

BS in Engineering Innovation and Leadership

The B.S. in Engineering Innovation and Leadership program (BSEIL) offers a rigorous and flexible major in Engineering with in-depth study of leadership and its effect upon engineering and society. The program includes concentrations in UTEP engineering fields. The Engineering Innovation and Leadership program and its associated concentrations meet the curricular accreditation requirements of the Engineering Accreditation Commission of ABET using the criteria for General Engineering.

Our graduates transition from UTEP to successful careers in the most cutting-edge, exciting engineering and technology companies in the U.S. and abroad, working to provide engineering combined with business acumen in innovative industries across the globe; in service science and engineering companies, such as Apple, AT&T, Halliburton, Google, IBM, and in aerospace, defense, energy, and manufacturing industries; product development; NASA; DOD laboratories; and academic positions.

Possible career paths for students in this degree are: Project Engineer, Engineering Manager, Systems Engineer, Sales Engineer, Design Engineer, Process Engineer, etc.

"We live in a technological age, and if our society is to flourish, many of our leaders should be engineers, and many of our engineers should be leaders"
- Samuel Florman, *The Interactive Engineer*, 1997

Marketable Skills

1. Communication: #Reach mutual understanding through effective exchange of information, ideas, and feelings.
2. Critical thinking: #Analyze and evaluate issues#to#understand problems and develop innovative solutions.
3. Leadership: Enact the five practices of exemplary leadership: model the way, inspire a shared vision, challenge the process, enable others to act, and encourage the heart.
4. Problem-solving: #Find innovative solutions to difficult or complex issues.
5. Teamwork: #Contribute as an effective, efficient member of a group#to#meet a common goal.
6. Multidisciplinary Engineering: Apply knowledge and skills related to foundational engineering concepts, design, and analysis that align with students' passions and interests.
7. Innovation and Entrepreneurship: Identify, design, and deploy innovative socio-technical solutions that address issues of desirability, feasibility, and viability.
8. Business Acumen: Employ an understanding and ability to deal with business scenarios in a manner that leads to successful outcomes, with knowledge and experience in foundational business principles of Accounting, Economics, Finance, Management, and Marketing.
9. Adaptability: Readily adjust to changing and complex situations, acquiring necessary skills and knowledge along the way.
10. Presentation: Imparting information to an audience effectively and guiding listeners through new information, ensuring clarity and understanding.

Program Objectives

Graduates of this program will:

1. **Value the role of engineering and leadership for the betterment of community and society.**
 - Elaboration: Our graduates will value and will demonstrate ability to recognize leadership opportunities and to take initiative for beneficial change. They will understand the broader impacts of their endeavors both inside and outside of engineering, be they social, economic, environmental, or ethical. They will be cognizant of their professional, civic, and societal responsibilities.
2. **Inventively cultivate success in their field by demonstrating technical competence and problem-solving skills, which will foster success in a variety of postgraduate environments, including professional practice and graduate school.**
 - Elaboration: Our graduates will have a solid grounding in fundamental principles of engineering, mathematics, and science, and they will apply this knowledge to a variety of systems inside and outside of engineering. They will be able to develop inventive solutions that are responsive to technical, social, economic, and cultural considerations and constraints among others.
3. **Possess attributes for assuming increasing levels of professional responsibility within and beyond engineering.**
 - Elaboration: In accelerating their ability to innovate and lead, our graduates will develop their character, competency, and capacity. They will also develop a deep understanding of engineering, mathematics, science, business, and entrepreneurship. They will build on this foundation by engaging in independent and team learning to identify and to respond to emerging technical and societal developments.

Admission Requirements

Students admitted into the program begin to take Engineering, Innovation and Leadership courses, when they are pre-calculus-ready (can register for MATH 1508 OR HIGHER)..Each semester, students admitted into the BSEL program must meet prepare for their ensuring registration by completing a proposed course of study, when this is completed will meet with a BSEL advisor to approve their courses and electives.

Engineering Concentration Selection

Students will select a particular engineering Concentration or a specialized combination of discipline-specific courses. Students can choose from the following engineering Concentrations:

- Engineering Innovation
- Biomedical Engineering
- Civil Engineering
- Computer Science
- Electrical Engineering
- Mechanical Engineering
- Metallurgical and Materials Engineering

Students who choose these tracks will likely proceed into either conventional engineering employment or into graduate school to obtain an M.S. or a Ph.D. in Engineering.

