THE UNIVERSITY OF TEXAS AT EL PASO

Office of the Dean

College of Engineering

UNDERGRADUATE CURRICULUM CHANGE MEMO

Date: **April 13, 2020**

From: **Norman Love, Associate Dean for Academic Affairs and Undergraduate Studies, College of Engineering**

Through: **Louis Everett, Chair of Curriculum Committee, College of Engineering**

Through: **Patricia Nava, Interim Dean, College of Engineering** *Patricia A. Nava*

To: **Carla Ellis, Chair of University Curriculum Committee**

Proposal Title: Engineering Curriculum Change for the Fall 2020 Catalog

Explain the nature of the change and the rationale.

The Department of Civil Engineering proposes the following changes to the Bachelor of Science in Civil Engineering degree plan:

1. Addition of Designated Core Section
   Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study and to revise the Social and Behavioral Science (SBS) requirement. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the creation/modification of a Designated Core section in order to have specific courses included in a students' financial aid is proposed. This includes the addition of MATH 1508 or MATH 1310, CE 2326 to correct prerequisite requirements for SBS, and other courses listed below.

   Courses added to Designated Core Section for Civil Engineering: MATH 1508 or MATH 1310, CE 2326 Economy for Engineers and Scientists, CS 1320 Computer Programming for Engineers, CHEM 1105 Laboratory for General Chemistry, CHEM 1305 General Chemistry, and PHYS 2420 Introductory Mechanics.

   Courses added to Designated Core Section for Construction Engineering Management: MATH 1508 or MATH 1310, CE 2326 Economy for Engineers and Scientists, COMM 1302 Business and Professional Communication, GEOL 1111 Principles of Earth Science Lab, GEO 1211 Principles of Earth Sciences, and UNIV 1301 Seminar for Critical Inquiry

2. Modification of Prerequisites Section
   Rationale: The prerequisite courses now reflect changes for courses moved into the Designated Core area

The Department of Computer Science proposes the following changes to the Bachelor of Science in Computer Science degree plan:

Addition of Designated Core Section
Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study requirement. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the modification of a Designated Core section in order to have specific courses included in a students' financial aid. This includes the addition of MATH 1508 or MATH 1310 and other course listed below.

Courses added to Designated Core Section for Computer Science: MATH 1508 or MATH 1310 and PHYS 2420 Introductory Mechanics.

The Department of Electrical and Computer Engineering proposes the following changes to the Bachelor of Science in Electrical Engineering degree plan:

1. Addition of Designated Core Section
   Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study and to revise the Social and Behavioral Science (SBS) requirement. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the creation/modification of a Designated Core section in order to have specific courses included in a students' financial aid is proposed. This includes the addition of MATH 1508 or MATH 1310, CE 2326 to correct prerequisite requirements for SBS, and other courses listed below.

   Courses added to Designated Core Section for Electrical Engineering: MATH 1508 or MATH 1310, CE 2326 Economy for Engineers and Scientists, CS 1320 Computer Programming for Engineers, PHYS 2420 Introductory Mechanics, and PHYS 2421 Fields and Waves.

2. Modification of Prerequisites Section
   Rationale: The prerequisite courses now reflect changes for courses moved into the Designated Core area

The Department of Engineering Education and Leadership proposes the following changes to the Bachelor of Science in Engineering Innovation and Leadership degree plan:

Changes to Designated Core Section
Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the modification of a Designated Core section in order to have specific courses included in a students' financial aid is proposed. This includes the addition of MATH 1508 or MATH 1310 and other courses listed below.

Courses in the Designated Core Section for Engineering Innovation and Leadership: MATH 1508 or MATH 1310, CE 2326 Economy for Engineers and Scientists, CS 1320 Computer Programming for Engineers or COMM 1302 Business and Professional Communication, PHYS 2420 Introductory Mechanics, PHYS 2421 Fields and Waves, and UNIV 1301 Seminar for Critical Inquiry

The Department of Industrial, Manufacturing and Systems Engineering proposes the following changes to the Bachelor of Science in Industrial and Systems Engineering degree plan:

1. Addition of Designated Core Section
   Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study and to revise the Social and Behavioral Science (SBS) requirement. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the creation of a Designated Core section in order to have specific courses included in a students' financial aid is proposed. This includes the addition of MATH 1508 or MATH 1310, CE 2326 to correct prerequisite requirements for SBS, and other courses listed below.

   Courses added to Designated Core Section for Industrial and Systems Engineering: MATH 1508 or MATH 1310, CE 2326 Economy for Engineers and Scientists, CHEM 1105 Laboratory for General Chemistry, CHEM 1305 General Chemistry, and PHYS 2420 Introductory Mechanics

2. Modification of Prerequisites Section
   Rationale: The prerequisite courses now reflect changes for courses moved into the Designated Core area, this includes addition of MATH 1411 to this section.

The Department of Mechanical Engineering proposes the following changes to the Bachelor of Science in Mechanical Engineering degree plan:

1. Addition of Designated Core Section
   Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study and to revise the Social and Behavioral Science (SBS) requirement. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the creation/modification of a Designated Core section in order to have specific courses included in a students' financial aid is proposed. This includes the addition of MATH 1508 or MATH 1310, CE 2326 to correct prerequisite requirements for SBS, and other courses listed below.

   Courses added to Designated Core Section for Mechanical Engineering: MATH 1508 or MATH 1310, CE 2326 Economy for Engineers and Scientists, CHEM 1105 Laboratory for General Chemistry, CHEM 1305 General Chemistry, and PHYS 2420 Introductory Mechanics.

