>), Associate Dean

Dr. Kristine M. Garza (<https://hb2504.utep.edu/Home/Profile/?username=kgarza>), Associate Dean for Student Success

## Professor

Robert Kirken (<http://facultyprofile.utep.edu/default.aspx?ID=rkirken>)

Contact Information: [rkirken@utep.edu](mailto:rkirken@utep.edu); 915-747-5536

Education: BA, Olivet College; Ph D, Wright State University; Postdoctoral Research Fellowship, National Institutes of Health/National Cancer Institute

Mourat Tchoshanov (<http://facultyprofile.utep.edu/default.aspx?ID=mouratt>)

Contact Information: [mouratt@utep.edu](mailto:mouratt@utep.edu); 915-747-7668

Education: Specialist Degree, Turkmen State Pedagogical Institute; Candidate of Sciences Degree, Kazan State Pedagogical Institute; Ph D, Kazan State Pedagogical University

## College of Sciences (Dean's Office)

### Programs

#### Bachelor of Science

- BS in Forensic Science ([http://catalog.utep.edu/undergrad/college-of-science/deans\\_office/forensic-science-bs/](http://catalog.utep.edu/undergrad/college-of-science/deans_office/forensic-science-bs/))

#### Certificates

- Pre-Health Professions Studies (<http://catalog.utep.edu/undergrad/college-of-science/premedcert/>)

## Biological Sciences

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/>)

## Programs

### Bachelor of Arts

- BA in Biological Sciences (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/biological-sciences-ba/>)

### Bachelor of Science

- BS in Biomedical Sciences (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/biological-sciences-bs/>)
- BS in Cellular and Molecular Biochemistry (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/cellular-molecular-biochemistry-bs/>)
- BS in Ecology and Evolutionary Biology (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/bs-ecology-evolutionary-biology/>)
- BS in Microbiology (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/microbiology-bs/>)

### Minor

- Minor in Biological Sciences (<http://catalog.utep.edu/undergrad/college-of-science/biological-sciences/biological-sciences-minor/>)

## Chemistry

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-science/chemistry/>)

## Programs

### Bachelor of Science

- BS in Biochemistry (<http://catalog.utep.edu/undergrad/college-of-science/chemistry/biochemistry-bs/>)
- BS in Chemistry (<http://catalog.utep.edu/undergrad/college-of-science/chemistry/chemistry-bs/>)

### Minor

- Minor in Chemistry (<http://catalog.utep.edu/undergrad/college-of-science/chemistry/chemistry-minor/>)

## Earth, Environmental and Resource Sciences

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/>)

## Programs

### Bachelor of Science

- BS in Environmental Science (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/environmental-science-bs/>)
- BS in Geological Sciences (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/geological-sciences-bs/>)
- BS in Geophysics (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/geophysics-bs/>)

### Minor

- Minor in Environmental Science (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/minor-environmental-science/>)
- Minor in Geography (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/minor-geography/>)
- Minor in Geological Sciences (<http://catalog.utep.edu/undergrad/college-of-science/earth-environmental-and-resource-sciences/minor-geological-sciences/>)

## Mathematical Sciences

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-science/mathematical-sciences/>)

## Programs

### Bachelor of Science

- BS in Mathematics (<http://catalog.utep.edu/undergrad/college-of-science/mathematical-sciences/mathematics-bs/>)

### Minor

- Minor in Mathematics (<http://catalog.utep.edu/undergrad/college-of-science/mathematical-sciences/mathematics-minor/>)
- Minor in Data Science (<http://catalog.utep.edu/undergrad/college-of-science/mathematical-sciences/statistics-minor/>)

## Physics

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-science/physics/>)

## Programs

### Bachelor of Science

- BS in Physics (<http://catalog.utep.edu/undergrad/college-of-science/physics/physics-bs/>)

### Minor

- Minor in Physics (<http://catalog.utep.edu/undergrad/college-of-science/physics/physics-minor/>)

## Fast Track to Graduate Programs

The College of Science offers fast-track to graduate school programs in bioinformatics, biology, chemistry, geology, mathematics, and physics. This allows students to take graduate courses that count toward both an undergraduate degree and a graduate degree.

