



Campus Curricula Committee Meeting Agenda

May 4, 2023

8:15am - 9:30am, Bertelsmeyer 110H

(For Faculty Senate Meeting of June 1, 2023)

Review of submitted Course Change forms:

File: 9.1 AERO ENG 4780 : Aerospace Systems Design I
File: 191.3 AERO ENG 4885 : Assessment
File: 2175.1 BIO SCI 1173 : Introduction to Environmental Sciences
File: 4974 CHEM 2410 : Physical Chemistry I
File: 4975 CHEM 2420 : Physical Chemistry II
File: 4108.4 CHEM 2459 : Accelerated Physical Chemistry Laboratory
File: 1825.4 CHEM 3310 : Inorganic Chemistry I
File: 4173.2 CHEM 3320 : Inorganic Chemistry II
File: 598.4 CHEM 3329 : Inorganic Chemistry Laboratory
File: 4922 CIV ENG 5181 : Building Materials Physics
File: 4980 COMP SCI 5420 : Introduction to Machine Learning
File: 1747.8 ECON 4540 : Energy Economics
File: 4943 ECON 5350 : Data Intelligence using Case Studies
File: 306.4 ELEC ENG 5570 : Extra High Voltage Engineering
File: 4966 ENV SCI 4000 : Special Problems
File: 4968 ENV SCI 4002 : Cooperative Environmental Scientist Training
File: 4967 ENV SCI 4010 : Seminar
File: 4969 ENV SCI 4099 : Undergraduate Research
File: 1066.1 MECH ENG 6657 : Laser Aided Manufacturing And Materials Processing
File: 805.8 SYS ENG 6213 : Deep Learning
File: 1917.5 SYS ENG 6543 : Digital Engineering
File: 2442.3 TCH COM 5085 : Internship

Review of submitted Program Change forms:

File: 141.40 AE ENG-BS : Aerospace Engineering BS
File: 308.3 CAD/CAM-CT : CAD/CAM & Rapid Prdct Real CT
File: 16.40 CHEM-BS : Chemistry BS
File: 153.82 CP ENG-BS : Computer Engineering BS
File: 38.33 ECON-BA : Economics BA
File: 39.31 ECON-BS : Economics BS
File: 221.4 ECON-MI : Economics Minor



File: 44.45 ENG MG-BS : Engineering Management BS
File: 382.20 ENV SCI-BS : Environmental Sciences BS
File: 261.8 FR ENG-UN : Foundational Engineering and Computing
File: 86.56 MC ENG-BS : Mechanical Engineering BS
File: 309.2 MF SYS-CT : Manufacturing Systems CT
File: 399 PROPOSED : Quantitative Economics Minor
File: 345.10 WATERSC-MS : Water Science and Engineering MS

Review of submitted Experimental Course forms:

File: 4949 CHEM ENG 5001.019 : Materials as Hard Tissue Devices
File: 4973 CHEM ENG 5001.021 : Fermentation Technology
File: 4977 CHEM ENG 5001.022 : Energy Engineering
File: 4971 COMP ENG 5001.005 : Fundamentals of Data Engineering
File: 4961 COMP SCI 6001.012 : Topics in Quantum Computing and Information
File: 4902 GEOLOGY 2001.001 : Climate Change and Society
File: 4981 TCH COM 6001.001 : Advanced Writing for Business

New Business:

Approve CCC calendar deadlines through August 2023.
Discussion regarding guidelines for Minors.
Discussion regarding the purpose and task of the CCC.

Course Change Request

Date Submitted: 03/10/23 12:01 pm

Viewing: **AERO ENG 4780 : Aerospace Systems**

Design I

File: 9.1

Last edit: 04/03/23 9:49 am

Changes proposed by: nisbett

Programs
referencing this
course

[AE ENG-BS: Aerospace Engineering BS](#)

Other Courses
referencing this
course

In The Prerequisites:

[AERO ENG 4781 : Aerospace Systems Design II](#)

Requested	Fall 2024 Fall 18 Prereq
Effective Change	Attribute Update
Date	
Department	Mechanical & Aerospace Engineering
Discipline	Aerospace Engineering (AERO ENG)
Course Number	4780
Title	

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 03/16/23 1:38 pm
David Bayless (djbkqf):
Approved for RMECHENG Chair
2. 04/03/23 11:04 am
Jennifer Pohlsander

- (jpnfd): Approved for CCC Secretary
- 3. 04/12/23 8:51 am
Mark Fitch
(mfitch):
Approved for Engineering DSCC Chair
- 4. 04/18/23 10:08 am
Jennifer Pohlsander
(jpnfd): Approved for Pending CCC Agenda post

Aerospace Systems Design I

Abbreviated Course Title Aerospace Systems Dsgn I

Catalog

Description

Consideration of the creative design process with emphasis on aeronautical-aerospace systems. Short design problems to illustrate the process. Selection of design projects for Aero Eng 4781. Information gathering for the design projects which will be completed in Aerospace Systems Design II. Fall semester.

