

BS in Mechanical Engineering

Engineers find high-paying careers in a large number of industries. They find work in large corporations and small businesses. They often create businesses of their own and find work related to their interests such as outdoor, indoor, travel.

Marketable Skills

Students will gain the following marketable skills:

1. Confidence: Be self-assured through appreciating your own talents, abilities, skills, and qualities.
2. Critical thinking: Analyze and evaluate issues in order to solve problems and develop informed opinions.
3. Entrepreneurship: Develop, organize, and manage ideas and opportunities turning them into new products, services, firms, or industries.
4. Leadership: Step up, think, and act critically and creatively to bring others together to accomplish a common task.
5. Problem-solving: Find solutions to difficult or complex issues.
6. Teamwork: Participate as an effective, efficient member of a group in order to meet a common goal.

Additionally, students will learn about mechanical design and manufacturing.

The Mechanical Engineering curriculum is designed for students who desire to enter industry or pursue advanced studies. The curriculum provides a broad range of courses in the areas of solid mechanics, fluid mechanics, thermal systems, design and manufacturing and dynamics and mechatronics.

Vision

The Mechanical Engineering Program strives to graduate mechanical engineers of the highest quality and to conduct state-of-the-art research.

Mission

The Mechanical Engineering Program makes a high-quality, relevant engineering education available to all residents of the El Paso binational region. The department dedicates itself to providing students a set of skills, knowledge and attitudes that will permit its graduates to succeed and thrive as engineers and leaders.

The Program strives to:

- prepare its graduates to pursue lifelong learning, serve the profession and meet intellectual, ethical and career challenges; and
- maintain a vital, state-of-the-art research enterprise to provide its students and faculty opportunities to create, interpret, apply, and disseminate knowledge.

General Upper Division Prerequisite

All students must demonstrate basic competency to take any upper-division course. An upper-division course is any MECH course in the Junior or Senior year. Competency can be demonstrated by completing the following courses at UTEP with a "C" or better.

Code	Title	Hours
MECH 2311	Intro to Thermal-fluid Sci	3
MECH 2322	Mechanics of Materials	3
MECH 2340	Mechanics II -Dynamics	3

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/#fastrackcoursestext>).

Degree Plan

Required Credits: 128

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements. (p. 4)		42
Mechanical Engineering Designated Core (All courses require a grade of C or better.)		

CE 2326 Econ for Engrs & Scientists is a designated core course. It is required for graduation even if other course is used to fulfill the core. All Mechanical Engineering majors are encouraged to take CE 2326 to fulfill the core.

Required Courses:

CE 2326	Econ for Engrs & Scientists	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	4
MATH 1508 or MATH 1310 or MATH 1411	Precalculus ((Listed if completed, but not required)) Trigonometry and Conics Calculus I	3-5
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1

Mechanical Engineering (Other Requirements) (All courses require a grade of C or better.)

Required Courses:

MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3

Science Elective

Select one of the following options:

BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I ^C	4
CHEM 1306 & CHEM 1106	General Chemistry and Laboratory for CHEM 1306 ^C	
PHYS 2321 & PHYS 2121	Introductory Electromagnetism and Laboratory for PHYS 2321	

MATH/Science Elective

Select one of the following:

BIOL 1306	Organismal Biology	
MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	
MATH 4329	Numerical Analysis	
MATH 4336	Applied Analysis II	
PHYS 2325	Survey of Modern Physics	
PHYS 3351	Analytical Mechanics I	
STAT 3320	Probability and Statistics	

MATH Elective

Select one of the following:

MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	
MATH 4329	Numerical Analysis	
MATH 4336	Applied Analysis II	
STAT 3320	Probability and Statistics	

Mechanical Engineering MajorRequired Courses: ¹

MECH 1305	Graphic & Design Fundamentals ^C	3
MECH 1321 or CE 2315	Mechanics I-Statics ^C Statics	3
MECH 2103	Engineering Computations ³	1
MECH 2311	Intro to Thermal-fluid Sci ^C	3
MECH 2322 or CE 2334	Mechanics of Materials ^C Mechanics of Materials	3
MECH 2331	Matl & Manufacturing Processes ^C	3
MECH 2340	Mechanics II -Dynamics ^C	3