Degree Plan

Required Credits: 125

Code	Title	Hours
Complete the University Core Curriculum		42
Complete the University Core Curriculum requirements. (p. 6)		
Designated Core		
CE 2326	Econ for Engrs & Scientists	
CS 1320	Computer Programming Sci/Engr ((Exception CS Concentration take COMM 1302 Business/Professional Comm (C) 3.))	
EL 1301	Eng Innovation and Leadership	
MATH 1508	Precalculus ((Listed if completed, but not required))	
or MATH 1310	Trigonometry and Conics	
or MATH 1411	Calculus I	
PHIL 2306	Ethics	
PHYS 2120	Laboratory for PHYS 2320	
PHYS 2320	Introductory Mechanics	
PHYS 2121	Laboratory for PHYS 2321	
PHYS 2321	Introductory Electromagnetism	
Foundation Math/Science		
Required:		
CHEM 1305	General Chemistry	3
MATH 1312	Calculus II	3
MATH 1411	Calculus I	4
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
MATH 3323	Matrix Algebra	3
or BME Sequence must take upper-division BIOL, CHEM, CBCH course from approved BME minor list		
Engineering Leadership Coursework		
All EL courses require a grade of "C" or better		
Required:		
EL 1402	Fund of Lead, Design & Graph	4
EL 2301	Modeling and Simulation	3
EL 3003	Professional Practice I	0

EL 3005	Professional Practice II	0
EL 3302	Engineering Measurements	3
EL 3331	Engr Design:People to Products	3
EL 3332	Engr Entr: Products to People	3
EL 3373	Eng Prob. & Statistical Models	3
or IE 3373	Engr Probability & Stat Models	
or EE 3384	Intro to Prob. w/ App. in ECE	
EL 4395	CD I:Definition & Exploration	3
EL 4396	CD II: Develop & Evaluation	3

Concentrations

In the Concentrations below, a student must take fifteen (15) credit hours of Emphasis courses approved by the Department. These courses must constitute an approved plan of study and can be taken inside or outside of engineering. Exceptions include those students taking the CS or BME Concentration (see required Emphasis courses for CS or BME Concentration below). Emphasis courses for Engineering Innovation Concentration may include: EL 3320 Finance Mgmt for the Engineer, EL 3330 Eng Leadership Development, EL 4330 Innovation in Technology, EL 4332 Law and Commercialization, EL 4331 Intellectual Property Law, EL 4334 Eng Ethics & Professionalism, and EL 4393 Special Topics in Eng and Lead, or other course approved by the Department.

Engineering Innovation

Code	Title	Hours
Engineering Innovation Concentration Required Courses		
CE 2338	Mechanics II (Dynamics)	3
or MECH 2340	Mechanics II -Dynamics	
CE 2377	Electro Mechanical Systems	3
or IE 2377	Electro-Mechanical Systems	
or MECH 2342	Electro Mechanical Systems	
MECH 2311	Intro to Thermal-fluid Sci	3
MME 2303	Intro to Materials Sci & Engrg	3
MME 2434	Mechanics of Materials	4
Upper Division Engineering/Technical Electives		
9 credit hours approved by advisor		9
Emphasis Courses		
A student must take fifteen (15) credit hours of emphasis courses approved by the department.		15
Total Hours		40

Biomedical Engineering

Code	Title	Hours
Biomedical Engineering Concentration		
BIOL 1305	General Biology	4
& BIOL 1107	and Topics in Study of Life I	
BIOL 2313	Human Anat/Physiology II	4
& BIOL 2113	and Human Anat/Physio Lab II	
or		
BIOL 2311	Human Anat/Physiology I	
& BIOL 2111	and Human Anat/Physio Lab I	
4 cr approved by the Department		4
Additional Required Courses		
CE 2338	Mechanics II (Dynamics)	3
or MECH 2340	Mechanics II -Dynamics	
CE 2377	Electro Mechanical Systems	3
or IE 2377	Electro-Mechanical Systems	
or MECH 2342	Electro Mechanical Systems	
MECH 2311	Intro to Thermal-fluid Sci	3
MME 2303	Intro to Materials Sci & Engrg	3

MME 2434	Mechanics of Materials	4
Upper Division Engineering Technical Electives		
BME 3303	Fundamentals of BME I	3
BME 3305	Fundamentals of BME II	3
Upper Division Course from list approved for BME Minor		3
Emphasis Course		
A student must take three (3) credit hours of emphasis courses approved by the department.		3
Total Hours		40

