BS in Metallurgical and Materials Engineering

The success of our students in their education at UTEP and in building and sustaining a career is our primary interest. Graduates in metallurgical and materials engineering often pursue careers in industries such as oil & gas, R&D, aerospace, primary metals, and biomedical components. The job functions of our engineers include failure analysis, product development, quality assurance, and production management.

Marketable Skills

Students will develop the following marketable skills:

1. Communication: Reach mutual understanding through effective exchange of information, ideas, and feelings
2. Critical thinking: Analyze and evaluate issues in order to solve problems and develop informed opinions
3. Leadership: Step up, think, and act critically and creatively to bring others together to accomplish a common task
4. Network building: Project-based learning, tours and formal interactions with industry partners
5. Problem-solving: Find solutions to difficult or complex issues
6. Research: Be able to search, investigate and critically analyze information in response to a specific research question
7. Teamwork: Participate as an effective, efficient member of a group in order to meet a common goal
8. Technical expertise: Hands-on experience with testing and analysis equipment

The Metallurgical and Materials Engineering undergraduate curriculum focuses on a strong materials science and engineering foundation, a deep understanding of how materials are processed, and how to tailor materials structure and properties to satisfy industrial needs and performance requirements. Students may choose a concentration in forensic engineering and materials performance, extractive and process metallurgy or biomaterials.

Vision

Our vision is to provide a modern Metallurgical and Materials Engineering Program of the highest quality.

Mission

The BS degree program in Metallurgical and Materials Engineering (MME) will serve two broad purposes: (1) to provide sufficient theory and hands-on experiences in metallurgical and materials engineering for a graduate to perform effectively, in industry or other employment; and (2) to provide opportunities for all types of students, while maintaining a high level of excellence as students progress through the curriculum. The MME program will also provide basic engineering skills for problem-solving and lifelong learning, along with good communication skills, both oral and written. MME faculty will maintain a balance between the applied and theoretical aspects, and will strive to provide pre-professional employment opportunities (either research experiences or internships) by continuously engaging industry in program activities with students.

Educational Objectives

1. Graduates will secure employment and/or admission to a graduate program in metallurgical and materials engineering or related professions
2. Graduates will advance in their career by continuing lifelong learning and personal/professional development
3. Graduates work effectively as contributors and leaders on diverse, interdisciplinary teams enabling innovation at the leading edge of technology in an ever-changing global community.
4. Graduates will be more competitive as practicing professionals with broad understanding of material systems, associated manufacturing processes and engineering solutions.

The Metallurgical and Materials Engineering (MME) program offers a Bachelor of Science MME degree with an option to develop an expertise in one of the four concentrations. If a student does not select a concentration, they are required to complete 4 elective courses (12 credit hours) from the list of all MME electives to satisfy the requirements for the BS MME degree.

- Concentration 1: Forensic Engineering and Materials Performance
- Concentration 2: Extractive and Process Metallurgy
- Concentration 3: Biomaterials
- Concentration 4: General Metallurgical and Materials Engineering

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).

UTEP senior students with at least 90 hours accumulated toward their BSMME degree, a minimum of 24 of those hours at UTEP and a cumulative GPA of at least 3.30 may be eligible for admission into the following fast-track programs:

- BS-MME/Master Program in Metallurgical and Materials Engineering (MS-MME)
- BS-MME/Master Program in Biomedical Engineering (MS-BME)

Students admitted to these programs take graduate classes that count both toward graduate degree requirements and undergraduate degree requirements, for up to 15 credit hours of graduate courses per approval of the undergraduate and graduate advisors.

Eligible graduate courses come from a list approved for fast-track by the Metallurgical, Materials and Biomedical Engineering (MMBME) Faculty.

Students must earn a B or better in the graduate course to count as graduate credit for the Master of Science in Metallurgical and Materials Engineering or for the Master of Science in Biomedical Engineering. If the grade is a C, it will not count towards the graduate degree but will still count towards the undergraduate degree.