MECH 2342 or EE 2350	Electro Mechanical Systems ^C Electric Circuits I	3
MECH 3312	Thermodynamics ³	3
MECH 3314	Fluid Mechanics ³	3
MECH 3334	Mechanical Design ³	3
MECH 3345	System Dynamics ³	3
MECH 3352	Engineering Analysis II ³	3
MECH 4315	Heat Transfer ³	3
MECH 4366	Senior Design Project ^{2,3}	3

Select one of the following:

MECH 2131	Manufacturing Engineering Lab ^C	
MECH 2132	Additive Manufacturing Lab ^C	
MECH 2133	Metal Casting Lab ^C	
MECH 2134	Intelligent Manufacturing Lab	

Select two of the following:

MECH 3103	Mechatronics Lab ³	
MECH 3113	Thermo-fluid Lab ³	
MECH 3123	Solid Mechanics Lab ³	

Select one of the following:

MECH 4326	Finite Element Analysis ³	
MECH 4328	Intro to LabVIEW	
MECH 4330	Dynamic Systems Simulation ³	
MECH 4392	Special Topics in Computation ³	

Select five of the following (minimum of one from each area):**Solid Mechanics Area**

AERO 3323	Aerospace Structures I	
AERO 4313	Aerospace Structures II	
MECH 4336	Principles of Engr Design ³	
MECH 4395	Special Topics in Mech. Engr. ³	
MECH 4370	Pre-Professional Experiences	

Thermal Fluid Area

AERO 3312	Aerodynamics 1	
AERO 4331	Aerodynamics II	
MECH 4316	Thermal System Design ³	
MECH 4394	Special Topics in Therm Fluid ³	

Electro-Mechanical Area

AERO 3343	Systems Modelling and Control	
MECH 4332	MECH Comp App Vision Robotics	
MECH 4334	Mechanical Systems Control	
MECH 4345	Comm & Mech Sensor Protocols	
MECH 4346	Mechatronics ³	
MECH 4393	Special Topics in Elect-Mech ³	

Total Hours**128****C**

Course require a grade of C or better.

1

All institutional courses appearing in this area count towards the major GPA with a minimum of 2.0

2

Must be in the last full semester and have a 2.0 GPA or better in major.

3

Course requires grade of D 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)

Code	Title	Hours
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.		
Select six hours of the following:		6
For students whose secondary education was in English:		
COMM 1611	Written and Oral Communication	
ENGL 1313	Writing About Literature	
RWS 1301	Rhetoric & Composition I	
RWS 1302	Rhetoric & Composition 2	
RWS 1601	Rhetoric, Composition & Comm	
For students whose secondary education was not in English:		
ESOL 1311	Expos Engl Compos-Spkr Esl	
ESOL 1312	Res & Crit Writng Spkr Esl	
Total Hours		6

II. American History (six hours)

Code	Title	Hours
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:		
HIST 1301	History of U.S. to 1865	3
HIST 1302	History of U.S. Since 1865	3
Total Hours		6

III. Language, Philosophy & Culture (three hours)

Code	Title	Hours
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.		
Select one of the following:		3
AFST 2300	Intro-African Amer Studies	
CHIC 2302	Latina/o Presence in the U.S.	
ENGL 2311	English Literature	
ENGL 2312	English Literature	
ENGL 2313	Intro to American Fiction	
ENGL 2314	Intro to American Drama	
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

IV. Mathematics (three hours)

Code	Title	Hours
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The objective of the mathematics component is to develop a quantitatively literate college graduate. Every college graduate should be able to apply basic mathematical tools in the solution of real-world problems.

