BS in Cellular and Molecular Biochemistry

Students in this program will interact closely with faculty members from the Departments of Biological Sciences and Chemistry, and will enjoy a training oriented toward the development of problem solving skills and critical thinking, tightly intertwined with the development of practical laboratory skills. Students graduating from this program will have a thorough education in basic biology and chemistry, and an in depth knowledge of molecular biology, cellular biology, and cellular and molecular biochemistry. At the practical level, students graduating from this program will have extensive knowledge of basic laboratory techniques, including preparation of reagents, solutions, and media for bacterial, cellular, and biochemical analyses, and will be competent in the most-extensively used techniques in the cellular, molecular, and biochemical laboratory environments, including protein and DNA purification and analysis methods, tissue culture, and recombinant DNA technologies. A degree in Cellular and Molecular Biochemistry will provide a sound preparation for graduate studies in biochemistry, molecular biology, cellular biology, cancer, infectious diseases, medicine, and other health-related fields, and provide the student with the technical and intellectual skills to pursue employment in areas related to biotechnology and biomedical research in the academic, pharmaceutical, and biotechnology industries.

The requirements for the BS degree in Cellular and Molecular Biochemistry consist of the general College of Science requirements: completion of at least 120 semester credit hours, a minimum of 37 of which must be in upper-division coursework, and completion of the University’s General Education Core, which includes mathematics requirements MATH 1411. In addition, MATH 1312 or STAT 2480 is required.

For more information contact CORE (https://www.utep.edu/science/core/) advisors.

Fast Track

The Fast-Track Program (http://catalog.utep.edu/admissions/undergraduate/fast-track/#text) enables outstanding undergraduate UTEP students to receive both undergraduate and graduate credit for up to 15 hours of UTEP course work as determined by participating Master's and Doctoral programs. Not all undergraduate programs have elected to participate in the Fast Track option, so students should see their departmental graduate advisor for information about requirements and guidelines. A list of courses that have been approved for possible use at the graduate level is found here (http://catalog.utep.edu/admissions/undergraduate/fast-track/#fasttrackcoursestext).

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

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

Degree Plan

Required Credits: 120

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<thead>
<tr>
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<th>Hours</th>
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<tr>
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<td>Complete the University Core Curriculum requirements. (p. 3)</td>
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<tr>
<td>Designated Core C</td>
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<tr>
<td></td>
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<td>Calculus I</td>
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<tr>
<td></td>
<td>PHYS 1403</td>
<td>General Physics I</td>
</tr>
<tr>
<td></td>
<td>&amp; PHYS 1404</td>
<td>and General Physics II</td>
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</table>
BS in Cellular and Molecular Biochemistry

or

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PHYS 2420</td>
<td>Introductory Mechanics</td>
</tr>
<tr>
<td>&amp; PHYS 2421</td>
<td>and Introductory Electromagnetism</td>
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**Cellular and Molecular Biochemistry Requirements:**

**Required Chemistry Courses:**

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<th>Course Title</th>
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<tr>
<td>CHEM 1105</td>
<td>Laboratory for CHEM 1305</td>
</tr>
<tr>
<td>CHEM 1106</td>
<td>Laboratory for CHEM 1306</td>
</tr>
<tr>
<td>CHEM 1305</td>
<td>General Chemistry</td>
</tr>
<tr>
<td>CHEM 1306</td>
<td>General Chemistry</td>
</tr>
<tr>
<td>CHEM 2124</td>
<td>Lab for Organic Chemistry 2324</td>
</tr>
<tr>
<td>CHEM 2125</td>
<td>Lab for Organic Chemistry 2325</td>
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<td>CHEM 2324</td>
<td>Organic Chemistry</td>
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<td>CHEM 2325</td>
<td>Organic Chemistry</td>
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<tr>
<td>CHEM 3131</td>
<td>Lab for Chemistry</td>
</tr>
<tr>
<td>CHEM 3330</td>
<td>Biochem I: Struc &amp; Function</td>
</tr>
<tr>
<td>CHEM 3332</td>
<td>Biochem II: Metabol &amp; Bioenerg</td>
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**Required Biology Courses:**