2. Modification of Prerequisites Section
   Rationale: The prerequisite courses now reflect changes for courses moved into the Designated Core area

The Department of Metallurgical, Materials, and Biomedical Engineering proposes the following changes to the Bachelor of Science in Metallurgical and Materials Engineering degree plan:

1. Addition of Designated Core Section
   Rationale: To organize all Bachelor of Science in Engineering degrees to comply with Program of Study and to revise the Social and Behavioral Science (SBS) requirement. Program of Study limits federal financial aid to courses in a student's degree plan. Thus, the creation/modification of a Designated Core section in order to have specific courses included in a students' financial aid is proposed. This includes the addition of MATH 1508 or MATH 1310, CE 2326 to correct prerequisite requirements for SBS, and other courses listed below.

   Courses added to Designated Core Section for Metallurgical and Materials Engineering: MATH 1508 or MATH 1310, CHEM 1305 General Chemistry, CHEM 1306 General Chemistry II, and CE 2326 Economy for Engineers and Scientists

2. Modification of Prerequisites Section
   Rationale: The prerequisite courses now reflect changes for courses moved into the Designated Core area

   The details of the changes are provided on the following pages.

From:	Everett, Louis
To:	Granda, Virginia D
Subject:	RE: Approval for Proposals Discussed in COECC April 20, 2020
Date:	Monday, April 20, 2020 4:06:17 PM
Attachments:	image001.png

All of these proposals were approved this morning.

From: Granda, Virginia D
Sent: Monday, April 20, 2020 3:51 PM
To: Everett, Louis <leverett@utep.edu>
Subject: Approval for Proposals Discussed in COECC April 20, 2020

Dr. Everett,

Attached are all of the proposals that were discussed during our COECC meeting this morning.

As you know, the proposals were approved unanimously by the COECC members.

In lieu of your signature, can you please confirm the attached proposals were approved by the COECC committee on April 20, 2020?

Best Regards,

Virginia

Virginia Granda-Becker
Coordinator of Undergraduate Studies

College of Engineering
The University of Texas at El Paso
500 W. University Ave.
El Paso, TX 79968
Office: 915-747-8011
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Date: April 16, 2020

From: Dr. Toni Blum
Associate Provost, Institutional Effectiveness
Office of the Provost
The University of Texas at El Paso

To: Dr. Norman Love
Associate Dean for Undergraduate Studies and Academic Affairs
College of Engineering
The University of Texas at El Paso

Subject: Engineering SCH for Program of Study

The purpose of this memo is to support the proposed changes made to engineering programs to address concerns related to Program of Study.

Engineering programs propose to add MATH 1508 or MATH 1310 within the Designated Core section of each program. This addition will not displace any course from the degree plan, but students may have to take more than the approved SCH for the degree with the addition of MATH 1411 as a required course in the Program Core. Typically, a student must be able to complete the degree within the number of SCH approved for the program. However, depending on the courses selected by the student the number of SCH may exceed this amount, which is allowed. The below table shows the number of SCH a student may be expected to take with the addition of MATH 1411 to the Program Core section.

As part of these changes, if students do not need MATH 1508 or MATH 1310 they can use MATH 1411 to satisfy the Math component in the core.

BS in Civil Engineering

Degree Plan

Required Credits: 128

Students are expected to satisfy all prerequisites and corequisites for all required and elective courses at the time of registration.

Code	Title	Hours
University Core Curriculum(All courses require a grade of C or better.)		
Complete the University Core Curriculum requirements.		42
Civil Engineering ~~Prerequisites~~ Designated Core (All courses require a grade of C or better.)		
Required courses:		
CE 2326	Econ for Engrs & Scientists	
CHEM 1105	Laboratory for CHEM 1305	
CHEM 1305	General Chemistry	
CS 1320	Computer Programming Sci/Engr	
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	
PHYS 2420	Introductory Mechanics	
Civil Engineering Core (All courses require a grade of C or better.)		
Required Courses:		
CE 1301	Civil Engineering Fundamentals	3
CE 1313	Engineering Measurements	3
CE 2315	Statics	3
CE 2334	Mechanics of Materials	3

Code	Title	Hours
CE 2335	Geological Engineering	3
CE 2338 or PHYS 3331	Mechanics II (Dynamics) Thermal Physics	3
CE 2343	Structural Analysis	3
CE 2373	Engr Probability & Statistics	3
CE 2375	Intro to Fluid Mechanics	3
CE 2385	Environmental Engr Fundamental	3
MATH 1411	Calculus	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
Civil Engineering Major		
Required Courses:		
CE 3334	Construction Management	3
CE 3336	Civil Engineering Materials	3
CE 3342	Water & Waste Water Engr	3
CE 3345	Design of Concrete Structures	3
CE 3348	Geotechnical Engineering	3
CE 3361	Design of Steel Structures	3
CE 3456	Hydrology & Hydraulic Engr	4
CE 4188	Senior Design I	1
CE 4195	Jr.Professional Orientation	1
CE 4288	Senior Design II	2