Select one of the following: 3

MATH 1309	College Algebra	
MATH 1310	Trigonometry and Conics	
MATH 1319	Math in the Modern World	
MATH 1320	Math for Social Sciences I	
MATH 1411	Calculus I	
MATH 1508	Precalculus ^{1,2}	
MATH 2301	Math for Social Sciences II	
STAT 1380	Statistical Literacy	
STAT 2480	Elementary Statistical Methods	

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)

Code	Title	Hours
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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.):

Select one of the following: 1-4

ASTR 1107	Astronomy Lab I	
ASTR 1307	Elem Astronomy-Solar System	
ASTR 1308	Elem Astr Stars & Galaxies	
BIOL 1103	Introductory Biology Lab	
BIOL 1104	Human Biology Laboratory	
BIOL 1107	Topics in Study of Life I	
BIOL 1108	Organismal Biology Laboratory	
BIOL 1203	Introductory Biology	
BIOL 1304	Human Biology	
BIOL 1305	General Biology	
BIOL 1306	Organismal Biology	
BIOL 2111	Human Anat/Physio Lab I	
BIOL 2113	Human Anat/Physio Lab II	
BIOL 2311	Human Anat/Physiology I	
BIOL 2313	Human Anat/Physiology II	
CHEM 1105	Laboratory for CHEM 1305	
CHEM 1106	Laboratory for CHEM 1306	
CHEM 1107	Intro General Chemistry Lab	
CHEM 1108	Intro Organic & Biochem Lab	
CHEM 1305	General Chemistry	
CHEM 1306	General Chemistry	
CHEM 1307	Intro to General Chemistry	
CHEM 1308	Intro Organic & Biochemistry	
ESCI 1101	Environmental Sci. Lab	

ESCI 1102	Non-major Lab for ESCI 1301
ESCI 1202	Intro to Environment Science 2
ESCI 1301	Intro to Environmental Sci
GEOG 1106	Laboratory for GEOG 1306
GEOG 1306	Physical Geography
GEOL 1103	Lab for GEOL 1313
GEOL 1104	Lab for GEOL 1314
GEOL 1111	Principles of Earth Sci - Lab
GEOL 1112	Laboratory for Geology 1212
GEOL 1211	Principles of Earth Sciences
GEOL 1212	Principles of Earth Science
GEOL 1230	The Blue Planet
GEOL 1231	Natural Hazards
GEOL 1313	Intro to Physical Geology
GEOL 1314	Intro to Historical Geol
HSCI 2302	Fundamentals of Nutrition
HSCI 2303	Wellness Dynamics
MICR 2330	Microorganisms and Disease
PHYS 1403	General Physics I
PHYS 1404	General Physics II
PHYS 2120	Laboratory for PHYS 2320
PHYS 2121	Laboratory for PHYS 2321
PHYS 2320	Introductory Mechanics
PHYS 2321	Introductory Electromagnetism

Total Hours**6****VI. Political Science (six hours)**

Code	Title	Hours
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
Total Hours		6

VII. Social and Behavioral Sciences (three hours)

Code	Title	Hours
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.		
Select one of the following:		
ANTH 1301	Intro-Phys Anth/Archeolog	3
ANTH 1302	Intro-Cultural Anthropology	
ANTH 1310	Cultural Geography	
ANTH 2320	Intro to Linguistics	
CE 2326	Econ for Engrs & Scientists	
ASIA 2300	Asian American Studies	
COMM 2350	Interpersonal Communication	
COMM 2372	Mass Media and Society	
ECON 2303	Principles of Macroeconomics	
ECON 2304	Principles of Microeconomics	
EDPC 1301	Introduction to Ed Psychology	

EDU 1342	Action Research in Classrooms
ENGL 2320	Introduction to Linguistics
GEOG 1310	Cultural Geography
LEAD 2300	Community Service
LING 2320	An Intro. to Linguistics
LING 2340	Lang. Inside & Out: Sel Topics
PSYC 1301	Introduction to Psychology
SOCI 1301	Introduction to Sociology
SOCI 1310	Cultural Geography

Total Hours **3**

VIII. Creative Arts (three hours)

Code	Title	Hours
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The objective of the visual and performing arts component is to expand students' knowledge and appreciation of the human imagination as expressed through works of visual art, dance, music, theatre and film. Through study in these disciplines, students will form aesthetic judgments and develop an appreciation of the arts as fundamental to the health and survival of any society.