Additional program requirements can be found here. (https://www.utep.edu/graduate/future-students/fast-track2.html#anchor1)

**Degree Plan**

**BS in Metallurgical and Materials Engineering**

Required Credits: 128

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>University Core Curriculum</strong></td>
<td></td>
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<tr>
<td></td>
<td>University Core Curriculum requirements (some of which are listed below) (p. 4)</td>
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<tr>
<td><strong>Metallurgical &amp; Materials Engineering Designated Core (All courses listed require a grade of C or better.)</strong></td>
<td></td>
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<tr>
<td>CE 2326</td>
<td>Econ for Engrs &amp; Scientists</td>
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<tr>
<td>CHEM 1105</td>
<td>Laboratory for CHEM 1305</td>
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<tr>
<td>CHEM 1305</td>
<td>General Chemistry</td>
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<td>CHEM 1306</td>
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<td>Precalculus (Listed if completed, but not required))</td>
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<tr>
<td>or MATH 1310</td>
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<tr>
<td>or MATH 1411</td>
<td>Calculus I</td>
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<td>Calculus III</td>
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<td>PHYS 2320</td>
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<td>PHYS 2120</td>
<td>Laboratory for PHYS 2320</td>
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<td>PHYS 2321</td>
<td>Introductory Electromagnetism</td>
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<td>PHYS 2121</td>
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<td>MME 1205</td>
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<tr>
<td>MME 1405</td>
<td>Intro to Metal and Matls Eng</td>
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<td>MME 2303</td>
<td>Intro to Materials Sci &amp; Engrng</td>
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<tr>
<td>MME 2305</td>
<td>Material &amp; Energy Balance</td>
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<td>MME 2434</td>
<td>Mechanics of Materials</td>
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<td><strong>Hours</strong></td>
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<td>Required Courses:</td>
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<tr>
<td>MME 3306</td>
<td>Rate Processes C</td>
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<td>MME 3308</td>
<td>Appl Chemical Thermodynamics C</td>
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<td>MME 3309</td>
<td>Circuits, Elect Mat &amp; Devices C</td>
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<td>MME 3406</td>
<td>Nanofunctnl Physical Metallurgy C</td>
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<td>MME 3413</td>
<td>Materials Characterization C</td>
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<td>MME 4219</td>
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<td>MME 4220</td>
<td>Senior Design Project 2</td>
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<td>MME 4303</td>
<td>Metals Processing C</td>
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<td>MME 4309</td>
<td>Corrosion</td>
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<td>MME 4316</td>
<td>Failure Analysis C</td>
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Select one concentration:

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<tr>
<td>Concentration Elective Course IV C</td>
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Total Hours 128

* Courses require a grade of C or better.

Concentrations

**Forensic Engineering and Materials Performance**

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<tr>
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<td>MME 4317</td>
<td>Advanced Failure Analysis</td>
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<td>MME 4331</td>
<td>Non-Destructive Examination C</td>
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<td>MME 4332</td>
<td>Root Cause Analysis C</td>
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<td>MME 4333</td>
<td>Fracture Mechanics C</td>
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<td>MME 4334</td>
<td>Biomed Product Performance C</td>
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<td>MME 4335</td>
<td>Functional Failure Analysis C</td>
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<tr>
<td>MME 4390</td>
<td>Special Topics in MME C</td>
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* Required Courses.
C Courses require a grade of C or better.

**Extractive and Process Metallurgy**

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<tr>
<td>MME 4315</td>
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<td>MME 4340</td>
<td>Mineral Processing C</td>
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<tr>
<td>MME 4341</td>
<td>Recycling Processes C</td>
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<td>MME 4342</td>
<td>Hydrometallurgy C</td>
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<td>MME 4350</td>
<td>Material Joining Technologies C</td>
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<td>MME 4390</td>
<td>Special Topics in MME C</td>
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<td>Topics in Geological Sciences C</td>
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* Required Courses.
C Courses require a grade of C or better.
### Biomaterials

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<tr>
<th>Code</th>
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<td>Choice of 4 courses from the following:</td>
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<td>Fundamentals of BME I (c)</td>
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<tr>
<td>BME 3305</td>
<td>Fundamentals of BME II (c)</td>
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</tr>
<tr>
<td>MME 4304</td>
<td>Printable Materials (c)</td>
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<tr>
<td>MME 4310</td>
<td>Polymer Engineering (c)</td>
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</tr>
<tr>
<td>MME 4312</td>
<td>Biomaterials Science and Eng (c)</td>
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</tr>
<tr>
<td>MME 4314</td>
<td>Composite Materials (c)</td>
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<tr>
<td>MME 4334</td>
<td>Biomed Product Performance (c)</td>
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<tr>
<td>MME 4390</td>
<td>Special Topics in MME (c)</td>
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* Required Courses.