Code	Title	Hours
CE 4339	Geostructural Design	3
CE 4340	Transportation Engineering	3
CE 4375	Adv. Topics in Civil Engr.	3
CE 4376	Adv Topics in Civ Engr II	3
Lower Division Technical Elective:		
Select on course from the following (Only 3 hours apply towards the requirement):		3
BIOL 1305	General Biology	
CHEM 1306	General Chemistry	
MATH 3323	Matrix Algebra	
PHYS 2421	Introductory Electromagnetism	
Upper Division Technical Elective:		
Select one course from the followting or any other upper division course from the College of Engineering (excluding CE) or College of Science (Only 3 hours apply towards the requirement).		3
ACCT 2301	Principles of Accounting I	
CE 4377	Adv Topics in Civil Engr III	
CHEM 1306	General Chemistry	
MATH 3323	Matrix Algebra	
POLS 3350	Intro to Public Administration	
POLS 3351	The Public Policy Process	
POLS 4359	Urban Planning	
RWS 3359	Technical Writing	
Total Hours		**128**

BS in Construction Engineering & Management

Degree Plan

Required Credits: 120

Course List

Code	Title	Hours
University Core Curriculum (All courses require a grade of C or better.)		
Complete the University Core Curriculum requirements.		42
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 1~~1~~3065	~~Laboratory for~~General CHEM 1306~~5~~	1
COMM 1302	Business/Profession Comm	3
GEOL 1111	Principles of Earth Sci - Lab	1
GEOL 1211	Principles of Earth Sciences	2
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	5-3
~~MATH 1411~~	~~Calculus I~~	~~4~~
UNIV 1301	Seminar/Critical Inquiry	3
Foundational Math & Science		
Required Courses:		
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
Construction Engineering & Management (Lower) (All courses require a grade of C or better.)		
Required Courses:		
ACCT 2301	Principles of Accounting I	3
CE 1301	Civil Engineering Fundamentals	3
CE 1313	Engineering Measurements	3
CE 2315	Statics	3
CE 2334	Mechanics of Materials	3
CE 2335	Geological Engineering	3
CE 2343	Structural Analysis	3
CE 2373	Engr Probability & Statistics	3
CE 2375	Intro to Fluid Mechanics	3

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Course List

Code	Title	Hours
Construction Engineering & Management (Upper)		
Required Courses:		
BLAW 3301	Legal Environment of Business	3
CE 3334	Construction Management	3
CE 3336	Civil Engineering Materials	3
CE 3348	Geotechnical Engineering	3
CE 4158	Constr Methods & Matrls Lab	1
CE 4188	Senior Design I	1
CE 4288	Senior Design II	2
CE 4339	Geostructural Design	3
CE 4354	Electrical & Mech Construction	3
CE 4358	Construction Methods & Materls	3
CE 4382	Constr. Cost Analys. & Bidding	3
CE 4385	Construction Internship	3
CE 4386	Construction Law & Ethics	3
CE 4387	Construction Scheduling	3
CE 4389	Construction Safety	3
FIN 3310	Business Finance	3
Total Hours		120

C Courses require a grade of C or better.

BS in Computer Science

Degree Plan

Required Credits: 120

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Computer Science Designated Core (All courses require a grade of C or better.)		
Required Courses:		
MATH 1508 or MATH 1310(Listed if completed, but not required)	Precalculus or Trigonometry and Conics	5-3
PHYS 2420	Introductory Mechanics	4
~~MATH 1411~~	~~Calculus I~~	~~4~~
~~Select one of the following lecture/lab combinations:~~		~~4~~
~~BIOL 1305 & BIOL 1107~~	~~General Biology and Topics in Study of Life I~~	
~~BIOL 1306 & BIOL 1108~~	~~Organismal Biology and Organismal Biology Laboratory~~	
~~ASTR 1307 & ASTR 1107~~	~~Elem Astronomy-Solar System and Astronomy Lab I~~	
~~CHEM 1305 & CHEM 1105~~	~~General Chemistry and Laboratory for CHEM 1305~~	
~~CHEM 1306 & CHEM 1106~~	~~General Chemistry and Laboratory for CHEM 1306~~	

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Code	Title	Hours
~~GEOL 1313 & GEOL 1103~~	~~Intro to Physical Geology and Lab for GEOL 1313~~	
~~GEOL 1314 & GEOL 1104~~	~~Intro to Historical Geol and Lab for GEOL 1314~~	
~~PHYS 2421~~	~~Introductory Electromagnetism~~	
Computer Science Additional Science Hours (All courses require a grade of C or better.)		
Select one of the following lecture/lab combinations:		4
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I	
BIOL 1306 & BIOL 1108	Organismal Biology and Organismal Biology Laboratory	
ASTR 1307 & ASTR 1107	Elem Astronomy-Solar System and Astronomy Lab I	
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	
CHEM 1306 & CHEM 1106	General Chemistry and Laboratory for CHEM 1306	
GEOL 1313 & GEOL 1103	Intro to Physical Geology and Lab for GEOL 1313	
GEOL 1314 & GEOL 1104	Intro to Historical Geol and Lab for GEOL 1314	
PHYS 2421	Introductory Electromagnetism	

Code	Title	Hours
Computer Science Core (All courses require a grade of C or better.)		
Required Courses:		
CS 1301 & CS 1101	Intro to Computer Science and Intro to Computer Science Lab	4
CS 2302	Data Structures	3
CS 2401	Elem. Data Struct./Algorithms	4
EE 2169	Laboratory for EE 2369	1
EE 2369	Digital Systems Design I	3
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2300 or CS 2101 & CS 2202	Discrete Mathematics Discrete Structures I & Discrete Structures II	3
Computer Science Major		
Required Courses:		
CS 3195	Junior Professionl Orientation	1
CS 3331	Adv. Object-Oriented Programng [C]	3
CS 3350	Automata/Computabi/Formal Lang	3
CS 3360	Design/Implementation Prog Lan	3
CS 3432	Comp Arch I: Comp Org/Design [C]	4