## Biological Sciences

### Any M.S. degree in the Biological Sciences department/Any Undergraduate degree implemented by the Biological Sciences Department

Code	Title	Hours
BIOL 5130	Seminar	1
BIOL 5131	Ethical, Soc/Pol Dimensions	1
BIOL 5301	Select Adv Topics Biol Science	3
BIOL 5305	Herpetology	3
BIOL 5307		3
BIOL 5308	Rsrch Funding & Prof Developmt	3
BIOL 5313	Biogeography	3
BIOL 5316	Biosystematics	3
BIOL 5318		3
BIOL 5322	Advances/Evolutionary Theory	3
BIOL 5323		3
BIOL 5324		3
BIOL 5326	Advances Immunological Concept	3
BIOL 5327	Advances in Ecological Theory	3
BIOL 5328	Biostatistics	3
BIOL 5329	Physiology of Bacterial Cell	3
BIOL 5340	Structure/Funct Macromolecules	3
BIOL 5342		3
BIOL 5343		3
BIOL 5344	Molecular Pathogenesis	3
BIOL 5346		3
BIOL 5351	Intro Bio I:Basic Seq. Comp.	3
BIOL 5352	Intro Bio II: Gene Find/Compar	3
BIOL 5354		3
BIOL 5360	Aquatic Ecology	3

### M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Biomedical Sciences

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3

FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Ecology and Evolutionary Biology**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Microbiology**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.S. in Bioinformatics (<http://catalog.utep.edu/grad/college-of-science/college-science-deans-office/bioinformatics-ms/>) / B.S. in Biomedical Sciences; B.S. in Microbiology**

Code	Title	Hours
BINF 5351	Intro. Bioinformatics I	3
BINF 5352	Intro. Bioinformatics II	3
BIOL 5351	Intro Bio I:Basic Seq. Comp.	3
BIOL 5352	Intro Bio II: Gene Find/Compar	3
BIOL 5316	Biosystematics	3
BIOL 5326	Advances Immunological Concept	3
BIOL 5329	Physiology of Bacterial Cell	3
BIOL 5340	Structure/Funct Macromolecules	3
BIOL 5342		
BIOL 5343		
BIOL 5344	Molecular Pathogenesis	3

**M.S. in Biological Sciences (<http://catalog.utep.edu/grad/college-of-science/biological-sciences/biological-sciences-ms/>) / B.S. in Biomedical Sciences**

Code	Title	Hours
BIOL 5131	Ethical, Soc/Pol Dimensions	1
BIOL 5301	Select Adv Topics Biol Science	3
BIOL 5305	Herpetology	3
BIOL 5307		
BIOL 5308	Rsrch Funding & Prof Developmt	3
BIOL 5313	Biogeography	3

BIOL 5316	Biosystematics	3
BIOL 5318		
BIOL 5322	Advances/Evolutionary Theory	3
BIOL 5323		
BIOL 5324		
BIOL 5326	Advances Immunological Concept	3
BIOL 5327	Advances in Ecological Theory	3
BIOL 5328	Biostatistics	3
BIOL 5329	Physiology of Bacterial Cell	3
BIOL 5340	Structure/Funct Macromolecules	3
BIOL 5342		
BIOL 5343		
BIOL 5344	Molecular Pathogenesis	3
BIOL 5346		
BIOL 5351	Intro Bio I:Basic Seq. Comp.	3
BIOL 5352	Intro Bio II: Gene Find/Compar	3
BIOL 5354		
BIOL 5360	Aquatic Ecology	3

**M.S. in Biomedical Engineering** (<http://catalog.utep.edu/grad/college-of-engineering/metallurgical-materials-engineering/20biomedical-engineering-ms/>) / **B.S. Biomedical Sciences; B.S. in Cellular and Molecular Biochemistry; B.S. in Microbiology**

Code	Title	Hours
BIOL 5301	Select Adv Topics Biol Science *	3
BIOL 5308	Rsrch Funding & Prof Developmt	3
BIOL 5311	Neurobiology of Brain Diseases	3
BIOL 5320	Endocrinology	3
BIOL 5330	Cancer Biology	3
BME 5301	BME for Global Health	3
BME 5302	Telemedicine & Imaging Info.	3
BME 5303	Research & Lab Methods	3
BME 5304	BME Device Design & Regulation	3
BME 5310	Biomaterials	3
BME 5313	Tissue Engineering	3
BME 5321	Biomechatronics	3
BME 5353		3
BME 5390	Special Topics in BME	3