\(c\) Courses require a grade of C or better.

### General MME

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BSMME- General</td>
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<td>Choice of 3 courses from the following and 1 course from another MME concentration:</td>
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<tr>
<td>MME 4310</td>
<td>Polymer Engineering (c)</td>
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<tr>
<td>MME 4314</td>
<td>Composite Materials (c)</td>
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<tr>
<td>MME 4315</td>
<td>Metallography and Micro Inter (c)</td>
<td>3</td>
</tr>
<tr>
<td>MME 4321</td>
<td>Engineering Alloys (c)</td>
<td>3</td>
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<tr>
<td>MME 4331</td>
<td>Non-Destructive Examination (c)</td>
<td>3</td>
</tr>
<tr>
<td>MME 4350</td>
<td>Material Joining Technologies (c)</td>
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<tr>
<td>MME 4390</td>
<td>Special Topics in MME (c)</td>
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* Required Courses.

\(c\) Course require a grade of C or better.

### University Core Curriculum

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

All courses require a C or better

#### I. Communication (six hours)

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<th>Code</th>
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<tr>
<td>For students whose secondary education was in English:</td>
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<tr>
<td>COMM 1611</td>
<td>Written and Oral Communication</td>
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<tr>
<td>ENGL 1313</td>
<td>Writing About Literature</td>
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<tr>
<td>RWS 1301</td>
<td>Rhetoric &amp; Composition I</td>
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<td>RWS 1302</td>
<td>Rhetoric &amp; Composition 2</td>
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<tr>
<td>RWS 1601</td>
<td>Rhetoric, Composition &amp; Comm</td>
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<tr>
<td>For students whose secondary education was not in English:</td>
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<tr>
<td>ESOL 1311</td>
<td>Expos Engl Compos-Spkr Esl</td>
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<tr>
<td>ESOL 1312</td>
<td>Res &amp; Crit Writing Spkr Esl</td>
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Total Hours 6
II. American History (six hours)

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<tr>
<td>HIST 1301</td>
<td>History of U.S. to 1865</td>
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</tr>
<tr>
<td>HIST 1302</td>
<td>History of U.S. Since 1865</td>
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</table>

Total Hours 6

III. Language, Philosophy & Culture (three hours)

Courses in this category focus on how ideas, values, beliefs, and other aspects of culture express and affect human experience. Courses involve the exploration of ideas that foster aesthetic and intellectual creation in order to understand the human condition across cultures.

Select one of the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Hours</th>
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<tr>
<td>AFST 2300</td>
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<td>CHIC 2302</td>
<td>Latina/o Presence in the U.S.</td>
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<td>ENGL 2311</td>
<td>English Literature</td>
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<td>English Literature</td>
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<td>ENGL 2313</td>
<td>Intro to American Fiction</td>
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<td>ENGL 2314</td>
<td>Intro to American Drama</td>
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<td>ENGL 2318</td>
<td>Intro to American Poetry</td>
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<td>FREN 2322</td>
<td>Making of the &quot;Other&quot; Americas</td>
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<td>HIST 2301</td>
<td>World History to 1500</td>
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<tr>
<td>HIST 2302</td>
<td>World History Since 1500</td>
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<td>PHIL 1301</td>
<td>Introduction to Philosophy</td>
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<td>PHIL 2306</td>
<td>Ethics</td>
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<td>RS 1301</td>
<td>Introduct to Religious Studies</td>
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<td>SPAN 2340</td>
<td>Seeing &amp; Naming: Conversations</td>
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<td>WS 2300</td>
<td>Introduction to Womens Studies</td>
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<tr>
<td>WS 2350</td>
<td>Global Feminisms</td>
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Total Hours 3