Computer Science

Code	Title	Hours
Computer Science Concentration Courses		
CS 1101	Intro to Computer Science Lab	1
CS 1301	Intro to Computer Science	3
CS 2101	Discrete Structures I	1
CS 2202	Discrete Structures II	2
CS 2302	Data Structures	3
CS 2401	Elem. Data Struct./Algorithms	4
EL 4171	Eng Ed and Lead Problems	1
Additional Required Courses		
CE 2338 or MECH 2340	Mechanics II (Dynamics) Mechanics II -Dynamics	3
CE 2377 or IE 2377 or MECH 2342	Electro Mechanical Systems Electro-Mechanical Systems Electro Mechanical Systems	3
MECH 2311	Intro to Thermal-fluid Sci	3
MME 2303	Intro to Materials Sci & Engrg	3
MME 2434	Mechanics of Materials	4
Upper Division Engineering / Technical Electives		
9 cr hrs from the following courses or as approved by the Department		9
CS 3320	(Course currently in degree plan, but no longer offered. Please see advisor for substitution.)	
CS 3331	Adv. Object-Oriented Programng	
CS 3350	Automata/Computabi/Formal Lang	
CS 3360	Design/Implementation Prog Lan	
CS 3370	(Course currently in degree plan, but no longer offered. Please see advisor for substitution.)	
CS 3432	Computer Organization	
CS 4310	Software Eng: Requirements Eng	
CS 4311	Software Eng: Design & Implmnt	
CS 4316	Computer Networks	
CS 4317	Human-Computer Interaction	
CS 4320	Artificial Intelligence	
CS 4330	Mobile Application Development	
CS 4339	Secure Web-Based Systems	
CS 4342	Data Base Management	
CS 4351	Computer Security	
CS 4352	(Course currently in degree plan, but no longer offered. Please see advisor for substitution.)	
CS 4364	Topics in Data Science	
CS 4365	Topics in Soft Computing	
CS 4371	Computer Science Problems	
CS 4373	Computer Science Internship	
CS 4374	Software Construction	
CS 4375	Operating Systems Concepts	

CS 4376	Comp Dcsn-Mkng & Risk Analysis
CS 4377	(Course currently in degree plan, but no longer offered. Please see advisor for substitution.)
CS 4379	Software Reverse Engineering
CS 4387	Software Integration and V&V
CS 4390	Special Topics in Computer Sci
CS 4392	(Course currently in degree plan, but no longer offered. Please see advisor for substitution.)

Total Hours **40**

Electrical Engineering

Code	Title	Hours
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Electrical Engineering Concentration Courses

EE 2350	Electric Circuits I	3
EE 2351	Electric Circuits II	3
EE 2353	Cont. Time Signals & Systems	3
EE 2369 & EE 2169	Digital Systems Design I and Laboratory for EE 2369	4
EE 2372	Software Design I	3

Upper Division Engineering Technical Electives

9 hours approved by Department 9

Students seeking the Academic Minor in EE must take 6 credit hours from the list

EE 3321	Electromagnetic Field Theory
EE 3329	Fund. of Semiconductor Dev
EE 3338 & EE 3138	Electronics I and Lab for Electrical Engr 3338
EE 3340	Electronics II
EE 3353	Discrete Time Signals & System
EE 3376 & EE 3176	Microprocessor Systems I and Laboratory For EE 3376
EE 3384	Intro to Prob. w/ App. in ECE

Emphasis Courses

A student must take fifteen (15) credit hours of emphasis courses approved by the department 15

Total Hours **40**

Civil Engineering

Code	Title	Hours
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Civil Engineering Concentration Required Courses

CE 1301	Civil Engineering Fundamentals	3
CE 2315	Statics	3
CE 2334	Mechanics of Materials	3
CE 2338 or MECH 2340	Mechanics II (Dynamics) Mechanics II -Dynamics	3
CE 2343 or CE 3336 or CE 2385	Structural Analysis Civil Engineering Materials Environmental Engr Fundamental	3
CE 2375	Intro to Fluid Mechanics	3
EL 4171	Eng Ed and Lead Problems	1

Upper Division Civil Engineering/Technical Electives

6 credit hours approved by the Department 6

Emphasis Courses

A student must take fifteen (15) credit hours of emphasis courses approved by the department. 15