Select one of the following: 3

ART 1300	Art Appreciation
ARTH 1305	History of Art I
ARTH 1306	History of Art II
CHIC 1311	Chicana/o Fine Arts Appreciat
DANC 1304	Dance Appreciation
FILM 1390	Intro-Art of Motion Pict.
MUSL 1324	Music Appreciation
MUSL 1327	Jazz to Rock
MUSL 2321	Music, Culture, and Society
THEA 1313	Introduction to Theatre

Total Hours **3**

IX. Component Area Option (six hours)

Code	Title	Hours
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The objective of the institutionally designated option component is to develop the critical thinking skills and academic tools required to be an effective learner. Special emphasis is placed on the use of technology in problem-solving, communications, and knowledge acquisition.

Select two of the following: 6

BUSN 1301	Intro to Global Business
COMM 1301	Public Speaking
COMM 1302	Business/Profession Comm
CS 1310	Intro-Computational Thinking
CS 1320	Computer Programming Sci/Engr
EL 1301	Eng Innovation and Leadership
LEAD 1300	Introduction to Leadership
SCI 1301	Inquiry in Math & Science
UNIV 1301	Seminar/Critical Inquiry

Total Hours **6**

4-Year Sample Degree Plan

BS Mechanical Engineering (Starting with Pre-Calculus)

Code	Title	Hours
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BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Summer

(if needed)

MATH 1508	Precalculus
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or MATH 1310	Trigonometry and Conics	
FRESHMAN		
Fall		
MATH 1411	Calculus I ¹	4
MECH 1305	Graphic & Design Fundamentals ¹	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1301	Rhetoric & Composition I ¹	3
UNIV 1301	Seminar/Critical Inquiry ¹	3
Spring		
CHEM 1105	Laboratory for CHEM 1305 ¹	1
CHEM 1305	General Chemistry ¹	3
HIST 1301	History of U.S. to 1865 ¹	3
MATH 1312	Calculus II ¹	3
MECH 1321	Mechanics I-Statics ¹	3
or CE 2315	Statics	
RWS 1302	Rhetoric & Composition 2 ¹	3
SOPHOMORE		
Fall		
HIST 1302	History of U.S. Since 1865 ¹	3
MATH 2313	Calculus III ¹	3
MECH 2322	Mechanics of Materials ¹	3
or CE 2334	Mechanics of Materials	
MECH 2331	Matl & Manufacturing Processes ¹	3
Design and Manufacturing Studio ^{1,8}		1
Science Elective [*]		4
Spring		
CE 2326	Econ for Engrs & Scientists ¹	3
MATH 2326	Differential Equations ¹	3
MECH 2103	Engineering Computations ¹	1
MECH 2311	Intro to Thermal-fluid Sci ¹	3
MECH 2340	Mechanics II -Dynamics ¹	3
MECH 2342	Electro Mechanical Systems ¹	3
or EE 2350	Electric Circuits I	
JUNIOR		
Fall		
MECH 3312	Thermodynamics	3
MECH 3314	Fluid Mechanics	3
MECH 3352	Engineering Analysis II	3
POLS 2310	Introduction to Politics ¹	3
Laboratory Experience ²		1
Math Elective ^{1,3}		3
Spring		
COMM 1302	Business/Profession Comm ¹	3
MECH 3334	Mechanical Design	3
MECH 3345	System Dynamics	3
Laboratory Experience ²		1
Language, Philosophy, and Culture		3
Science/Math Elective ⁴		3
SENIOR		
Fall		
MECH 4315	Heat Transfer	3

Computational Elective ⁶	3
Design Elective Electro-Mechanical ⁵	3
Design Elective Solid Mechanics Area ⁵	3
Design Elective Thermal Fluid Area ⁵	3

Spring

MECH 4366	Senior Design Project ⁷	3
POLS 2311	American Gover & Politics ¹	3
Design Elective Any Area ⁵		3
Design Elective Any Area ⁵		3
Creative Arts Elective		3

Notes:

- Must be either CHEM 1306 with CHEM 1106, BIOL 1107 with 1305 or PHYS 2421 or by permission of advisor.