Code	Title	Hours
CS 4175	Parallel Computing	1
CS 4310	Software Eng: Requirements Eng [C]	3
CS 4311	Software Eng: Design & Implmnt	3
CS 4342	Data Base Management	3
CS 4375	Theory of Operating Systems	3
MATH 3323	Matrix Algebra	3
Statistics:		
Select one of the following:		3
EE 3384	Probabilistic Methods-Engr/Sci	
STAT 3320	Probability and Statistics	
STAT 3330	Probability	
Additional Mathematics or Science Option:		
Option A: Mathematics		
MATH 2313	Calculus III	
MATH 2325	Intro. to Higher Mathematics	
MATH 2326	Differential Equations	
MATH 3320	Actuarial Mathematics	
MATH 3325	Principles of Mathematics	
MATH 4329	Numerical Analysis	
STAT 3381	Nonparametric Statistics	
STAT 4380	Statistics I	

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Code	Title	Hours
STAT 4385	Applied Regression Analysis	
Option B: An additional 3 credit lecture course from the list of science courses above		
Technical Electives:		
Select 15 hours from the following: [1]		15
~~Free Electives:~~		
CS 1110	Introduction to Problem Solving	1
CS 1120	Computational Thinking in Problem Solving	1
CS 2210	Algorithmic Thinking in Problem Solving	2
CS 1190	Special Topics in Computing	1
CS 1290	Special Topics in Computing	2
CS 3000 or 4000 level course		
Free Electives:		
Complete three~~four~~ additional hours of free electives [2]		3~~4~~
Total Hours		**120**

Course List

C Courses require a grade of C or better.

1 ~~No more than six credit hours of CS xx90, CS 4181 Undergraduate Seminar, CS 4371 Computer Science Problems, CS 4X73, CS 4392 Rsrch Methods/Computer Science and/or CS 4393 Senior Project (in any combination) can count for technical electives.~~ CS 1110, CS 1120, CS 2210, CS 1190, CS 1290, CS 3000 or 4000 level course. No more than three credit hours of CS 1xxx and CS 2xxx can count for technical electives. No more than six credit hours of CS 1xxx, CS 2xxx, CS 4390, CS 4181, CS 4371, CS 4x73, CS 4392 and/or CS 4393 (in any combination) can count for technical electives.

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Commented [GVD1]: Do we need to add CS 1110, CS 1120 & CS 2210 to this list

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Code	Title	Hours

[2] Courses that may be counted towards the free elective requirements are college-level courses offered by the college of Liberal Arts, Business, Science, or Engineering. Remedial courses cannot be counted as a free elective.

BS in Electrical Engineering

Degree Plan

BS in Electrical Engineering with Concentration

Required Credits: 128

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Concentration Required		
This program requires the selection of a concentration.		
Electrical Engineering ~~Prerequisites~~ Designated Core (All courses require a grade of C or better.)		
Required Courses:		
CE 2326	Econ for Engrs & Scientists	3
CS 1320	Computer Programming Sci/Engr	3
PHYS 2420	Introductory Mechanics	4
PHYS 2421	Introductory Electromagnetism	4
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	5-3
~~MATH 1411~~	~~Calculus I~~	~~4~~
Electrical Engineering Core (Lower) (All courses require a grade of C or better.)		
Required Courses:		
EE 1105	Lab for EE 1305	1

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Code	Title	Hours
EE 1305	Intro to Electrical Engineer	3
EE 2151	Lab for EE 2351	1
EE 2169	Laboratory for EE 2369	1
EE 2350	Electric Circuits I	3
EE 2351	Electric Circuits II	3
EE 2353	Cont. Time Signals & Systems	3
EE 2369	Digital Systems Design I	3
EE 2372	Software Design I	3
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
Select one of the following:		
BIOL 1305	General Biology	3
CHEM 1305	General Chemistry	3
MATH 2300	Discrete Mathematics	3
Electrical Engineering Core (Upper)		
Required Courses:		
EE 3138	Lab for Electrical Engr 3338 [C]	1
EE 3176	Laboratory For EE 3376 [C]	1

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Code	Title	Hours
EE 3195	Junior Professional Orientat [C]	1
EE 3321	Electromagnetic Field Theory [C]	3
EE 3325	Applied Quantum Mech for EE [C]	3
EE 3329	Fund. of Semiconductor Dev	3
EE 3338	Electronics I [C]	3
EE 3340	Electronics II [C]	3
EE 3353	Discrete Time Signals & System [C]	3
EE 3376	Microprocessor Systems I [C]	3
EE 3384	Probabilistic Methods-Engr/Sci [C]	3
EE 4220	Senior Project Lab I [C]	2
EE 4230	Senior Project Lab II	2
MATH 3323	Matrix Algebra [C]	3
Select one of the following:		1
EE 3154	Laboratory for EE 3354	
EE 3193	Undergraduate Service Learning	
EE 3194	Undergraduate Research	
EE 4142	Laboratory For EE 4342	
EE 4153	Lab for EE 4353	

Code	Title	Hours
EE 4171	Engineering Problems	
EE 4178	Laboratory For EE 4378	
EE 4181	Co-op Work Experiences	
EE 4182	Co-op Work Experiences	
EE 4183	Co-op Work Experiences	
EE 4185	Biomedical Instrumentation Lab	
EE 4193	Undergrad Services Learning	
EE 4194	Undergraduate Research	
EE 4195	Senior Professional Orientat	
Professional Options:		
Select three hours of technical electives approved by the department advisor:		3
Concentration		
Complete one of the following concentrations		12
Total Hours		**128**

Course List

C Courses require a grade of C or better.