IV. Mathematics (three hours)

Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

Select one of the following:

<table>
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<td>Trigonometry and Conics</td>
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<td>MATH 1319</td>
<td>Math in the Modern World</td>
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<td>MATH 1320</td>
<td>Math for Social Sciences I</td>
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<td>Precalculus $^{1,2}$</td>
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<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
V. Life & Physical Sciences (six hours)

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<td>ASTR 1107</td>
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<td>ASTR 1307</td>
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<td>ASTR 1308</td>
<td>Elem Astr Stars &amp; Galaxies</td>
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<td>BIOL 1103</td>
<td>Introductory Biology Lab</td>
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<td>BIOL 1104</td>
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<td>BIOL 1107</td>
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<td>BIOL 1108</td>
<td>Organismal Biology Laboratory</td>
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<td>BIOL 1203</td>
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<td>BIOL 1305</td>
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<td>Human Anat/Physio Lab II</td>
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<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>
<td>General Chemistry</td>
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<td>CHEM 1306</td>
<td>General Chemistry</td>
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<td>CHEM 1307</td>
<td>Intro to General Chemistry</td>
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<td>CHEM 1308</td>
<td>Intro Organic &amp; Biochemistry</td>
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<td>ESCI 1101</td>
<td>Environmental Sci. Lab</td>
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<tr>
<td>GEOG 1106</td>
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<td>GEOG 1306</td>
<td>Physical Geography</td>
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<tr>
<td>GEOL 1103</td>
<td>Lab for GEOL 1313</td>
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<td>GEOL 1104</td>
<td>Lab for GEOL 1314</td>
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<tr>
<td>GEOL 1111</td>
<td>Principles of Earth Sci - Lab</td>
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<tr>
<td>GEOL 1112</td>
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<tr>
<td>GEOL 1211</td>
<td>Principles of Earth Sciences</td>
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<tr>
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<td>Intro to Physical Geology</td>
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<td>GEOL 1314</td>
<td>Intro to Historical Geol</td>
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<tr>
<td>HSCI 2302</td>
<td>Fundamentals of Nutrition</td>
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<td>HSCI 2303</td>
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<td>MICR 2330</td>
<td>Microorganisms and Disease</td>
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<td>PHYS 1404</td>
<td>General Physics II</td>
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<td>PHYS 2121</td>
<td>Laboratory for PHYS 2321</td>
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<tr>
<td>PHYS 2320</td>
<td>Introductory Mechanics</td>
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Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on experiences. Select one of the following:
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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>PHYS 2321</td>
<td>Introductory Electromagnetism</td>
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### VI. Political Science (six hours)

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<tr>
<td></td>
<td>Courses in this category focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations. Required Courses:</td>
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<tr>
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<td>POLS 2310 Introduction to Politics</td>
<td>3</td>
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<td>POLS 2311 American Gover &amp; Politics</td>
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### VII. Social and Behavioral Sciences (three hours)

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<tr>
<td></td>
<td>Courses in this category focus on the application of empirical and scientific methods that contribute to the understanding of what makes us human. Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the individual, society, and culture. Select one of the following:</td>
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<td></td>
<td>ANTH 1301 Intro-Phys Anth/Archeolog</td>
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<td></td>
<td>ANTH 1302 Intro-Cultural Anthropology</td>
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<tr>
<td></td>
<td>ANTH 1310 Cultural Geography</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ANTH 2320 Intro to Linguistics</td>
<td></td>
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<tr>
<td></td>
<td>CE 2326 Econ for Engrs &amp; Scientists</td>
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<tr>
<td></td>
<td>ASIA 2300 Asian American Studies</td>
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<td></td>
<td>COMM 2350 Interpersonal Communication</td>
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</tr>
<tr>
<td></td>
<td>COMM 2372 Mass Media and Society</td>
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<tr>
<td></td>
<td>ECON 2303 Principles of Macroeconomics</td>
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<tr>
<td></td>
<td>ECON 2304 Principles of Microeconomics</td>
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<tr>
<td></td>
<td>EDPC 1301 Introduction to Ed Psychology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDU 1342 Action Research in Classrooms</td>
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<tr>
<td></td>
<td>ENGL 2320 Introduction to Linguistics</td>
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<tr>
<td></td>
<td>GEOG 1310 Cultural Geography</td>
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<tr>
<td></td>
<td>LEAD 2300 Community Service</td>
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<td></td>
<td>LING 2320 An Intro. to Linguistics</td>
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<td></td>
<td>LING 2340 Lang. Inside &amp; Out: Sel Topics</td>
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<tr>
<td></td>
<td>PSYC 1301 Introduction to Psychology</td>
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<td></td>
<td>SOCI 1301 Introduction to Sociology</td>
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<td>SOCI 1310 Cultural Geography</td>
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### VIII. Creative Arts (three hours)