\* Advisor approval needed

## Chemistry

**M.S. in Bioinformatics** (<http://catalog.utep.edu/grad/college-of-science/college-science-deans-office/bioinformatics-ms/>) / **B.S. in Chemistry**

Code	Title	Hours
BINF/CHEM 5341	Anal./Model of Bio Structures	3
CHEM 5321	Advanced Organic Chemistry I	3
CHEM 5322	Advanced Organic Chemistry II	3
CHEM 5329	Contem Topics Organic Chemistr	3
CHEM 5339	Contemp Topics in Biochemistry	3



**M.S. in Chemistry (<http://catalog.utep.edu/grad/college-of-science/chemistry/chemistry-ms/>) / B.S. in Chemistry**

Code	Title	Hours
CHEM 5322	Advanced Organic Chemistry II	3
CHEM 5351	Advanced Physical Chemistry I	3

**Earth, Environmental and Resource Sciences****M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Geological Sciences**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.S. in Environmental Sciences (<http://catalog.utep.edu/grad/college-of-science/earth-environmental-and-resource-sciences/environmental-science-ms/>) / B.S. in Environmental Sciences**

Code	Title	Hours
BINF 5341	Anal./Model of Bio Structures	3
BINF 5351	Intro. Bioinformatics I	3
BINF 5352	Intro. Bioinformatics II	3
BINF 5354	Post-Genomic Analysis	3
BIOL 5130	Seminar	1
BIOL 5131	Ethical, Soc/Pol Dimensions	1
BIOL 5301	Select Adv Topics Biol Science	3
BIOL 5305	Herpetology	3
BIOL 5307		3
BIOL 5308	Rsrch Funding & Prof Developmt	3
BIOL 5313	Biogeography	3
BIOL 5316	Biosystematics	3
BIOL 5318		3
BIOL 5322	Advances/Evolutionary Theory	3
BIOL 5323		3
BIOL 5324		3
BIOL 5326	Advances Immunological Concept	3
BIOL 5327	Advances in Ecological Theory	3
BIOL 5328	Biostatistics	3
BIOL 5329	Physiology of Bacterial Cell	3
BIOL 5340	Structure/Funct Macromolecules	3
BIOL 5342		3
BIOL 5343		3
BIOL 5344	Molecular Pathogenesis	3
BIOL 5346		3
BIOL 5351	Intro Bio I:Basic Seq. Comp.	3
BIOL 5352	Intro Bio II: Gene Find/Compar	3
BIOL 5354		3
BIOL 5360	Aquatic Ecology	3
CHEM 5321	Advanced Organic Chemistry I	3
CHEM 5322	Advanced Organic Chemistry II	3
CHEM 5329	Contem Topics Organic Chemistr	3

CHEM 5339	Contemp Topics in Biochemistry	3
CHEM 5341	Anal./Model of Bio Structures	3
CHEM 5351	Advanced Physical Chemistry I	3
GEOL 5101	Graduate Seminar	1
GEOL 5102		1
GEOL 5115	Selected Topics in Geol Scien	1
GEOL 5162	Directed Study in Geology	1
GEOL 5289	Graduate Research in Geol Sci	2
GEOL 5303	Computer Appl in Earth Sci	3
GEOL 5307		3
GEOL 5308	Planetary Geology	3
GEOL 5310	Intro Entrepreneurial Geosci	3
GEOL 5311		3
GEOL 5315	Selected Topics-Geological Sci	3
GEOL 5317	Hydrogeology	3
GEOL 5318	Petroleum Geology	3
GEOL 5320	Environmental Tracers in Water	3
GEOL 5321	Introduction to GIST	3
GEOL 5322	Advanced GIST	3
GEOL 5323	Spat Analysis Earth/Env Sci	3
GEOL 5324	Machine Learning in Geoscience	3
GEOL 5343	Isotope Geology	3
GEOL 5344	Advanced Petrology	3
GEOL 5345		3
GEOL 5348		3
GEOL 5362	Directed Study in Geology	3
GEOL 5363	Sandstone Petrography	3
GEOL 5364	Sedimentary Depositional Envir	3
GEOL 5365	Basin Analysis	3
GEOL 5375	Quantit Techniq Geological Sci	3
GEOL 5376	Low Temperature Geochemistry	3
GEOL 5378	Global Biochemical Cycles	3
GEOL 5379		3
GEOL 5381	Paleoclimatology	3
GEOL 5384		3
GEOL 5387		3
GEOL 5389	Graduate Research in Geol Sci	3
GEOL 5392		3
GEOL 5397	Geol/Mineral Resources Mexico	3
GEOL 5401	Fundamentals of Earth Science	4
GEOL 5402	Fundmtls/Fld Meth in Earth Sci	4
GEOP 5163	Directed Study in Geophysics	1
GEOP 5263	Directed Study in Geophysics	2
GEOP 5306	Atmospheric Processes	3
GEOP 5336	Digital Image Processing	3
GEOP 5352	Geophysical Inverse Theory	3
GEOP 5353	Reflection Seismic Data Proces	3
GEOP 5354	Seismology	3
GEOP 5356	Topics in Geophysics	3
GEOP 5357	Well Logging	3
GEOP 5361	Plate Tectonics	3
GEOP 5362		3