Concentration in Computer Engineering

Code	Title	Hours
Computer Engineering Concentration		

Code	Title	Hours
A student must take four courses as described in the concentration course list, available from the advisor.		12
Total Hours		**12**

Course List

Concentration in Fields and Devices

Code	Title	Hours
Fields and Devices Engineering Concentration		
A student must take four courses as described in the concentration course list, available from the advisor.		12
Total Hours		**12**

Course List

Concentration in General Electrical Engineering

Code	Title	Hours
General Electrical Engineering Concentration		
A student must take four courses as described in the concentration course list, available from the advisor.		12
Total Hours		**12**

Course List

Concentration in Power and Energy Systems Engineering

Code	Title	Hours
Power and Energy Systems Engineering Concentration		
A student must take four courses as described in the concentration course list, available from the advisor.		12
Total Hours		**12**

Code	Title	Hours
Course List		

Concentration in Biomedical Engineering

Code	Title	Hours
Biomedical Engineering Concentration		
A student must take four courses as described in the concentration course list, available from the advisor.		12
Total Hours		**12**

Course List

Concentration in Signal Processing, Systems and Communications

Code	Title	Hours
Signal Processing, Systems and Communications Engineering Concentration		
A student must take four courses as described in the concentration course list, available from the advisor.		12
Total Hours		**12**

Course List

BS in Engineering Innovation and Leadership

Degree Plan

Required Credits: 125

Code	Title	Hours
Complete the University Core Curriculum		42
Complete the University Core Curriculum requirements.		
Designated Core		
CE 2326	Econ for Engrs & Scientists	
CS 1320 or	Computer Programming Sci/Engr	
COMM 1302 (for CS Concentration)	Business/Profession Comm	
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	
~~MATH 1411~~	~~Calculus I~~	
PHIL 2306	Ethics	
PHYS 2420	Introductory Mechanics	
PHYS 2421	Introductory Electromagnetism	
UNIV 1301	Seminar/Critical Inquiry	
Foundation Math/Sci		
CHEM 1305	General Chemistry	3

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Code	Title	Hours
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2300	Discrete Mathematics (For CS sequence only)	3
or MATH 2313	Calculus III	
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		
EL 1302	Intro to Eng Design & Leadshp	3
EL 1405	Fund of Engr Lead and Graphics	4
EL 2301	Modeling and Simulation	3
EL 3302	Engineering Measurements	3
EL 3003	Professional Practice I	0
EL 3005	Professional Practice II	0
EL 3331	Engr Design:People to Products	3

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Code	Title	Hours
EL 3332	Engr Entr: Products to People	3
EL 3373	Eng Prob. & Statistical Models	3
EL 4395	CD I:Definition & Exploration	3
EL 4396	CD II: Develop & Evaluation	3
Total Hours		

Course List

Sequences

Choose one of the following six sequences

~~General~~ Engineering Innovation ~~Sequence~~ Concentation

Code	Title	Hours
~~General~~ Engineering Innovation ~~Sequence~~ Concentration Required Courses		
CE 2338 or MECH 2340	Mechanics II (Dynamics)	3
CE 2377 or IE 2377 or MECH 2342	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

Code	Title	Hours
Upper Division Engineering/Technical Electives		
9 credit hours approved by advisor		
~~Concentration~~ Emphasis Courses		
A student must take twelve (12) credit hours of courses approved by the department.		
Total Hours		**37**

Course List

Computer Science ~~Sequence~~Concentration

Code	Title	Hours
Computer Science ~~Sequence~~ Concentration Courses		
CS 1101	Intro to Computer Science Lab	1
CS 1301	Intro to Computer Science	3
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)	3

Code	Title	Hours
CE 2377 or IE 2377 or MECH 2342	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 Hours approved by the advisor		9
Total Hours		**37**

Course List

Electrical Engineering ~~Sequence~~Concentration

Code	Title	Hours
Electrical Engineering ~~Sequence~~ Concentration		
CS 1320	Computer Programming Sci/Engr	3
EE 2350	Electric Circuits I	3
EE 2351	Electric Circuits II	3
EE 2369 & EE 2169	Digital Systems Design I and Laboratory for EE 2369	4

Code	Title	Hours
EE 2372	Software Design I	3
EE 3321	Electromagnetic Field Theory	3
or EE 2353	Cont. Time Signals & Systems	
Upper Division Engineering Technical Electives		
Take 6 hours of EE Upper Division courses approved by advisor		6
~~Concentration~~ Sequence Courses		
A student must take twelve (12) credit hours of concentration courses approved by department.		
Total Hours		**37**

Course List

Biomedical Engineering ~~Sequence~~Concentration

Code	Title	Hours
Biomedical Engineering ~~Sequence~~ Concentration Required Courses		
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I	4
BIOL 2311 & BIOL 2111	Human Anat/Physiology I and Human Anat/Physio Lab I	4
BIOL 2313 & BIOL 2113	Human Anat/Physiology II and Human Anat/Physio Lab II	4