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<thead>
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<tr>
<td>BIOL 1107</td>
<td>Topics in Study of Life I C</td>
</tr>
<tr>
<td>BIOL 1108</td>
<td>Organismal Biology Laboratory C</td>
</tr>
<tr>
<td>BIOL 1305</td>
<td>General Biology C</td>
</tr>
<tr>
<td>BIOL 1306</td>
<td>Organismal Biology C</td>
</tr>
<tr>
<td>BIOL 3320</td>
<td>Genetics</td>
</tr>
<tr>
<td>CBCH 3316</td>
<td>Membrane Biology</td>
</tr>
<tr>
<td>&amp; BIOL 3115</td>
<td>and Molecular Cell Biol Laboratory C</td>
</tr>
<tr>
<td>CBCH 4310</td>
<td>Techniques in Mol Biochem C</td>
</tr>
<tr>
<td>CBCH 4320</td>
<td>Adv Topics in Mol Biochem</td>
</tr>
<tr>
<td>MICR 2340</td>
<td>General Microbiology</td>
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<tr>
<td>&amp; MICR 2141</td>
<td>and Gen Microbiology Laboratory C</td>
</tr>
<tr>
<td>MICR 3345</td>
<td>Microbial Physiology</td>
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<tr>
<td>&amp; MICR 3146</td>
<td>and Microbial Physiology Lab</td>
</tr>
<tr>
<td>MICR 3449</td>
<td>Prokaryotic Molecular Genetics</td>
</tr>
<tr>
<td>MICR 4353</td>
<td>Immunology</td>
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<tr>
<td>&amp; MICR 4154</td>
<td>and Immunology Laboratory</td>
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**CBCH Major:**

<table>
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<tr>
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<tbody>
<tr>
<td>BIOL 3314</td>
<td>Molecular Cell Biology</td>
</tr>
<tr>
<td>&amp; BIOL 3115</td>
<td>and Molecular Cell Biol Laboratory</td>
</tr>
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<td>CBCH 4414</td>
<td>Cellular Biochemistry</td>
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**Prescribed Course Electives:**

Select five hours of the following:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BIOL 3192</td>
<td>Professional Development Sem.</td>
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<tr>
<td>BIOL 3330</td>
<td>Histology</td>
</tr>
<tr>
<td>BIOL 4198</td>
<td>Special Problems</td>
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<tr>
<td>BIOL 4298</td>
<td>Special Problems</td>
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<tr>
<td>BIOL 4388</td>
<td>Mammalian Physiology</td>
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<tr>
<td>BIOL 4398</td>
<td>Special Problems</td>
</tr>
<tr>
<td>CHEM 4134</td>
<td>Structural Biochemistry Lab</td>
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<tr>
<td>CHEM 4176</td>
<td>Introduction to Research</td>
</tr>
<tr>
<td>CHEM 4334</td>
<td>Structural Biochemistry</td>
</tr>
<tr>
<td>CHEM 4376</td>
<td>Introduction to Research</td>
</tr>
<tr>
<td>MICR 3343</td>
<td>Pathogenic Microbiology</td>
</tr>
<tr>
<td>&amp; MICR 3144</td>
<td>and Pathogenic Microbiology Lab</td>
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</table>
BS in Cellular and Molecular Biochemistry

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>MICR 4351</td>
<td>General Virology</td>
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<td>MICR 4355</td>
<td>Medical Mycology</td>
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<td>ZOOL 3464</td>
<td>Medical Parasitology</td>
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<tr>
<td>ZOOL 4384</td>
<td>Neurobiology</td>
</tr>
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</table>

**Total Hours**: 120

C Course requires a grade of C or better.

1 A total of thirty-seven hours of upper division coursework is required for all Bachelor of Science degrees.

**University Core Curriculum**

NOTE: The department may make specific suggestions for courses which are most applicable towards your major.

**Psychology and Criminal Justice majors and minors** are required to take MATH 1320 Math for Social Sciences I or a higher level Calculus course.

**Business majors** are required to take MATH 1320 Math for Social Sciences I or a higher level Calculus course.

NOTE: All courses require a C or better

**Communication (six hours)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The objective of the communication component is to enable the student to communicate effectively in clear and correct prose or orally in a style appropriate to the subject, occasion, and audience.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select six hours of the following:</td>
<td>6</td>
</tr>
<tr>
<td>COMM 1611</td>
<td>Written and Oral Communication</td>
<td></td>
</tr>
<tr>
<td>ENGL 1313</td>
<td>Writing About Literature</td>
<td></td>
</tr>
<tr>
<td>RWS 1301</td>
<td>Rhetoric &amp; Composition I</td>
<td></td>
</tr>
<tr>
<td>RWS 1302</td>
<td>Rhetoric &amp; Composition 2</td>
<td></td>
</tr>
<tr>
<td>RWS 1601</td>
<td>Rhetoric, Composition &amp; Comm</td>
<td></td>
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</table>