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<th>Hours</th>
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<tr>
<td></td>
<td>Courses in this category focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art. Select one of the following:</td>
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</tr>
<tr>
<td>ART 1300</td>
<td>Art Appreciation</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 1305</td>
<td>History of Art I</td>
<td></td>
</tr>
<tr>
<td>ARTH 1306</td>
<td>History of Art II</td>
<td></td>
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<tr>
<td>CHIC 1311</td>
<td>Chicana/o Fine Arts Appreciat</td>
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<td>DANC 1304</td>
<td>Dance Appreciation</td>
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<tr>
<td>FILM 1390</td>
<td>Intro-Art of Motion Pict.</td>
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<tr>
<td>MUSL 1324</td>
<td>Music Appreciation</td>
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### IX. Component Area Option (six hours)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
</table>
| a. A minimum of 3 SCH must meet the definition and corresponding Core Objectives specified in one of the foundational component areas.  
As an option for up to 3 semester credit hours of the Component Area Option, an institution may select course(s) that: (i) Meet(s) the definition specified for one or more of the foundational component areas; and (ii) Include(s) a minimum of three Core Objectives, including Critical Thinking Skills, Communication Skills, and one of the remaining Core Objectives of the institution's choice. |
| BUSN 1301 | Intro to Global Business | 1 |
| COMM 1301 | Public Speaking | 1 |
| COMM 1302 | Business/Profession Comm | 1 |
| CS 1310 | Intro-Computational Thinking | 1 |
| CS 1320 | Computer Programming Sci/Engr | 1 |
| EL 1301 | Eng Innovation and Leadership | 1 |
| LEAD 1300 | Introduction to Leadership | 1 |
| SCI 1301 | Inquiry in Math & Science | 1 |
| UNIV 1301 | Seminar/Critical Inquiry | 1 |

Total Hours: 0

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### 4-Year Sample Degree Plan

#### BS Materials and Metallurgical Engineering (Starting with Pre-Calculus)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td><strong>Summer (if needed)</strong></td>
<td><strong>BACHELOR OF SCIENCE IN MATERIALS AND METALLURGICAL ENGINEERING</strong></td>
<td><strong>Hours</strong></td>
</tr>
<tr>
<td>MATH 1508</td>
<td>Precalculus <strong>^</strong></td>
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<tr>
<td>or MATH 1310</td>
<td>Trigonometry and Conics</td>
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**FRESHMAN**

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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>RWS 1301</td>
<td>Rhetoric &amp; Composition I *</td>
<td>3</td>
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<tr>
<td>CHEM 1305 &amp; CHEM 1105</td>
<td>General Chemistry and Laboratory for CHEM 1305 *</td>
<td>4</td>
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<tr>
<td>MATH 1411</td>
<td>Calculus I <strong>^</strong></td>
<td>4</td>
</tr>
<tr>
<td>MME 1405</td>
<td>Intro to Metal and Matls Eng *</td>
<td>4</td>
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</table>

| Spring  |                                          |       |
| RWS 1302 | Rhetoric & Composition 2 * | 3 |
| HIST 1301 | History of U.S. to 1865 * | 3 |
| CHEM 1306 | General Chemistry * | 3 |
| UNIV 1301 | Seminar/Critical Inquiry | 3 |
| MME 1205 | Computation/Graph in Mater Sci | 2 |
| MATH 1312 | Calculus II **^** | 3 |

