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/#fasttrackcoursestext).

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	Precalculus ((Listed if completed, but not required))	3-5
or MATH 1310	Trigonometry and Conics	
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	Statics	3
or MECH 1321	Mechanics I-Statics	
ISE 1333	Computational Methods	3
MECH 2331	Matl & Manufacturing Processes	3
or MME 2303	Intro to Materials Sci & Engrg	
ISE 2333	Decision Support Systems	3
ISE 2377	Electro-Mechanical Systems	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:		
ISE 3331	Systems Engineering	3
ISE 3334	Intro to Work Design	3
ISE 3352	Design of Experiments	3
ISE 3373	Engr Probability & Stat Models	3
ISE 3390	Oper Research I: Deter Models	3
ISE 4266	Senior Design	2
ISE 4334	Work Design- Prod. & Safety	3
ISE 4353	Industrial Systems Simulation	3
ISE 4385	Statist Quality Cntrl/Reliabil	3
ISE 4390	Oper Research II: Stoch Models	3
ISE 4391	Prod Plan & Inv Cont Systs	3
MATH 3323	Matrix Algebra [C]	3
MATH 4329	Numerical Analysis	3
Technical Electives:		
Select three courses from the following, or any other upper divison course from the College of Engineering, College of Science, or College of Business Administration:		9

ISE 4354	Data Analytics Applications	
ISE 4371	Engineering Problems	
ISE 4395	Special Topics Industrial Engr	
ISE 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

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 [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
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:		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
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 and 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	
CE 2326	Econ for Engrs & Scientists	
CHIC 2311	Intro to Chicano Studies	
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	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 (three hours)

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	
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		**0**

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	Precalculus	3-5
or MATH 1310	Trigonometry and Conics	
FRESHMAN		
Fall		
RWS 1301	Rhetoric & Composition I +	3
MATH 1411	Calculus I +	4
UNIV 1301	Seminar/Critical Inquiry +	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305 +	4
ISE 1333	Computational Methods	3
Spring		
RWS 1302	Rhetoric & Composition 2 +	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
MME 2303	Intro to Materials Sci & Engrg +	3
or MECH 2331	Matl & Manufacturing Processes	
ISE 2333	Decision Support Systems	3
MATH 1312	Calculus II +	3
SOPHOMORE		
Fall		
HIST 1302	History of U.S. Since 1865 +	3
COMM 1302	Business/Profession Comm	3
MECH 1305	Graphic & Design Fundamentals +	3
CE 2315	Statics +	3
or MECH 1321	Mechanics I-Statics	
MATH 2313	Calculus III +	3
Spring		
POLS 2310	Introduction to Politics +	3
Creative Arts +		3
ISE 2377	Electro-Mechanical Systems	3
ISE 3373	Engr Probability & Stat Models	3
MATH 3323	Matrix Algebra +	3
JUNIOR		
Fall		
HIST 1301	History of U.S. to 1865 +	3
CE 2326	Econ for Engrs & Scientists +	3
ISE 3390	Oper Research I: Deter Models	3
MATH 2326	Differential Equations +	3
MATH 4329	Numerical Analysis	3
Spring		
POLS 2311	American Gover & Politics +	3
PHIL 2306	Ethics	3
ISE 3334	Intro to Work Design	3
ISE 4334	Work Design- Prod. & Safety	3
ISE 3352	Design of Experiments	3
SENIOR		
Fall		

ISE 3331	Systems Engineering	3
ISE 4353	Industrial Systems Simulation	3
ISE 4391	Prod Plan & Inv Cont Systs	3
Technical Elective I		3
Technical Elective II		3
Spring		
MECH 2131	Manufacturing Engineering Lab	1
ISE 4390	Oper Research II: Stoch Models	3
ISE 4385	Statist Quality Cntrl/Reliabil	3
ISE 4266	Senior Design	2
Technical Elective III		3
Notes:		
+ Grade of “C” or better required.		
Technical Electives: Select three courses from the following ISE 4354, ISE 4371, ISE 4395, ISE 4396; 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		
RWS 1301	Rhetoric & Composition I +	3
UNIV 1301	Seminar/Critical Inquiry +	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305 +	4
MATH 1411	Calculus I +	4
ISE 1333	Computational Methods	3
Spring		
RWS 1302	Rhetoric & Composition 2 +	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
MME 2303	Intro to Materials Sci & Engrg +	3
or MECH 2331	Matl & Manufacturing Processes	
ISE 2333	Decision Support Systems	3
MATH 1312	Calculus II +	3
SOPHOMORE		
Fall		
HIST 1301	History of U.S. to 1865	3
COMM 1302	Business/Profession Comm	3
MECH 1305	Graphic & Design Fundamentals +	3
CE 2315	Statics +	3
or MECH 1321	Mechanics I-Statics	
MATH 2313	Calculus III +	3
Spring		
POLS 2310	Introduction to Politics +	3
Creative Arts +		3
ISE 2377	Electro-Mechanical Systems	3
ISE 3373	Engr Probability & Stat Models	3
MATH 3323	Matrix Algebra +	3
JUNIOR		
Fall		

HIST 1302	History of U.S. Since 1865	3
CE 2326	Econ for Engrs & Scientists +	3
ISE 3390	Oper Research I: Deter Models	3
MATH 2326	Differential Equations +	3
MATH 4329	Numerical Analysis	3
Spring		
POLS 2311	American Gover & Politics +	3
PHIL 2306	Ethics	3
ISE 3334	Intro to Work Design	3
ISE 4334	Work Design- Prod. & Safety	3
ISE 3352	Design of Experiments	3
SENIOR		
Fall		
ISE 3331	Systems Engineering	3
ISE 4353	Industrial Systems Simulation	3
ISE 4391	Prod Plan & Inv Cont Systs	3
Technical Elective I		3
Technical Elective II		3
Spring		
MECH 2131	Manufacturing Engineering Lab	1
ISE 4390	Oper Research II: Stoch Models	3
ISE 4385	Statist Quality Cntrl/Reliabil	3
ISE 4266	Senior Design	2
Technical Elective III		3
Notes:		
+ Grade of “C” or better required.		
Technical Electives: Select three courses from the following ISE 4354, ISE 4371, ISE 4395, ISE 4396; 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**