For students whose secondary education was in English:

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<thead>
<tr>
<th>Code</th>
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<th>Hours</th>
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<tbody>
<tr>
<td>ESOL 1311</td>
<td>Expos Engl Compos-Spkr Esl</td>
<td>3</td>
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<tr>
<td>ESOL 1312</td>
<td>Res &amp; Crit Writng Spkr Esl</td>
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**Total Hours**: 12

**American History (six hours)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The objectives of the history component are to expand students’ knowledge of the origin and history of the U.S., their comprehension of the past and current role of the U.S. in the world, and their ability to critically evaluate and analyze historical evidence. U.S. history courses (three hours must be Texas history) include:</td>
<td></td>
</tr>
<tr>
<td>HIST 1301</td>
<td>History of U.S. to 1865</td>
<td>3</td>
</tr>
<tr>
<td>HIST 1302</td>
<td>History of U.S. Since 1865</td>
<td>3</td>
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</table>

**Total Hours**: 6

**Language, Philosophy & Culture (three hours)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The objective of the humanities component is to expand students’ knowledge of the human condition and human cultures, especially in relation to behaviors, ideas, and values expressed in works of human imagination and thought. Through study in disciplines such as literature and philosophy, students engage in critical analysis and develop an appreciation of the humanities as fundamental to the health and survival of any society.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td>CHIC 2302</td>
<td>Latina/o Presence in the U.S.</td>
<td></td>
</tr>
<tr>
<td>ENGL 2311</td>
<td>English Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 2312</td>
<td>English Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 2313</td>
<td>Intro to American Fiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 2314</td>
<td>Intro to American Drama</td>
<td></td>
</tr>
</tbody>
</table>
ENGL 2318  Intro to American Poetry
FREN 2322  Making of the "Other" Americas
HIST 2301  World History to 1500
HIST 2302  World History Since 1500
PHIL 1301  Introduction to Philosophy
PHIL 2306  Ethics
RS 1301  Introduct to Religious Studies
SPAN 2340  Seeing & Naming: Conversations
WS 2300  Introduction to Womens Studies
WS 2350  Global Feminisms

Total Hours 3

Mathematics (three hours)

<table>
<thead>
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<tbody>
<tr>
<td>MATH 1309</td>
<td>College Algebra</td>
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<tr>
<td>MATH 1310</td>
<td>Trigonometry and Conics</td>
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<tr>
<td>MATH 1319</td>
<td>Math in the Modern World</td>
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</tr>
<tr>
<td>MATH 1320</td>
<td>Math for Social Sciences I</td>
<td></td>
</tr>
<tr>
<td>MATH 1411</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 1508</td>
<td>Precalculus 1,2</td>
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<tr>
<td>MATH 2301</td>
<td>Math for Social Sciences II</td>
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<tr>
<td>STAT 1380</td>
<td>Statistical Literacy</td>
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<tr>
<td>STAT 2480</td>
<td>Elementary Statistical Methods</td>
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1 A higher-level course in the calculus sequence can be substituted.
2 TCCN MATH 1314 will also satisfy this requirement.

Total Hours 3

Life & Physical Sciences (six hours)

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<tbody>
<tr>
<td>ASTR 1107</td>
<td>Astronomy Lab I</td>
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<tr>
<td>ASTR 1307</td>
<td>Elem Astronomy-Solar System</td>
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</tr>
<tr>
<td>ASTR 1308</td>
<td>Elem Astr Stars &amp; Galaxies</td>
<td></td>
</tr>
<tr>
<td>BIOL 1103</td>
<td>Introductory Biology Lab</td>
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<tr>
<td>BIOL 1104</td>
<td>Human Biology Laboratory</td>
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<tr>
<td>BIOL 1107</td>
<td>Topics in Study of Life I</td>
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</tr>
<tr>
<td>BIOL 1108</td>
<td>Organismal Biology Laboratory</td>
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<tr>
<td>BIOL 1203</td>
<td>Introductory Biology</td>
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</tr>
<tr>
<td>BIOL 1304</td>
<td>Human Biology</td>
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<tr>
<td>BIOL 1305</td>
<td>General Biology</td>
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<td>BIOL 1306</td>
<td>Organismal Biology</td>
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</tr>
<tr>
<td>BIOL 2111</td>
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<tr>
<td>BIOL 2113</td>
<td>Human Anat/Physio Lab II</td>
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<td>BIOL 2311</td>
<td>Human Anat/Physiology I</td>
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<tr>
<td>BIOL 2313</td>
<td>Human Anat/Physiology II</td>
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</table>