**SOPHOMORE**

<table>
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<tr>
<th>Code</th>
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<th>Hours</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>HIST 1302</td>
<td>History of U.S. Since 1865 *</td>
<td>3</td>
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<tr>
<td>CE 2326</td>
<td>Econ for Engrs &amp; Scientists *</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 2320</td>
<td>Introductory Mechanics</td>
<td>3</td>
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<tr>
<td>PHYS 2120</td>
<td>Laboratory for PHYS 2320</td>
<td>1</td>
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<tr>
<td>MME 2303</td>
<td>Intro to Materials Sci &amp; Engrg *</td>
<td>3</td>
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<tr>
<td>MATH 2313</td>
<td>Calculus III *</td>
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</table>
### BS in Metallurgical and Materials Engineering

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td>CHEM 1305</td>
<td>General Chemistry</td>
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<tr>
<td>&amp; CHEM 1105</td>
<td>and Laboratory for CHEM 1305 *</td>
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<tr>
<td>MATH 1411</td>
<td>Calculus I *</td>
<td>4</td>
</tr>
</tbody>
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### Creative Arts Elective
- **Spring**: PHYS 2321, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Junior**: PHYS 2311, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Fall**: PHYS 2321, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Spring**: PHYS 2311, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Junior**: PHYS 2311, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Fall**: PHYS 2321, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Spring**: PHYS 2311, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Junior**: PHYS 2311, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Fall**: PHYS 2321, PHYS 2121, MME 2434, MME 2305, MATH 2326
- **Spring**: PHYS 2311, PHYS 2121, MME 2434, MME 2305, MATH 2326

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### Notes:
- + Grade "C" or better required. A "C" or better is required in MME courses through the junior level.
- * MATH 1508 or MATH 1310 do not count towards the 128-hour degree, but must be taken if not placed into MATH 1411.
- Component Area: UNIV 1301 and COMM 1302
- Visual and Performing Arts menu.
- Language, Philosophy and Culture menu
- Concentration Option from (1) Forensic Engineering and Materials Performance, (2) Extractive and Process Metallurgy, (3) Biomaterials and (4) General MME Concentrations.

Total Hours: 133

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### BS Materials and Metallurgical Engineering (Starting with Calculus)

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<tr>
<td>CHEM 1305</td>
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<td>&amp; CHEM 1105</td>
<td>and Laboratory for CHEM 1305 *</td>
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<tr>
<td>MATH 1411</td>
<td>Calculus I *</td>
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### BS in Metallurgical and Materials Engineering

<table>
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<td>MME 1405</td>
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<td>RWS 1301</td>
<td>Rhetoric &amp; Composition I</td>
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<td><strong>SOPHOMORE</strong></td>
<td>CHEM 1306</td>
<td>General Chemistry</td>
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<td>HIST 1301</td>
<td>History of U.S. to 1865</td>
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<td>MATH 1312</td>
<td>Calculus II</td>
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<td>RWS 1302</td>
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<td>PHYS 2320</td>
<td>Introductory Mechanics</td>
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<td>MME 2305</td>
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<td>POLS 2310</td>
<td>Introduction to Politics</td>
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<td>MME 3309</td>
<td>Circuits, Elect Mat &amp; Devices</td>
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<td>MME 3308</td>
<td>Appl Chemical Thermodynamics</td>
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<td>Materials Characterization</td>
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<td><strong>Spring</strong></td>
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<td>MME 4316</td>
<td>Failure Analysis</td>
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<td>MME 4303</td>
<td>Metals Processing</td>
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<td>MME 4219</td>
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<td><strong>SENIOR</strong></td>
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**Notes:**
Grade "C" or better required. A "C" or better is required in MME courses through the junior level.

MATH 1508 or MATH 1310 do not count towards the 128-hour degree, but must be taken if not placed into MATH 1411.

Component Area: UNIV 1301 and COMM 1302

1 Visual and Performing Arts menu.

2 Language, Philosophy and Culture menu

Concentration Option from (1) Forensic Engineering and Materials Performance, (2) Extractive and Process Metallurgy, (3) Biomaterials and (4) General MME Concentrations.

Total Hours 128