

BS in Aerospace and Aeronautical Engineering

The Aerospace and Aeronautical Engineering curriculum is designed for students who desire to enter the aerospace or related industry or to pursue advanced studies in these areas. The curriculum provides a broad range of courses in the areas of aerodynamics, aerospace structures and aerospace and aeronautic vehicle design.

Vision

The Aerospace and Aeronautical Engineering Program strives to graduate aerospace engineers of the highest quality and to conduct state-of-the-art research.

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.

Mission

The Aerospace and Aeronautical Engineering program at The University of Texas at El Paso seeks to prepare students for careers in aerospace engineering and related disciplines. Successful achievement of this objective will be met if:

- The majority of our graduates obtain meaningful employment in the aerospace or related industry after graduation
- After five years most graduates are working in engineering
- After five years most graduates have achieved their initial career goals and advanced their careers, i.e. promotion, pursuit of advanced degree, etc.
- All graduates feel well served by the education they received at UTEP.

The program will consist of a largely common initial two years with the current B.S. in Mechanical Engineering degree program at UTEP but have course, laboratory and project experiences in the last two years of the curriculum that prepare students in:

- Aerodynamics,
- Propulsion,
- Aerostructures,
- Aerospace dynamics and controls, and
- Aerospace systems engineering

Admission Requirements

There are no additional admission requirements to the program above those of admission to the University of Texas at El Paso and to be eligible to take MATH 1411 Calculus I or equivalent.

Degree Requirements

The degree requires 128 SCH which includes:

1. completion of the university core curriculum (42 SCH)
2. 56 SCH of prescribed courses,
3. 30 SCH of engineering electives

Degree Plan

Code	Title	Hours
Designated Core		
CE 2326	Econ for Engrs & Scientists	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	4
MATH 1508	Precalculus	3-5

or MATH 1310	Trigonometry and Conics	
or MATH 1411	Calculus I	
PHYS 2320 & PHYS 2120	Introductory Mechanics and Laboratory for PHYS 2320	4
University Core Curriculum(All courses require a grade of C or better.)		
Complete the University Core Curriculum requirements. (p.)		42
Aerospace Engineering (Other Requirements) (All courses require a grade of C or better.)		
Required Courses: Some of these are included in the core.		
CE 2326	Econ for Engrs & Scientists	3
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
Math/Science Elective		
Select one of the following: (Math courses in this section cannot be used to satisfy other degree requirements)		3
MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	
MATH 4326	Linear Algebra	
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	
Science Elective		
Select one of the following:		4
CHEM 1306 & CHEM 1106	General Chemistry and Laboratory for CHEM 1306	
PHYS 2321 & PHYS 2121	Introductory Electromagnetism and Laboratory for PHYS 2321	
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I	
Math Elective		
Select one of the following:(Math courses in this section cannot be used to satisfy other degree requirements)		
MATH 3323	Matrix Algebra	3
MATH 3335	Applied Analysis I	3
MATH 4329	Numerical Analysis	3
MATH 4336	Applied Analysis II	3
STAT 3320	Probability and Statistics	3
Aerospace Engineering Major		
Required Courses:		
MECH 1305	Graphic & Design Fundamentals ^c	3
MECH 1321	Mechanics I-Statics ^c	3
MECH 2103	Engineering Computations ^c	1
MECH 2311	Intro to Thermal-fluid Sci ^c	3
MECH 2322	Mechanics of Materials ^c	3
MECH 2340	Mechanics II -Dynamics ^c	3
MECH 2342	Electro Mechanical Systems ^c	3
MECH 3352	Engineering Analysis	3
AERO 2131	Aerospace Materials Lab	1
AERO 2331	Aerospace Materials	3
AERO 3312	Aerodynamics 1	3
AERO 3323	Aerospace Structures I	3
AERO 3343	Systems Modelling and Control	3

