

BS in Industrial and Systems Engineering

The Industrial and Systems 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 human interface design and management, plant design, operations research, production and inventory control and quality control.

Marketable Skills

Students will develop the following marketable skills:

1. Critical thinking: Analyze and evaluate issues in order to solve problems and develop informed opinions
2. Decision Making
3. Problem-solving: Find solutions to difficult or complex issues
4. Research: Be able to search, investigate and critically analyze information in response to a specific research question

Vision

The Industrial and Systems Engineering program strives to graduate industrial engineers of the highest quality and to conduct state-of-the-art research for the end-to-end enterprise.

Mission

The Industrial and Systems Engineering program makes available a high quality, relevant engineering education available to all residents of the El Paso bi-national region. The department dedicates itself to providing Indicates Texas Common Course Number (TCCN) students with a set of skills, knowledge and attitudes that will permit its graduates to succeed and thrive as engineers and leaders.

Program Educational Objectives

The Industrial and Systems Engineering program produces diverse and exceptional graduates who within a few years after graduation will:

- Gain successful employment in a competitive global marketplace in leadership positions.
- Engage and be successful in graduate studies and/or professional training programs

Student Outcomes

The Bachelor of Science in Industrial and Systems Engineering (BSISE) program has seven student outcomes that we expect our students to achieve at the time of graduation. These student outcomes support the BSISE program educational objectives. Attainment of these outcomes prepares graduates to enter the professional practice of engineering. The student outcomes are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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>).

Fast-Track Combined BSISE/Master Program in Industrial, Manufacturing, or Systems Engineering

Students with at least 90 hours accumulated toward their BSISE degree and a cumulative GPA of at least 3.30 may be eligible for admission into the fast-track BSISE/Master Program. Students admitted to this program take graduate classes that count both toward graduate degree requirements and undergraduate degree requirements, for up to 9 credit hours of IE, MFG, or SE graduate courses per approval of the undergraduate and graduate advisors. Eligible IE, MFG, or SE graduate courses come from a list approved for fast-track by the IMSE Faculty. Students must earn a B or better in

the graduate course to count as graduate credit for the Master of Science in Industrial Engineering, Master of Science in Manufacturing Engineering, or for the Master of Science in Systems Engineering. If the grade is a C, it will not count towards the graduate degree but will still count towards the undergraduate degree.

Degree Plan

Required Credits: 120

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements. (p. 3)		42
Industrial Engineering Designated Core (All courses require a grade of C or better.)		
Required Courses:		
CE 2326	Econ for Engrs & Scientists	3
CHEM 1105	Laboratory for CHEM 1305	1
CHEM 1305	General Chemistry	3
MATH 1508 or MATH 1310	Precalculus ((Listed if completed, but not required)) Trigonometry and Conics	3-5
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
Industrial Engineering Prerequisites (All courses require a grade of C or better.)		
MATH 1411	Calculus I	4
Industrial Engineering Core (All courses require a grade of C or better.)		
Required Courses:		
CE 2315 or MECH 1321	Statics Mechanics I-Statics	3
IE 1333	Computational Methods	3
MECH 2331 or MME 2303	Matl & Manufacturing Processes Intro to Materials Sci & Engrg	3
IE 2333	Decision Support Systems	3
IE 2377 or MECH 2342 or EE 2350	Electro-Mechanical Systems Electro Mechanical Systems Electric Circuits I	3
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
MECH 1305	Graphic & Design Fundamentals	3
MECH 2131	Manufacturing Engineering Lab	1
Industrial Engineering Major		
Required Courses:		
IE 3331	Systems Engineering	3
IE 3334	Intro to Work Design	3
IE 3352	Design of Experiments	3
IE 3373	Engr Probability & Stat Models ^C	3
IE 3390	Oper Research I: Deter Models	3
IE 4266	Senior Design	2
IE 4334	Work Design- Prod. & Safety	3
IE 4353	Industrial Systems Simulation	3
IE 4385	Statist Quality Cntrl/Reliabil	3
IE 4390	Oper Research II: Stoch Models	3
IE 4391	Prod Plan & Inv Cont Sys	3
MATH 3323	Matrix Algebra ^C	3
MATH 4329	Numerical Analysis	3
Technical Electives:		

Select three courses from the following, or any other upper division course from the College of Engineering, College of Science, or College of Business Administration: 9

IE 4371	Engineering Problems	
IE 4395	Special Topics Industrial Engr	
IE 4396	Intl Manufacturing Intern I	
RWS 3359	Technical Writing	
Total Hours		120

C

Courses 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

Communication (six hours)

Code	Title	Hours
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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

American History (six hours)

Code	Title	Hours
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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

Language, Philosophy & Culture (three hours)

Code	Title	Hours
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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****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****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**

Political Science (six hours)

Code	Title	Hours
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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

Total Hours **6**

Social and Behavioral Sciences (three hours)

Code	Title	Hours
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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: **3**

ANTH 1301	Intro-Phys Anth/Archeolog
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**

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**

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 Industrial and Systems Engineering (Starting with Pre-Calculus)**