The objective of the study of the natural sciences is to enable the student to understand, construct, and evaluate relationships in the natural sciences, and to enable the student to understand the bases for building and testing theories. The courses listed are for non-majors; the major courses in the discipline can be substituted for the non-major sequence. A minimum of two semesters of lecture and one semester of laboratory associated with one of the courses, or two semesters of combined (3 credit) lecture-laboratory courses (Only six hours apply toward the required 42):
<table>
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<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1105</td>
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<tr>
<td>CHEM 1106</td>
<td>Laboratory for CHEM 1306</td>
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</tr>
<tr>
<td>CHEM 1107</td>
<td>Intro General Chemistry Lab</td>
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<tr>
<td>CHEM 1108</td>
<td>Intro Organic &amp; Biochem Lab</td>
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</tr>
<tr>
<td>CHEM 1305</td>
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<td>General Chemistry</td>
<td></td>
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<tr>
<td>CHEM 1307</td>
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<tr>
<td>CHEM 1308</td>
<td>Intro Organic &amp; Biochemistry</td>
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<td>Non-major Lab for ESCI 1301</td>
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<td>Intro to Environment Science 2</td>
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<tr>
<td>ESCI 1301</td>
<td>Intro to Environmental Sci</td>
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<tr>
<td>GEOG 1106</td>
<td>Laboratory for GEOG 1306</td>
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<tr>
<td>GEOG 1306</td>
<td>Physical Geography</td>
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<td>GEOL 1103</td>
<td>Lab for GEOL 1313</td>
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<td>Laboratory for Geology 1212</td>
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<tr>
<td>GEOL 1211</td>
<td>Principles of Earth Sciences</td>
<td></td>
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<tr>
<td>GEOL 1212</td>
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<tr>
<td>GEOL 1230</td>
<td>The Blue Planet</td>
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<td>GEOL 1231</td>
<td>Natural Hazards</td>
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<tr>
<td>GEOL 1313</td>
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<td>GEOL 1314</td>
<td>Intro to Historical Geol</td>
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<td>HSCI 2302</td>
<td>Fundamentals of Nutrition</td>
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<td>HSCI 2303</td>
<td>Wellness Dynamics</td>
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<tr>
<td>MICR 2330</td>
<td>Microorganisms and Disease</td>
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<td>PHYS 1403</td>
<td>General Physics I</td>
<td></td>
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<tr>
<td>PHYS 1404</td>
<td>General Physics II</td>
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<tr>
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**Total Hours**: 1-4

### Political Science (six hours)

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<td>POLS 2310</td>
<td>Introduction to Politics</td>
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<tr>
<td>POLS 2311</td>
<td>American Gover &amp; Politics</td>
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**Total Hours**: 6

### Social and Behavioral Sciences (three hours)

<table>
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<th>Hours</th>
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The objectives of the political science component are to expand students' knowledge of the origin and evolution of the U.S. and Texas political systems, focusing on the growth of political institutions, and on the constitutions of Texas and the United States; and to enhance their understanding of federalism, states rights, and individual civil liberties, rights, and responsibilities.

Required Courses:

- POLS 2310 Introduction to Politics 3
- POLS 2311 American Gover & Politics 3

The objective of the social and behavioral science component is to increase students' knowledge of how social and behavioral scientists discover, describe, and explain the behaviors and interactions among individuals, groups, institutions, events, and ideas. Such knowledge will better equip students to understand themselves and the roles they play in addressing the issues facing humanity.

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**Total Hours** 3

### Component Area Option (six hours)

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**Total Hours** 6
# 4-Year Sample Degree Plan

## BS in Cellular and Molecular Biochemistry (Starting with Calculus)

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MICR 4353 & MICR 4154
Immunology and Immunology Laboratory 4

**Spring**

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Special Problems 1
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Adv Topics in Mil Biochem 3
CBCH 4414
Cellular Biochemistry 4
CHEM 3332
Biochem II: Metabol & Bioenerg 3
MICR 3449
Prokaryotic Molecular Genetics 4

Total Hours 119-120

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