AERO 4322	Aerospace Propulsion	3
AERO 4364	Aerospace Communications	3
AERO 4365	Aerospace Systems Engineering	3
AERO 4366	Aerospace Senior Design	3
Select two of the following: Laboratory Experience		2
MECH 3103	Mechatronics Lab	
MECH 3113	Thermo-fluid Lab	
MECH 3123	Solid Mechanics Lab	
Concentration Electives: Must take 3 from one Concentration ¹		9
Aircraft Concentration:		
AERO 4311	Flight Dynamics and Controls	
AERO 4312	Aircraft Design	
AERO 4313	Aerospace Structures II	
AERO 4319	Special Topics in Aeronautics	
Launch Vehicles and Missiles Concentration		
AERO 4331	Aerodynamics II	
AERO 4332	Hypersonic Vehicle Design	
AERO 4335	Structural Dynamics	
AERO 4339	Special Topics in Hypersonics	
Satellite Concentration		
AERO 4351	Orbit and Attitude Dynamics	
AERO 4353	Spacecraft Environments	
AERO 4355	Space Mission Design	
AERO 4359	Special Topics in Astronautics	
Technical Electives		6
Select six hours from any AERO course if not required in another section		
Total Hours		128

C Course requires a grade of C or better

1 Must declare a concentration and take three classes from the declared concentration area

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

I. Communication (six hours)

Code	Title	Hours
Courses in this category focus on developing ideas and expressing them clearly, considering the effect of the message, fostering understanding, and building the skills needed to communicate persuasively. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages 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
Courses in this category focus on the consideration of past events and ideas relative to the United States, with the option of including Texas History for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role.		

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
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:		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
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:		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	
MATH 2301	Math for Social Sciences II	
STAT 1380	Statistical Literacy	
STAT 2480	Elementary Statistical Methods	
TOTAL HOURS		3

V. Life & Physical Sciences (six hours)

Code	Title	Hours
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:		
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 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
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:		
POLS 2310	Introduction to Politics	3

POLS 2311	American Gover & Politics	3
TOTAL HOURS		6

VII. Social & Behavioral Sciences (three hours)

Code	Title	Hours
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:		3
ANTH 1301	Intro-Phys Anth/Archeolog	
ANTH 1302	Intro-Cultural Anthropology	
ANTH 1310	Cultural Geography	
ANTH 2320	Intro to Linguistics	
ASIA 2300	Asian American Studies	
CE 2326	Econ for Engrs & Scientists	
CHIC 2311	Intro to Chicano 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	Leadership in Action	
LING 2320	Introduction 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

Code	Title	Hours
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:		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	Introduction to Dance	
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
a. A minimum of 3 SCH must meet the definition and corresponding Core Objectives specified in one of the foundational component areas. b. 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	
COMM 1301	Public Speaking	3
COMM 1302	Business/Profession Comm	
CS 1310	Intro-Computational Thinking	
CS 1320	Computer Programming Sci/Engr	
EL 1301	Eng Innovation and Leadership	
ENGR 1302	Engineering Design Experience	
ENGR 1303	Applied Engineering Analysis	
LEAD 1300	Introduction to Leadership	
SCI 1301	Inquiry in Math & Science	
SPLP 1312	Comm. Var. Across the Lifespan	
UNIV 1301	Seminar/Critical Inquiry	
TOTAL HOURS		6

4-Year Sample Degree Plan**BS Aerospace and Aeronautical Engineering (Starting with Calculus)**

Code	Title	Hours
BACHELOR OF SCIENCE IN AEROSPACE AND AERONAUTICAL ENGINEERING		
FRESHMAN		
Fall		
RWS 1301	Rhetoric & Composition I ⁺	3
UNIV 1301	Seminar/Critical Inquiry ⁺	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
MATH 1411	Calculus I ⁺	4
MECH 1305	Graphic & Design Fundamentals ⁺	3
Spring		
HIST 1301	History of U.S. to 1865 ⁺	3
RWS 1302	Rhetoric & Composition 2 ⁺	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305 ⁺	4
MECH 1321	Mechanics I-Statics ⁺	3
MATH 1312	Calculus II ⁺	3
SOPHOMORE		
Fall		
HIST 1302	History of U.S. Since 1865 ⁺	3
MECH 2322	Mechanics of Materials ⁺	3
AERO 2331	Aerospace Materials ⁺	3
AERO 2131	Aerospace Materials Lab ⁺	1
MATH 2313	Calculus III ⁺	3
Science Elective ^{+, 1}		4
Spring		
CE 2326	Econ for Engrs & Scientists ⁺	3
MECH 2340	Mechanics II -Dynamics ⁺	3
MECH 2311	Intro to Thermal-fluid Sci ⁺	3
MECH 2342	Electro Mechanical Systems ⁺	3