GEOP 5363	Directed Study in Geophysics	3
GEOP 5364		3
GEOP 5460	Geop App-Digital Signal Proces	4
MATH 5310		
MATH 5311	Topics in Applied Mathematics	3
MATH 5314		
MATH 5315		
MATH 5321	Principles of Analysis	3
MATH 5325	Principles of Algebra	3
MATH 5329	Numerical Analysis	3
MATH 5330	Comp Methods of Linear Algebra	3
MATH 5331	Real Variables	3
MATH 5335	Techniques in Optimization	3
MATH 5341	General Topology	3
MATH 5343	Numer Solution Part Diff Equat	3
MATH 5345	Numerical Optimization	3
MATH 5346		
MATH 5351	Complex Variables	3
PHYS 5196	Graduate Research in Physics	1
PHYS 5321	Mechanics	3
PHYS 5325	Mathematical Physics	3
PHYS 5341	Electrodynamics	3
PHYS 5361	Quantum Mechanics	3
PHYS 5365	Advanced Statistical Mechanics	3
PHYS 5371	Solid State Physics	3
PHYS 5393	Special Topics in Physics	3
PHYS 5396	Graduate Research in Physics	3
STAT 5329	Statistical Programming	3
STAT 5354	Post-Genomic Analysis	3
STAT 5428	Intro to Statistical Analysis	4

### **M.S. in Geological Sciences (<http://catalog.utep.edu/grad/college-of-science/earth-environmental-and-resource-sciences/geological-sciences-ms/>) / B.S. in Geological Sciences**

<b>Code</b>	<b>Title</b>	<b>Hours</b>
GEOL 5101	Graduate Seminar	1
GEOL 5102		1
GEOL 5115	Selected Topics in Geol Scien	1
GEOL 5162	Directed Study in Geology	1
GEOL 5215	Selected Topics in Geol Scienc	2
GEOL 5262	Directed Study in Geology	2
GEOL 5289	Graduate Research in Geol Sci	2
GEOL 5303	Computer Appl in Earth Sci	3
GEOL 5307		3
GEOL 5308	Planetary Geology	3
GEOL 5309	Mineral Resrcs, Econ & Environ	3
GEOL 5310	Intro Entrepreneurial Geosci	3
GEOL 5311		3
GEOL 5315	Selected Topics-Geological Sci	3
GEOL 5317	Hydrogeology	3
GEOL 5318	Petroleum Geology	3
GEOL 5320	Environmental Tracers in Water	3
GEOL 5321	Introduction to GIST	3