Total Hours **40**

Mechanical Engineering

Code	Title	Hours
Mechanical Concentration Required Courses		
MECH 1321	Mechanics I-Statics	3
MECH 2103	Engineering Computations	1
MECH 2311	Intro to Thermal-fluid Sci	3
MECH 2322	Mechanics of Materials	3
MECH 2340	Mechanics II -Dynamics	3
Upper Division Engineering Technical Electives		
MECH 3312	Thermodynamics	3
MECH 3314	Fluid Mechanics	3
MECH 4315	Heat Transfer	3
Mechanical Concentration Elective (choose one) (3 SCH)		3
AERO 3312	Aerodynamics 1	
AERO 3323	Aerospace Structures I	
AERO 3343	Systems Modelling and Control	
EL 4393	Special Topics in Eng and Lead	
MECH 3334	Mechanical Design	
MECH 3345	System Dynamics	
Emphasis Courses		
A student must take fifteen (15) credit hours of emphasis courses approved by the department.		15
Total Hours		40

Metallurgical and Materials Engineering

Code	Title	Hours
Metallurgical and Materials Engineering Concentration Required Courses		
Upper Division MME/ Technical Electives		
12 cr hrs of MME courses approved by the EIL Department		12
CE 2377	Electro Mechanical Systems	3
or IE 2377	Electro-Mechanical Systems	
or MECH 2342	Electro Mechanical Systems	
MME 2303	Intro to Materials Sci & Engrg	3
MME 2434	Mechanics of Materials	4
MME 4316	Failure Analysis	3
Emphasis Courses		
A student must take fifteen (15) credit hours of courses approved by department.		15
Total Hours		40

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
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
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
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 Engineering Innovation and Leadership: Biomedical Engineering

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
BIOMEDICAL ENGINEERING CONCENTRATION (Starting with Calculus)		
FRESHMAN		
Fall		
CS 1320	Computer Programming Sci/Engr ⁺	3
EL 1405	⁺	4
MATH 1411	Calculus I ^{+‡}	4
RWS 1301	Rhetoric & Composition I ⁺¹	3
UNIV 1301	Seminar/Critical Inquiry ⁺¹	3
Spring		
CHEM 1305	General Chemistry ⁺	3
EL 1302	⁺	3
MATH 1312	Calculus II ⁺	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺¹	3
SOPHOMORE		
Fall		
EL 2301	Modeling and Simulation ⁺	3
HIST 1301	History of U.S. to 1865 ⁺¹	3

MATH 2313	Calculus III ⁺	3
MME 2303	Intro to Materials Sci & Engrg	3
PHYS 2321	Introductory Electromagnetism	3
PHYS 2121	Laboratory for PHYS 2321	1
Spring		
CE 2326	Econ for Engrs & Scientists ⁺¹	3
EL 3302	Engineering Measurements ⁺	3
EL 3373	Eng Prob. & Statistical Models ⁺²	3
MATH 2326	Differential Equations ⁺	3
MME 2434	Mechanics of Materials	4
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I ^{1,6}	4
CE 2338	Mechanics II (Dynamics) ^{1,3}	3
CE 2377	Electro Mechanical Systems ^{1,4}	3
EL 3331	Engr Design:People to Products ⁺	3
HIST 1302	History of U.S. Since 1865 ⁺¹	3
Spring		
Visual and Performing Arts Elective ⁺		3
MECH 2311	Intro to Thermal-fluid Sci ^{1,4}	3
BME 3303 & MME 4171	Fundamentals of BME I and Engineering Problems ^{1,6}	4
BIOL 2311 & BIOL 2111	Human Anat/Physiology I and Human Anat/Physio Lab I ^{1,5,6}	4
EL 3332	Engr Entr: Products to People ⁺	3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		
BME 3305	Fundamentals of BME II ^{1,6}	3
EL 4395	CD I:Definition & Exploration ⁺	3
PHIL 2306	Ethics ⁺¹	3
POLS 2310	Introduction to Politics ⁺¹	3
Concentration elective as approved by department		3
Spring		
EL 4396	CD II: Develop & Evaluation ⁺	3
POLS 2311	American Gover & Politics ⁺	3
Eng. Technical Elective from approved list for BME Minor ^{1,6}		3
Upper level BIOL, CHEM, or CBCH course from approved list for BME Minor ^{1,6}		3

Notes:

+ Grade of C or better required

‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.