Code	Title	Hours
BME 3303	Fundamentals of BME I	3
BME 3305	Fundamentals of BME II	3
Additional required Courses		
CE 2338 or MECH 2340	Mechanics II (Dynamics)	3
CE 2377 or IE 2377 or MECH 2342	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		
3 credit hours of courses approved for BME minorApproved BME Elective		3
Total Hours		**37**

Course List

Metallurgical and Materials Engineering ~~Sequence~~ Concentration

Code	Title	Hours
Metallurgical and Materials Engineering ~~Sequence~~ Concentration Required Courses		

Code	Title	Hours
CE 2377 or IE 2377 or MECH 2342	Electro Mechanical Systems	3
MME 2303	Intro to Materials Sci & Engrg	3
MME 2305	Material & Energy Balance	3
MME 2434	Mechanics of Materials	4
MME 3309	Electronic Mat Sci & Tech	3
MME 3312	Biomat, Biomat Prntng & Dev	3
Upper Division Engineering Technical Electives		
MME 4309	Corrosion	3
MME 4316	Failure Analysis	3
~~Concentration~~ Emphasis Courses		
A student must take twelve (12) credit hours of concentration courses approved by department.		3
Total Hours		**37**

Course List

~~Engineering Mechanics~~Civil Engineering ~~Sequence~~Concentration

Code	Title	Hours
Engineering Mechanics ~~Sequence~~ 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)	3
CE 2375	Intro to Fluid Mechanics	3
CE 2377 or IE 2377 or MECH 2342	Electro Mechanical Systems	3
EL 4171	Eng Ed and Lead Problems	1
Upper Division Civil Engineering/Technical Elective		
6 credit hours approved by the department		3
~~Concentration~~ Emphasis Courses		
A student must take twelve (12) credit hours of concentration courses approved by the department.		
Total Hours		**37**

Course List

Addition of New Emphasis in Mechanical Engineering per Proposal Effective 2020-2021

BS in Industrial and Systems Engineering

Degree Plan

Required Credits: 120

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Industrial Engineering ~~Prerequisites~~ Designated Core (All courses require a grade of C or better.)		
Required Courses:		
CHEM 1105	Laboratory for CHEM 1305	1
CHEM 1305	General Chemistry	3
CE 2326	Econ for Engrs & Scientists	3
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	5-3
~~MATH 1411~~	~~Calculus I~~	~~4~~
PHYS 2420	Introductory Mechanics	4
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
~~CE 2326~~	~~Econ for Engrs & Scientists~~	~~3~~
IE 1333	Computational Methods	3

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Code	Title	Hours
IE 2333	Decision Support Systems	3
IE 2303 or MECH 2331 or MME 2303	Materls & Manuftng Processes Matl & Manufacturing Processes Intro to Materials Sci & Engrg	3
IE 2377 or MECH 2342	Electro-Mechanical Systems 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:		
IE 3331	Systems Engineering	3
~~IE 3332~~	~~Safety Engineering~~	~~3~~
IE 3352	Design of Experiments	3
IE 3373	Engr Probability & Stat Models [C]	3
IE 3390	Operations Research I	3
IE 3~~4~~377	Methods and Indust. Ergonomics	3~~4~~
IE 4353	Industrial Systems Simulation	3
~~IE 4384~~IE 4332	~~Industrial Layout~~Work Design Productivity and Safety	3
IE 4385	Statist Quality Cntrl~~/Reliabil~~ & Data Analytics	3

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Code	Title	Hours
IE 4390	~~Probabilistic~~ Operations Research II: Stochastic Models	3
IE 4391	Production Planning & Inventory Control Systems	3
IE 44266	Senior Design	24
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
IE 4333	Sup Chain Mgmt I: System Model	
IE 4371	Engineering Problems	
IE 4395	Special Topics Industrial Engr	
IE 4396	Intl Manufacturing Intern I	
IE 4397	Intl Manufacturing Intern II	
RWS 3359	Technical Writing	
Total Hours		**120**

Course List

C Courses require a grade of C or better.

BS in Mechanical Engineering

Degree Plan

Required Credits: 128

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Mechanical Engineering ~~Prerequisites~~Designated Core (All courses require a grade of C or better.)		
Required Courses:		
CE 2326	Econ for Engrs & Scientists	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	3
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	5-3
~~MATH 1411~~	~~Calculus I~~	~~4~~
PHYS 2420	Introductory Mechanics	4
~~Select one of the following options:~~		~~4~~
~~BIOL 1305 & BIOL 1107~~	~~General Biology and Topics in Study of Life I C~~	
~~CHEM 1306 & CHEM 1106~~	~~General Chemistry and Laboratory for CHEM 1306 C~~	

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Code	Title	Hours
~~PHYS 2421~~	~~Introductory Electromagnetism~~	
Mechanical Engineering (Other Requirements) (All courses require a grade of C or better.)		
Required Courses:		
~~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
Science Elective Select one of the following options:		4
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I [C]	
CHEM 1306 & CHEM 1106	General Chemistry and Laboratory for CHEM 1306 [C]	
PHYS 2421	Introductory Electromagnetism	
MATH/Science Elective Select one of the following:		3
BIOL 1306	Organismal Biology	
MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	