Code	Title	Hours
BACHELOR OF SCIENCE IN INDUSTRIAL AND SYSTEMS ENGINEERING		
Summer		
MATH 1508 or MATH 1310	Precalculus Trigonometry and Conics	3-5
FRESHMAN		
Fall		
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305 ⁺	4
IE 1333	Computational Methods	3
MATH 1411	Calculus I ⁺	4
RWS 1301	Rhetoric & Composition I ⁺	3
UNIV 1301	Seminar/Critical Inquiry ⁺	3
Spring		
IE 2333	Decision Support Systems	3
MATH 1312	Calculus II ⁺	3
MME 2303 or MECH 2331	Intro to Materials Sci & Engrg ⁺ Matl & Manufacturing Processes	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺	3
SOPHOMORE		
Fall		
CE 2315 or MECH 1321	Statics ⁺ Mechanics I-Statics	3
COMM 1302	Business/Profession Comm	3
HIST 1302	History of U.S. Since 1865 ⁺	3
MATH 2313	Calculus III ⁺	3
MECH 1305	Graphic & Design Fundamentals ⁺	3
Spring		
IE 2377 or MECH 2342 or EE 2350	Electro-Mechanical Systems ⁺ Electro Mechanical Systems Electric Circuits I	3
IE 3373	Engr Probability & Stat Models ⁺	3
MATH 3323	Matrix Algebra ⁺	3
POLS 2310	Introduction to Politics ⁺	3
Creative Arts elective ⁺		3
JUNIOR		
Fall		
CE 2326	Econ for Engrs & Scientists ⁺	3
HIST 1301	History of U.S. to 1865 ⁺	3
IE 3390	Oper Research I: Deter Models	3
MATH 2326	Differential Equations ⁺	3
MATH 4329	Numerical Analysis	3
Spring		
IE 3334	Intro to Work Design	3
IE 3352	Design of Experiments	3

IE 4334	Work Design- Prod. & Safety	3
PHIL 2306	Ethics	3
POLS 2311	American Gover & Politics ⁺	3
SENIOR		
Fall		
IE 3331	Systems Engineering	3
IE 4353	Industrial Systems Simulation	3
IE 4391	Prod Plan & Inv Cont Sys	3
Technical Elective I		3
Technical Elective III		3
Spring		
IE 4266	Senior Design	2
IE 4385	Statist Quality Cntrl/Reliabil	3
IE 4390	Oper Research II: Stoch Models	3
MECH 2131	Manufacturing Engineering Lab	1
Technical Elective II		3

Notes:

+ Grade of "C" or better required.

Technical Electives: Select three courses from the following IE 4333, IE 4371, IE 4395, IE 4396, IE 4397; RWS 3359; or any Junior or Senior level course from the College of Engineering, College of Science, or College of Business Administration

Total Hours**123-125****BS Industrial and Systems Engineering (Starting with Calculus)**

Code	Title	Hours
BACHELOR OF SCIENCE IN INDUSTRIAL AND SYSTEMS ENGINEERING		
FRESHMAN		
Fall		
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305 ⁺	4
IE 1333	Computational Methods	3
MATH 1411	Calculus I ⁺	4
RWS 1301	Rhetoric & Composition I ⁺	3
UNIV 1301	Seminar/Critical Inquiry ⁺	3
Spring		
IE 2333	Decision Support Systems	3
MATH 1312	Calculus II ⁺	3
MME 2303 or MECH 2331	Intro to Materials Sci & Engrg ⁺ Matl & Manufacturing Processes	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺	3
SOPHOMORE		
Fall		
CE 2315 or MECH 1321	Statics ⁺ Mechanics I-Statics	3
COMM 1302	Business/Profession Comm	3
HIST 1302	History of U.S. Since 1865 ⁺	3
MATH 2313	Calculus III ⁺	3
MECH 1305	Graphic & Design Fundamentals ⁺	3
Spring		
IE 2377 or MECH 2342	Electro-Mechanical Systems ⁺ Electro Mechanical Systems	3

or EE 2350	Electric Circuits I	
IE 3373	Engr Probability & Stat Models ⁺	3
MATH 3323	Matrix Algebra ⁺	3
POLS 2310	Introduction to Politics ⁺	3
Creative Arts elective ⁺		3

JUNIOR**Fall**

CE 2326	Econ for Engrs & Scientists ⁺	3
HIST 1301	History of U.S. to 1865 ⁺	3
IE 3390	Oper Research I: Deter Models	3
MATH 2326	Differential Equations ⁺	3
MATH 4329	Numerical Analysis	3

Spring

IE 3334	Intro to Work Design	3
IE 3352	Design of Experiments	3
IE 4334	Work Design- Prod. & Safety	3
PHIL 2306	Ethics	3
POLS 2311	American Gover & Politics ⁺	3

SENIOR**Fall**

IE 3331	Systems Engineering	3
IE 4353	Industrial Systems Simulation	3
IE 4391	Prod Plan & Inv Cont Sys	3
Technical Elective I		3
Technical Elective III		3

Spring

IE 4266	Senior Design	2
IE 4385	Statist Quality Cntrl/Reliabil	3
IE 4390	Oper Research II: Stoch Models	3
MECH 2131	Manufacturing Engineering Lab	1
Technical Elective II		3

Notes:

⁺ Grade of "C" or better required.

Technical Electives: Select three courses from the following IE 4333, IE 4371, IE 4395, IE 4396, IE 4397; RWS 3359; or any Junior or Senior level course from the College of Engineering, College of Science, or College of Business Administration

Total Hours

120