1 Prerequisites for non-Engineering Leadership courses can be found in the catalog.

2 May substitute IE 3373 or EE 3384

3 May substitute ME 2340

4 May substitute IE 2377 or ME 2342

5 May substitute for BIOL 2313 and BIOL 2113

6 BME sequence may qualify for BME Minor. Approved electives for BME Minor are on BME Minor website. Students must register for these courses and lab sections after advising by BME Minor advisor

Total Hours**125****BS Engineering Innovation and Leadership: Civil Engineering**

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
CIVIL ENGINEERING CONCENTRATION		
FRESHMAN		
Fall		
EL 1405	+	4
HIST 1301	History of U.S. to 1865 ⁺³	3
MATH 1411	Calculus I ^{+‡}	4
RWS 1301	Rhetoric & Composition I ⁺³	3
UNIV 1301	Seminar/Critical Inquiry ⁺	3
Spring		
EL 1302	1+	3
CHEM 1305	General Chemistry ⁺	3
MATH 1312	Calculus II ⁺	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺³	3
SOPHOMORE		
Fall		
CE 1301	Civil Engineering Fundamentals ³	3
EL 2301	Modeling and Simulation ⁺	3
HIST 1302	History of U.S. Since 1865 ⁺³	3
MATH 2313	Calculus III ⁺	3
PHYS 2321	Introductory Electromagnetism	3
PHYS 2121	Laboratory for PHYS 2321	1
Spring		
CE 2315	Statics ⁺	3
CE 2326	Econ for Engrs & Scientists ⁺³	3
EL 3302	Engineering Measurements ⁺¹	3
EL 3373	Eng Prob. & Statistical Models ⁺²	3
MATH 2326	Differential Equations ⁺	3
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
CE 2338 or MECH 2340	Mechanics II (Dynamics) Mechanics II -Dynamics	3
CE 2375	Intro to Fluid Mechanics	3
EL 3331	Engr Design:People to Products ¹⁺	3
MATH 3323	Matrix Algebra ⁺	3
Emphasis Elective #1		3
Spring		
CS 1320	Computer Programming Sci/Engr	3
CE 2334	Mechanics of Materials ⁺³	3
CE 2377 or CE 3336 or CE 2385	Electro Mechanical Systems Civil Engineering Materials Environmental Engr Fundamental	3

EL 3304	Engr Design:Products to People ¹⁺	3
Emphasis Elective #2		3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		
EL 4171	Eng Ed and Lead Problems	1
EL 4395	CD I:Definition & Exploration ⁺¹	3
PHIL 2306	Ethics ⁺³	3
POLS 2310	Introduction to Politics ⁺³	3
Civil Upper Division Technical Elective ³		3
Emphasis Elective #3		3
Spring		
EL 4396	CD II: Develop & Evaluation ⁺¹	3
POLS 2311	American Gover & Politics ⁺³	3
Creative Arts Elective ⁺		3
Civil Upper Division Technical Elective ³		3
Emphasis Elective #4		3

Notes:

+ Grade of C or better required

1 Engineering Leadership courses must be taken in order shown unless approved by department Chair.

2 IE 3373 may be substituted with department approval

3 Prerequisites for non-Engineering Leadership courses can be found in the catalog

‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.

Total Hours**125****BS Engineering Innovation and Leadership: Computer Science**

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
COMPUTER SCIENCE CONCENTRATION (Starting with Calculus)		
FRESHMAN		
Fall		
EL 1301	Eng Innovation and Leadership	3
HIST 1301	History of U.S. to 1865 ⁺³	3
MATH 1411	Calculus I ^{+‡}	4
RWS 1301	Rhetoric & Composition I ⁺³	3
Emphasis Elective		3
Spring		
EL 1302		
RWS 1302	Rhetoric & Composition 2 ⁺³	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
CHEM 1305	General Chemistry ⁺	3
MATH 1312	Calculus II ⁺	3
SOPHOMORE		
Fall		
CS 1401	Intro to Computer Science	4
EL 2301	Modeling and Simulation ⁺	3
HIST 1302	History of U.S. Since 1865 ⁺³	3
MATH 2300	Discrete Mathematics	3
PHYS 2321	Introductory Electromagnetism	3