MECH 2103	Engineering Computations ⁺	1
MATH 2326	Differential Equations ⁺	3
JUNIOR		
Fall		
POLS 2310	Introduction to Politics ⁺	3
AERO Concentration Course		3
AERO 3312	Aerodynamics 1	3
MECH 3352	Engineering Analysis	3
Laboratory Experience ²		1
Math Elective ^{+,3}		3
Spring		
COMM 1302	Business/Profession Comm ⁺	3
AERO 3323	Aerospace Structures I	3
AERO 3343	Systems Modelling and Control	3
Aero Concentration I ⁵		3
Science/Math Elective ^{+,4}		3
Laboratory Experience ²		1
SENIOR		
Fall		
Language, Philosophy, and Culture Course ⁺		3
AERO 4322	Aerospace Propulsion	3
AERO 4365	Aerospace Systems Engineering	3
Technical Elective		3
Aero Concentration III ⁵		3
Spring		
POLS 2311	American Govern & Politics ⁺	3
Creative Arts Course ⁺		3
AERO 4366	Aerospace Senior Design	3
AERO 4364	Aerospace Communications	3
Technical Elective		3

Notes:

+Grade of C or better required

1. Must be either CHEM 1306 with CHEM 1106, PHYS 2421 or by permission of advisor.

2. From the department approved list of Laboratory Experience 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: 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 PHYS, OR CHEM).

5. Must take at least three classes from one aerospace concentration area.

6. Two technical electives selected from any MECH or AERO 3XXX or 4XXX courses. At least one elective must be at the 4XXX level.

Total Hours
128**BS Aerospace and Aeronautical Engineering (Starting with Precalculus)**

Code	Title	Hours
BACHELOR OF SCIENCE IN AEROSPACE AND AERONAUTICAL ENGINEERING		
FRESHMAN		
Summer		
MATH 1508	Precalculus	5
Fall		
RWS 1301	Rhetoric & Composition I	3
UNIV 1301	Seminar/Critical Inquiry	3

PHYS 2320 & PHYS 2120	Introductory Mechanics and Laboratory for PHYS 2320	4
MATH 1411	Calculus I	4
MECH 1305	Graphic & Design Fundamentals	3
Spring		
HIST 1301	History of U.S. to 1865	3
RWS 1302	Rhetoric & Composition 2	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	4
MECH 1321	Mechanics I-Statics	3
MATH 1312	Calculus II	3
SOPHOMORE		
Fall		
HIST 1302	History of U.S. Since 1865	3
MECH 2322	Mechanics of Materials	3
AERO 2331	Aerospace Materials	3
AERO 2131	Aerospace Materials Lab	1
MATH 2313	Calculus III	3
Science Elective		4
Spring		
CE 2326	Econ for Engrs & Scientists	3
MECH 2340	Mechanics II -Dynamics	3
MECH 2311	Intro to Thermal-fluid Sci	3
MECH 2342	Electro Mechanical Systems	3
MECH 2103	Engineering Computations	1
MATH 2326	Differential Equations	3
JUNIOR		
Fall		
POLS 2310	Introduction to Politics	3
Aero Concentration Course		3
AERO 3312	Aerodynamics 1	3
MECH 3352	Engineering Analysis	3
Math Elective		3
Lab Experience		1
Spring		
COMM 1302	Business/Profession Comm	3
AERO 3323	Aerospace Structures I	3
AERO 3343	Systems Modelling and Control	3
Aero Concentration Course		3
Science/Math Elective		3
Lab Experience		1
SENIOR		
Fall		
Language, Philosophy, and Culture		3
AERO 4322	Aerospace Propulsion	3
AERO 4365	Aerospace Systems Engineering	3
Technical Elective		3
Aero Concentration Course		3
Spring		
POLS 2311	American Gover & Politics	3
Creative Arts		3
AERO 4366	Aerospace Senior Design	3

Technical Elective		3
AERO 4364	Aerospace Communications	3
Total Hours		133