1 Grade of C or better required

2 From the department approved list of Design and Project Experience I and II courses.

3. Selected from MATH 3323, 3335, 4326, 4329, 4336, STAT 3320. By completing 3 of these electives you may be eligible for a Mathematics minor, interested students should consult the Department of Mathematics.

4. Approved courses are: BIOL 1306, PHYS 2325, PHYS 3351, PHYS 4348 or any course listed in NOTE 3 (not already taken). Also, as per the UTEP core curriculum requirements two of your science classes must be in the same area (either BIOL, PHYS, OR CHEM).

5. From the department approved list of Design Electives.

6. From the department approved list of Computational Electives.

7. Must be in the last full semester and have a 2.0 GPA or better in major.

8. From the department approved list of Design and Manufacturing Studio courses.

Total Hours **128**

BS Mechanical Engineering (Starting with Calculus)

Code	Title	Hours
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING		
FRESHMAN		
Fall		
MATH 1411	Calculus I ¹	4
MECH 1305	Graphic & Design Fundamentals ¹	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1301	Rhetoric & Composition I ¹	3
UNIV 1301	Seminar/Critical Inquiry ¹	3
Spring		
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305 ¹	4
HIST 1301	History of U.S. to 1865 ¹	3
MATH 1312	Calculus II ¹	3
MECH 1321 or CE 2315	Mechanics I-Statics ¹ Statics	3
RWS 1302	Rhetoric & Composition 2 ¹	3
SOPHOMORE		
Fall		
HIST 1302	History of U.S. Since 1865 ¹	3
MATH 2313	Calculus III ¹	3
MECH 2322 or CE 2334	Mechanics of Materials ¹ Mechanics of Materials	3
MECH 2331	Matl & Manufacturing Processes ¹	3
Design and Manufacturing Studio ^{1,8}		1
Science Elective *		4

Spring

CE 2326	Econ for Engrs & Scientists ¹	3
MATH 2326	Differential Equations ¹	3
MECH 2103	Engineering Computations	1
MECH 2311	Intro to Thermal-fluid Sci ¹	3
MECH 2340	Mechanics II -Dynamics ¹	3
MECH 2342 or EE 2350	Electro Mechanical Systems ¹ Electric Circuits I	3

JUNIOR**Fall**

MECH 3312	Thermodynamics	3
MECH 3314	Fluid Mechanics	3
MECH 3352	Engineering Analysis II	3
POLS 2310	Introduction to Politics ¹	3
Laboratory Experience ^{1,2}		1
Math Elective ³		3

Spring

COMM 1302	Business/Profession Comm ¹	3
MECH 3334	Mechanical Design	3
MECH 3345	System Dynamics	3
Laboratory Experience ²		1
Language, Philosophy, and Culture ¹		3
Science/Math Elective ^{1,4}		3

SENIOR**Fall**

MECH 4315	Heat Transfer	3
Computational Elective ⁶		3
Design Elective Electro-Mechanical ⁵		3
Design Elective Solid Mechanics Area ⁵		3
Design Elective Thermal Fluid Area ⁵		3

Spring

MECH 4366	Senior Design Project ⁷	3
POLS 2311	American Gover & Politics ¹	3
Design Elective Any Area ⁵		3
Design Elective Any Area ⁵		3
Creative Arts Elective ¹		3

Notes:

- Must be either CHEM 1306 with CHEM 1106, BIOL 1107 with 1305 or PHYS 2421 or by permission of advisor.

1 Grade of C or better required

2 From the department approved list of Design and Project Experience I and II courses.

3. Selected from MATH 3323, 3335, 4326, 4329, 4336, STAT 3320. By completing 3 of these electives you may be eligible for a Mathematics minor, interested students should consult the Department of Mathematics.

4. Approved courses are: BIOL 1306, PHYS 2325, PHYS 3351, PHYS 4348 or any course listed in NOTE 3 (not already taken). Also, as per the UTEP core curriculum requirements two of your science classes must be in the same area (either BIOL, PHYS, OR CHEM).

5. From the department approved list of Design Electives.

6. From the department approved list of Computational Electives.

7. Must be in the last full semester and have a 2.0 GPA or better in major.

8. From the department approved list of Design and Manufacturing Studio courses.

Total Hours**128**