PHYS 2121	Laboratory for PHYS 2321	1
Spring		
CE 2326	Econ for Engrs & Scientists ⁺³	3
CS 2401	Elem. Data Struct./Algorithms	4
EL 3302	Engineering Measurements ⁺¹	3
EL 3373	Eng Prob. & Statistical Models ⁺²	3
or IE 3373	Engr Probability & Stat Models	
or EE 3384	Intro to Prob. w/ App. in ECE	
MME 2434	Mechanics of Materials	4
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
CE 2338	Mechanics II (Dynamics) ⁴	3
or MECH 2340	Mechanics II -Dynamics	
CS 2302	Data Structures	3
EL 3331	Engr Design:People to Products ¹⁺	3
MATH 2326	Differential Equations ⁺	3
MME 2303	Intro to Materials Sci & Engrg	3
Spring		
COMM 1302	Business/Profession Comm ⁺³	3
EL 3332	Engr Entr: Products to People	3
MATH 3323	Matrix Algebra ⁺	3
MECH 2311	Intro to Thermal-fluid Sci ³	3
POLS 2310	Introduction to Politics ⁺³	3
Emphasis Elective		3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		
CE 2377	Electro Mechanical Systems ³	3
or IE 2377	Electro-Mechanical Systems	
or MECH 2342	Electro Mechanical Systems	
EL 4395	CD I:Definition & Exploration ⁺¹	3
PHIL 2306	Ethics ⁺³	3
POLS 2311	American Gover & Politics	3
CS Upper Division Elective ³		3
Spring		
EL 4171	Eng Ed and Lead Problems	1
EL 4396	CD II: Develop & Evaluation ⁺¹	3
Creative Arts ⁺		3
CS Upper Division Elective ³		3
CS Upper Division Elective ³		3

Notes:

+ Grade of C or better required

1 Engineering Leadership courses must be taken in order shown unless approved by department Chair.

2 IE 3373 may be substituted with department approval

3 Prerequisites for non-Engineering Leadership courses can be found in the catalog

‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.

Total Hours**124**

BS Engineering Innovation and Leadership: Electrical Engineering

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
ELECTRICAL ENGINEERING CONCENTRATION (Starting with Calculus)		
FRESHMAN		
Fall		
CHEM 1305	General Chemistry ⁺	3
EL 1405	⁺	4
MATH 1411	Calculus I ^{+‡}	4
RWS 1301	Rhetoric & Composition I ⁺³	3
UNIV 1301	Seminar/Critical Inquiry ⁺	3
Spring		
EL 1302	1 ⁺	3
MATH 1312	Calculus II ⁺	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺³	3
Creative Arts Elective ⁺		3
SOPHOMORE		
Fall		
CS 1320	Computer Programming Sci/Engr	3
EL 2301	Modeling and Simulation ⁺	3
HIST 1301	History of U.S. to 1865 ⁺³	3
MATH 2313	Calculus III ⁺	3
PHYS 2321	Introductory Electromagnetism	3
PHYS 2121	Laboratory for PHYS 2321	1
Spring		
CE 2326	Econ for Engrs & Scientists ⁺³	3
EE 2372	Software Design I ⁺	3
EL 3302	Engineering Measurements ⁺¹	3
HIST 1302	History of U.S. Since 1865 ⁺³	3
MATH 2326	Differential Equations ⁺	3
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
EE 2350	Electric Circuits I ⁺	3
EL 3331	Engr Design:People to Products ¹⁺	3
EL 3373	Eng Prob. & Statistical Models ²	3
MATH 3323	Matrix Algebra ⁺	3
Emphasis Elective #1		3
Spring		
EE 2351	Electric Circuits II ⁺	3
EE 2369 & EE 2169	Digital Systems Design I and Laboratory for EE 2369 ⁺	4
EL 3304	Engr Design:Products to People ¹⁺	3
PHIL 2306	Ethics ⁺³	3
Emphasis Elective #2		3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		

EE 2353	Cont. Time Signals & Systems	3
EL 4395	CD I:Definition & Exploration ⁺¹	3
POLS 2310	Introduction to Politics ⁺³	3
Upper Division Technical Elective ^{3,4}		3
Emphasis Elective #3		3
Spring		
EL 4396	CD II: Develop & Evaluation ⁺¹	3
POLS 2311	American Gover & Politics ⁺³	3
Upper Division Technical Elective ^{3,4}		3
Upper Division Technical Elective ^{3,4}		3
Emphasis Elective #4		3

Notes:

+ Grade of C or better required

1 Engineering Leadership courses must be taken in order shown unless approved by department Chair.

2 IE 3373 may be substituted with department approval

3 Prerequisites for non-Engineering Leadership courses can be found in the catalog

4 Students must take 6 credit hours from the list (EE 3321, EE 3329, EE 3338 & EE 3138, EE 3340, EE 3376 & EE 3176, EE 3384, EE 3353)

‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.