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Code	Title	Hours
MATH 4329	Numerical Analysis	
MATH 4336	Applied Analysis II	
PHYS 2325	Survey of Modern Physics	
PHYS 3351	Analytical Mechanics I	
PHYS 4348	Fundamentals of Acoustics	
STAT 3320	Probability and Statistics	
MATH Elective Select one of the following:		
MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	
MATH 4329	Numerical Analysis	
MATH 4336	Applied Analysis II	
STAT 3320	Probability and Statistics	
Mechanical Engineering Major		
Required Courses: [1]		
MECH 1305	Graphic & Design Fundamentals [C]	3
MECH 1321	Mechanics I-Statics [C]	3

Code	Title	Hours
MECH 2103	Engineering Computations	1
MECH 2311	Intro to Thermal-fluid Sci [C]	3
MECH 2322	Mechanics of Materials [C]	3
MECH 2331	Matl & Manufacturing Processes [C]	3
MECH 2340	Mechanics II - Dynamics [C]	3
MECH 2342	Electro Mechanical Systems [C]	3
MECH 3312	Thermodynamics	3
MECH 3314	Fluid Mechanics	3
MECH 3334	Mechanical Design [3]	3
MECH 3345	System Dynamics [C]	3
MECH 3352	Engineering Analysis II	3
MECH 4315	Heat Transfer [3]	3
MECH 4366	Senior Design Project [2, 3]	3
Select one of the following:		
MECH 2131	Manufacturing Engineering Lab	

Code	Title	Hours
MECH 2132	Additive Manufacturing Lab	
MECH 2133	Metal Casting Lab	
Select two of the following:		
MECH 3103	Mechatronics Lab	
MECH 3113	Thermo-fluid Lab	
MECH 3123	Solid Mechanics Lab	
Select one of the following:		
MECH 4326	Finite Element Analysis [3]	
MECH 4330	Dynamic Systems Simulation	
MECH 4392	Special Topics in Computation	
Select five of the following (minimum of one from each area):		
Solid Mechanics Area		
MECH 4316	Thermal System Design [3]	
MECH 4336	Principles of Engr Design [3]	
MECH 4346	Mechatronics [3]	
MECH 4393	Special Topics in Elect-Mech	
MECH 4394	Special Topics in Therm Fluid	

Code	Title	Hours
MECH 4395	Special Topics in Mech. Engr. [3]	
Thermal Fluid Area		
Electro-Mechanical Area		
Total Hours		**128**

Course List

C Course require a grade of C or better.

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

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

3 Course requires grade of D or better

BS in Metallurgical and Materials Engineering

Return to: Degree Programs
The Metallurgical and Materials Engineering curriculum focuses on a strong materials science and engineering foundation, a deep understanding of how materials are processed, and microstructure engineering to industrial needs and performance requirements. Students may choose a concentration in (1) forensic engineering and materials performance, (2) extractive and process metallurgy, (3) biomaterials or (4) general metallurgical and materials engineering.

Vision

Our vision is to provide a modern Metallurgical and Materials Engineering Program of the highest quality.

Mission

The BS degree program in Metallurgical and Materials Engineering will serve two broad purposes: (1) to provide sufficient theory and hands-on experiences in metallurgical and materials engineering for a graduate to perform effectively, in industry or other employment; and (2) to provide opportunities for all types of students, while maintaining a high level of excellence as students progress through the curriculum. The MME program will also provide basic engineering skills for problem-solving and lifelong learning, along with the communication skills, both oral and written, sought after by industry. The MME program will maintain a balance between the applied and theoretical aspects, and will strive to provide pre-professional employment opportunities (either research experiences or internships) by continuously engaging industry in program activities and interactions with students.

Educational Objectives

1. Graduates will secure employment and/or admission to a graduate program in metallurgical and materials engineering or related professions
2. Graduates will advance in their career by continuing lifelong learning and personal/professional development
3. Graduates work effectively as contributors and leaders on diverse, interdisciplinary teams enabling innovation at the leading edge of technology in an ever-changing global community.
4. Graduates will be more competitive as practicing professionals with broad understanding of material systems, associated manufacturing processes and engineering solutions.

Concentrations

The Metallurgical and Materials Engineering (MME) program offers a Bachelor of Science degree in MME with an option to develop expertise in one of the four concentrations listed below:

- Concentration 1: Forensic Engineering and Materials Performance
- Concentration 2: Extractive Metallurgy
- Concentration 3: Biomaterials
- Concentration 4: General Metallurgical and Materials Engineering

Joint-Degree BS-MBA Program

Students with at least 90 hours accumulated toward their BSMME degree, a cumulative GPA of at least 3.30, and admission to the full-time MBA program can pursue a joint-degree BS-MBA program. Students admitted to this program (a) will apply credit for ECON 5360 Managerial Economics, BLAW 5306 Business Law and Ethics, and ACCT 5301 Financial Accounting toward the requirements of MME 4320 Nanomaterials & Nanostructures, MME 4303 Metals Processing, and one upper-division elective course in Metallurgical and Materials Engineering and (b) will apply graduate credit for (a) MME 4419 MME Design & Practice, (b) MME 4404 Materials Processing and (c) MME 4195 Senior Professional Orientation toward the electives requirements of the MBA program.