GEOL 5322	Advanced GIST	3
GEOL 5323	Spat Analysis Earth/Env Sci	3
GEOL 5324	Machine Learning in Geoscience	3
GEOL 5343	Isotope Geology	3
GEOL 5344	Advanced Petrology	3
GEOL 5345		3
GEOL 5348		3
GEOL 5362	Directed Study in Geology	3
GEOL 5363	Sandstone Petrography	3
GEOL 5364	Sedimentary Depositional Envir	3
GEOL 5365	Basin Analysis	3
GEOL 5375	Quantit Techniq Geological Sci	3
GEOL 5376	Low Temperature Geochemistry	3
GEOL 5378	Global Biochemical Cycles	3
GEOL 5379		3
GEOL 5381	Paleoclimatology	3
GEOL 5384		3
GEOL 5387		3
GEOL 5389	Graduate Research in Geol Sci	3
GEOL 5392		3
GEOL 5397	Geol/Mineral Resources Mexico	3
GEOL 5401	Fundamentals of Earth Science	4
GEOL 5402	Fundmtls/Fld Meth in Earth Sci	4
GEOP 5163	Directed Study in Geophysics	1
GEOP 5263	Directed Study in Geophysics	2
GEOP 5306	Atmospheric Processes	3
GEOP 5335	Intro to Remote Sensing	3
GEOP 5336	Digital Image Processing	3
GEOP 5352	Geophysical Inverse Theory	3
GEOP 5353	Reflection Seismic Data Proces	3
GEOP 5354	Seismology	3
GEOP 5356	Topics in Geophysics	3
GEOP 5357	Well Logging	3
GEOP 5361	Plate Tectonics	3
GEOP 5362		3
GEOP 5363	Directed Study in Geophysics	3
GEOP 5364		3
GEOP 5460	Geop App-Digital Signal Proces	4

## Mathematics

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Mathematical Sciences**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Mathematical Sciences (Actuarial Concentration)**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Mathematical Sciences (Applied Concentration)**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Mathematical Sciences (Statistics Concentration)**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.S. in Bioinformatics (<http://catalog.utep.edu/grad/college-of-science/college-science-deans-office/bioinformatics-ms/>) / B.S. in Mathematics**

Code	Title	Hours
BINF/STAT 5354	Post-Genomic Analysis	3
MATH 5330	Comp Methods of Linear Algebra	3
MATH 5335	Techniques in Optimization	3
STAT 5329	Statistical Programming	3
STAT 5428	Intro to Statistical Analysis	4

**M.S. in Mathematical Sciences (<http://catalog.utep.edu/grad/college-of-science/mathematical-sciences/mathematical-sciences-ms/>) / B.S. in Mathematical Sciences**

Code	Title	Hours
MATH 5310		
MATH 5311	Topics in Applied Mathematics	3
MATH 5314		
MATH 5315		
MATH 5321	Principles of Analysis	3
MATH 5325	Principles of Algebra	3

MATH 5329	Numerical Analysis	3
MATH 5330	Comp Methods of Linear Algebra	3
MATH 5331	Real Variables	3
MATH 5335	Techniques in Optimization	3
MATH 5341	General Topology	3
MATH 5343	Numer Solution Part Diff Equat	3
MATH 5345	Numerical Optimization	3
MATH 5346		
MATH 5351	Complex Variables	3
MATH 5370	Special Topics	3

**M.S. in Statistics (<http://catalog.utep.edu/grad/college-of-science/mathematical-sciences/statistics-ms/>) / B.S. in Mathematical Sciences**

Code	Title	Hours
MATH 5321	Principles of Analysis	3
STAT 5329	Statistical Programming	3
STAT 5428	Intro to Statistical Analysis	4

## Physics

**M.B.A. - Master of Business Administration (<http://catalog.utep.edu/grad/college-of-business-administration/business-administration-deans-office/master-of-business-administration/>) / B.S. in Physics - Applied Physics Concentration**

Code	Title	Hours
ACCT 5304	Accounting Analysis	3
BLAW 5306	Business Law and Ethics	3
ECON 5311	Managerial Economics	3
FIN 5311	Financial Management	3
MGMT 5311	Organizational Mgmt Seminar	3
MKT 5311	Marketing Management	3
QMB 5311	Quantitative Methods-Business	3
OSCM 5308	Concepts of Production Mgmt	3

**M.S. in Physics (<http://catalog.utep.edu/grad/college-of-science/physics/physics-ms/>) / B.S. in Physics**

Code	Title	Hours
PHYS 5196	Graduate Research in Physics	1
PHYS 5321	Mechanics	3
PHYS 5325	Mathematical Physics	3
PHYS 5341	Electrodynamics	3
PHYS 5361	Quantum Mechanics	3
PHYS 5365	Advanced Statistical Mechanics	3
PHYS 5371	Solid State Physics	3
PHYS 5396	Graduate Research in Physics	3

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