Total Hours**125****BS Engineering Innovation and Leadership: Engineering Innovation**

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
ENGINEERING INNOVATION CONCENTRATION (Starting with Calculus)		
FRESHMAN		
Fall		
EL 1301	Eng Innovation and Leadership	3
HIST 1301	History of U.S. to 1865 ⁺¹	3
MATH 1411	Calculus I ^{+‡}	4
RWS 1301	Rhetoric & Composition I ⁺¹	3
Emphasis Elective		3
Spring		
CHEM 1305	General Chemistry ⁺¹	3
EL 1302	+	3
MATH 1312	Calculus II ⁺	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺¹	3
SOPHOMORE		
Fall		
EL 2301	Modeling and Simulation ⁺	3
HIST 1302	History of U.S. Since 1865 ⁺¹	3
MATH 2313	Calculus III ⁺	3
MME 2303	Intro to Materials Sci & Engrg	3
PHYS 2321	Introductory Electromagnetism	3
PHYS 2121	Laboratory for PHYS 2321	1
Spring		
CE 2326	Econ for Engrs & Scientists ⁺¹	3
EL 3302	Engineering Measurements ⁺	3
EL 3373	Eng Prob. & Statistical Models ⁺	3
MME 2434	Mechanics of Materials	4

MATH 2326	Differential Equations ⁺	3
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
CE 2338 or MECH 2340	Mechanics II (Dynamics) Mechanics II -Dynamics	3
CE 2377 or IE 2377 or MECH 2342	Electro Mechanical Systems Electro-Mechanical Systems Electro Mechanical Systems	3
EL 3331	Engr Design:People to Products ⁺	3
MATH 3323	Matrix Algebra ⁺	3
Emphasis Elective #1		3
Spring		
CS 1320	Computer Programming Sci/Engr ¹	3
EL 3332	Engr Entr: Products to People ⁺	3
MECH 2311	Intro to Thermal-fluid Sci	3
Eng. Technical Elective ¹		3
Emphasis Elective #2		3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		
EL 4395	CD I:Definition & Exploration ⁺	3
PHIL 2306	Ethics ⁺¹	3
POLS 2310	Introduction to Politics ⁺¹	3
Eng. Technical Elective ¹		3
Emphasis Elective #3		3
Spring		
EL 4396	CD II: Develop & Evaluation ⁺	3
POLS 2311	American Gover & Politics ⁺¹	3
Creative Arts Elective ⁺		3
Eng. Technical Elective ¹		3
Emphasis Elective #4		3
Notes:		
+ Grade of C or better required		
‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.		
¹ Prerequisites for non-Engineering Leadership courses can be found in the catalog.		
Total Hours		124

BS Engineering Innovation and Leadership: Mechanical Engineering

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
MECHANICAL ENGINEERING CONCENTRATION (Starting with Calculus)		
FRESHMAN		
Fall		
EL 1405	‡	4
MATH 1411	Calculus I ⁺	4
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1301	Rhetoric & Composition I ⁺³	3

UNIV 1301	Seminar/Critical Inquiry ⁺	3
Spring		
EL 1302	1+	3
MATH 1312	Calculus II ⁺	3
MECH 1321	Mechanics I-Statics ⁺	3
PHYS 2321	Introductory Electromagnetism	3
PHYS 2121	Laboratory for PHYS 2321	1
RWS 1302	Rhetoric & Composition 2 ⁺³	3
SOPHOMORE		
Fall		
CHEM 1305	General Chemistry	3
EL 2301	Modeling and Simulation ⁺	3
HIST 1301	History of U.S. to 1865 ⁺³	3
MATH 2313	Calculus III ⁺	3
MECH 2311	Intro to Thermal-fluid Sci ⁺	3
Spring		
CE 2326	Econ for Engrs & Scientists ⁺³	3
EL 3302	Engineering Measurements ⁺¹	3
HIST 1302	History of U.S. Since 1865 ⁺³	3
MATH 2326	Differential Equations ⁺	3
MECH 2322	Mechanics of Materials ⁺	3
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
EL 3331	Engr Design:People to Products ¹⁺	3
EL 3373	Eng Prob. & Statistical Models ²	3
MATH 3323	Matrix Algebra ⁺	3
MECH 2340	Mechanics II -Dynamics	3
MECH 2103	Engineering Computations	1
Emphasis Elective		3
Spring		
CS 1320	Computer Programming Sci/Engr	3
EL 3304	Engr Design:Products to People ¹⁺	3
EL 3332	Engr Entr: Products to People	3
MECH 3312	Thermodynamics ⁺	3
PHIL 2306	Ethics ⁺²	3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		
EL 4395	CD I:Definition & Exploration ⁺¹	3
MECH 2311	Intro to Thermal-fluid Sci	3
MECH 3314	Fluid Mechanics	3
POLS 2310	Introduction to Politics ⁺³	3
Creative Arts Elective ⁺		3
Spring		
EL 4396	CD II: Develop & Evaluation ⁺¹	3
MECH 4315	Heat Transfer	3
POLS 2311	American Gover & Politics ⁺³	3
MECH Concentration Elective ^{3,4}		3
Emphasis Elective		3