BS in Metallurgical and Materials Engineering

Degree Plan

BS in Metallurgical and Materials Engineering with concentrations in (1) Forensic Engineering and Materials Performance, (2) Extractive and Processing Metallurgy, (3) Biomaterials and (4) General Metallurgical and Materials Engineering

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Required Credits: 128

Code	Title	Hours
1. University Core Curriculum		
University Core Curriculum requirements (some of which are listed below) – Total Hours		42
2. Metallurgical & Materials Engineering ~~Prerequisites~~ Designated Core (All courses listed require a grade of C or better.)		
Required Courses as part of the University Core:		
~~MATH 1312~~	~~Calculus II~~	~~3~~
CHEM 1305	General Chemistry	3
CHEM 1306	General Chemistry	3
CE 2326	Econ for Engrs & Scientists	3
MATH 1508 or MATH 1310 (Listed if completed, but not required)	Precalculus or Trigonometry and Conics	5-3
Additional Required Courses:		
CHEM 1105	Laboratory for CHEM 1305	1
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
PHYS 2420	Introductory Mechanics	4
PHYS 2421	Introductory Electromagnetism	4
Total Hours		22~~19~~
3. BSMME (Lower Division) (All courses require a grade of C or better.)		
Required Courses:		

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Code	Title	Hours
MME 1205	Computation/Graph in Mater Sci	2
MME 1401	Intro to Metal Mat Engr	4
MME 2303	Intro to Materials Sci & Engrg	3
MME 2305	Material & Energy Balance	3
MME 2434	Mechanics of Materials	4
Total Hours		16
4. BSMME (Upper Division and Concentrations)		
Upper division and concentration courses – Total Hours		51
Total BS MME Degree Hours		**128**

Metallurgical and Materials Engineering (Upper Division and Concentration Courses)

Code	Title	Hours
Required Courses:		
MME 3195	Junior Professional Orient. [C]	1
MME 3306	Rate Processes [C]	3
MME 3308	Appl Chemical Thermodynamics [C]	3
MME 3309	Circuits, Electronic Materials and Devices [C]	3
MME 3406	Nanofuctnl Physical Metallurgy [C]	4
MME 3407	Mechanical Behavior of Matls [C]	4
MME 3413	Materials Characterization [C]	4
MME 4303	Metals Processing	3

Code	Title	Hours
MME 4309	Corrosion	3
MME 4316	Failure Analysis	3
MME 4404	Mat. Synthesis & Manufacturing	4
MME 4419	Metal Materials Design & Pract	4
	Concentration Elective Course I [C]	3
	Concentration Elective Course II [C]	3
	Concentration Elective Course III [C]	3
	Concentration Elective Course IV [C]	3
Total Hours		51

C - Courses require a grade of C or better.

Concentration in Forensic Engineering and Materials Performance

Code	Title	Hours
BSMME - Forensic Engineering and Materials Performance		
Choice of 4 courses from the following:		
MME4315	Metallography and Microstructure Interpretation* [C]	3
MME4330	Advanced Failure Analysis* [C]	3
MME4331	Non-Destructive Examination [C]	3
MME4332	Root Cause Analysis [C]	3
MME4333	Fracture Mechanics [C]	3
MME4334	Biomedical Product Performance Analysis [C]	3
MME4335	Functional Failure Analysis [C]	3

Code	Title	Hours
MME4390	Special Topics in MME [C]	3

* - Required Courses
C - Courses require a grade of C or better.

Concentration in Extractive and Process Metallurgy

Code	Title	Hours
BSMME – Extractive and Process Metallurgy		
Choice of 4 courses from the following:		
MME4315	Metallography and Microstructure Interpretation* [C]	3
MME4320	Solidification Processes [C]	3
MME4340	Mineral Processing [C]	3
MME4341	Recycling Processes [C]	3
MME4342	Hydrometallurgy* [C]	3
MME4350	Materials Joining Technologies [C]	3
MME4390	Special Topics in MM [C]	3
GEOL 4315	Topics in Geological Sciences [C]	3

* - Required Courses
C - Courses require a grade of C or better.

Concentration in Biomaterials

Code	Title	Hours
BSMME – Biomaterials		
Choice of 4 courses from the following:		

Code	Title	Hours
BME 3303	Fundamentals of BME I [C]	3
BME 3305	Fundamentals of BME II [C]	3
MME4304	Printable Materials [C]	3
MME4310	Polymer Engineering [C]	3
MME4312	Biomaterials Science and Engineering * [C]	3
MME4314	Composite Materials [C]	3
MME4334	Biomedical Product Performance Analysis [C]	3
MME4421	Engineering Alloys [C]	3
MME4390	Special Topics in MME [C]	3

* - Required Courses
C - Courses require a grade of C or better.

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General MME Concentration

Code	Title	Hours
BSMME – General		
Choice of 3 courses from the following and 1 course from another MME concentration:		
MME4310	Polymer Engineering [C]	3
MME4314	Composite Materials [C]	3
MME4315	Metallography and Microstructure Interpretation * [C]	3
MME4321	Engineering Alloys [C]	3
MME4331	Non-Destructive Examination [C]	3
MME4350	Materials Joining Technologies [C]	3
MME4390	Special Topics in MME [C]	3

* - Required Courses
C - Courses require a grade of C or better.

C

University Core Curriculum

NOTE: The department may make specific suggestions for courses which are most applicable towards your major.
Psychology and Criminal Justice majors and minors are required to take MATH 1320 Math for Social Sciences I or a higher level Calculus course.
Business majors are required to take MATH 1320 Math for Social Sciences I or a higher level Calculus course.
NOTE: All courses require a C or better