Notes:

+ Grade of C or better required

1 Engineering Leadership courses must be taken in order shown unless approved by department Chair.

2 IE 3373 may be substituted with department approval

3 Prerequisites for non-Engineering Leadership courses can be found in the catalog

4 Choose one from: MECH 3345; MECH 3334; AERO 3312; AERO 3343; AERO 3323, or EL 4393

‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.

Total Hours**125****BS Engineering Innovation and Leadership: Metallurgical and Materials Engineering**

Code	Title	Hours
BACHELOR OF SCIENCE IN ENGINEERING INNOVATION AND LEADERSHIP		
METALLURGICAL AND MATERIALS ENGINEERING CONCENTRATION (Starting with Calculus)		
FRESHMAN		
Fall		
EL 1301	Eng Innovation and Leadership	3
HIST 1301	History of U.S. to 1865 ⁺³	3
MATH 1411	Calculus I ^{+‡}	4
RWS 1301	Rhetoric & Composition I ⁺³	3
MME Elective		3
Spring		
CHEM 1305	General Chemistry ⁺	3
EL 1302		
MATH 1312	Calculus II ⁺	3
PHYS 2320	Introductory Mechanics	3
PHYS 2120	Laboratory for PHYS 2320	1
RWS 1302	Rhetoric & Composition 2 ⁺³	3
SOPHOMORE		
Fall		
EL 2301	Modeling and Simulation	3
HIST 1302	History of U.S. Since 1865 ⁺³	3
MATH 2313	Calculus III ⁺	3
MME 2303	Intro to Materials Sci & Engrg	3
PHYS 2321	Introductory Electromagnetism	3
PHYS 2121	Laboratory for PHYS 2321	1
Spring		
CE 2326	Econ for Engrs & Scientists ⁺³	3
EL 3302	Engineering Measurements ⁺¹	3
EL 3373	Eng Prob. & Statistical Models ⁺²	3
or IE 3373	Engr Probability & Stat Models	
or EE 3384	Intro to Prob. w/ App. in ECE	
MME 2434	Mechanics of Materials	4
MATH 2326	Differential Equations ⁺	3
JUNIOR		
Summer		
EL 3003	Professional Practice I	0
Fall		
CE 2377	Electro Mechanical Systems ³	3
or IE 2377	Electro-Mechanical Systems	
or MECH 2342	Electro Mechanical Systems	
EL 3331	Engr Design:People to Products ⁺¹	3

MATH 3323	Matrix Algebra ⁺	3
Emphasis Elective #1		3
Emphasis Elective #2		3
Spring		
CS 1320	Computer Programming Sci/Engr ³	3
EL 3332	Engr Entr: Products to People ⁺¹	3
MME 2305	Material & Energy Balance	3
Emphasis Elective #3		3
MME Elective		3
SENIOR		
Summer		
EL 3005	Professional Practice II	0
Fall		
EL 4395	CD I:Definition & Exploration ⁺¹	3
PHIL 2306	Ethics ⁺³	3
POLS 2310	Introduction to Politics ⁺	3
Emphasis Elective #4		3
MME Elective		3
Spring		
EL 4396	CD II: Develop & Evaluation ⁺¹	3
MME 4316	Failure Analysis	3
POLS 2311	American Gover & Politics ⁺	3
Creative Arts Elective ⁺		3
Emphasis Elective #5		3
Notes:		
+ Grade of C or better required		
‡ If taking Pre-Calculus first, it is recommended to take MATH 1411 (Calculus I) in the Spring semester, and MATH 1312 (Calculus II) over the summer, to be on track for Engineering courses.		
1 Engineering Leadership courses must be taken in order shown unless approved by department Chair		
2 IE 3373 may be substituted with department approval		
3 Prerequisites for non-Engineering Leadership courses can be found in the catalog		
Total Hours		121