Prerequisites

Aero Eng 3251 and Aero Eng 3361 and Aero Eng ~~3251, 3361~~, 3171.

Field Trip

Statement

Credit Hours LEC: 3 ~~2~~ LAB: 0 IND: 0 RSD: 0

Total: 3 ~~2~~

Required for Yes ~~No~~

Majors

Elective for No

Majors

Justification for
change:

Changing to 3 credit hours to be consistent with the alternative first-semester senior design course AE 4790.

We expect to offer this for the first time as 3 credit hours in Fall 2024. The effective date on this CC form did not include that option, so we selected the latest available option of Spring 2024. We are submitting now to accompany the DC form that needs to be effective Fall 2023.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

jpnfd (04/03/23 8:53 am): Updated prerequisite format.

Key: 9

[Preview Bridge](#)

Course Change Request

Date Submitted: 04/12/23 10:21 am

Viewing: **AERO ENG 4885 : Assessment**

File: 191.3

Last approved: 05/06/16 3:33 am

Last edit: 04/12/23 11:43 am

Changes proposed by: nisbett

Programs
referencing this
course

[AE ENG-BS: Aerospace Engineering BS](#)

Requested Fall 2023 ~~01/12/2016~~
Effective Change
Date
Department Mechanical & Aerospace Engineering
Discipline Aerospace Engineering (AERO ENG)
Course Number 4885
Title

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC
Chair
4. Pending CCC
Agenda post
5. CCC Meeting
Agenda
6. Campus Curricula
Committee Chair
7. FS Meeting
Agenda
8. Faculty Senate
Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 04/12/23 10:37
am
David Bayless
(djbkqf):
Approved for
RMECHENG Chair
2. 04/12/23 11:43
am
Jennifer

- Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/18/23 9:16 am
Mark Fitch
(mfitch):
Approved for
Engineering DSCC
Chair
4. 04/18/23 10:08
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. May 6, 2016 by
isaac (191.1)

Assessment

Abbreviated Assessment
Course Title

Catalog

Description

This course is an overview and assessment of the required aerospace engineering courses that the students took.

Prerequisites

Aero Eng 3171, Aero Eng 3361, Aero Eng 4253; preceded or accompanied by 4535,
Aero Eng 4535. ~~4253.~~

Field Trip

Statement

Credit Hours	LEC: 1	LAB: 0	IND: 0	RSD: 0
Total: 1				
Required for Majors	Yes			
Elective for Majors	No			

Justification for change:

Changing Aero Eng 4535 from prerequisite to pre- or co-requisite to eliminate recurring scheduling issues for fall semester graduation.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

jpnfd (04/12/23 11:43 am): Added punctuation to prerequisite.

Key: 191

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/20/23 1:14 pm

Viewing: **BIO SCI 1173 : Introduction to Environmental Sciences**

File: 2175.1

Last edit: 03/20/23 1:22 pm

Changes proposed by: jpnfd

Programs
referencing this
course

[BIO SC-BA: Biological Sciences BA](#)

[EDUC-BS: Education BS](#)

[ECON-BA: Economics BA](#)

[ENV SCI-BS: Environmental Sciences BS](#)

[ECON-BS: Economics BS](#)

[GL&GPH-BS: Geology and Geophysics BS](#)

Other Courses
referencing this
course

In The Prerequisites:

[BIO SCI 2223 : General Genetics](#)

Requested	Fall 2018 <u>2023</u>
Effective Change	
Date	
Department	Biological Sciences
Discipline	Biological Sciences (BIO SCI)

In Workflow

1. **RBIOLSCI Chair**
2. **CCC Secretary**
3. **Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 03/20/23 4:12 pm
David Duvernell
(duvernell):
Approved for
RBIOLSCI Chair
2. 04/03/23 11:04
am
Jennifer
Pohlsander

Course Number 1173

Title

(jpnfd): Approved
for CCC Secretary
3. 04/06/23 8:55 am
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Introduction to Environmental Sciences

Abbreviated Environmental Science

Course Title

Catalog

Description

An introduction to environmental science, with an emphasis on biological aspects of current environmental problems. Topics range from chemical toxicity to global climate change. Environmental challenges facing local species and ecosystems will be emphasized.

Prerequisites

Field Trip

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0

Total: 3

Required for No

Majors

Elective for No

Majors

Justification for
change:

This course already exists within BIO SCI, but co-listing it with ENV SCI to increase visibility to majors and to increase the number of ENV SCI credits that a major can receive. Part of a standard list of degree options needed for the major.

This course has been offered in BIO SCI as a permanent course for many years.

Semesters
previously
offered as an
experimental
course

Co-Listed

Courses:

[ENV SCI 1173 - Course Not Found](#)

Course Reviewer

Comments

Key: 2175

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 03/30/23 12:04 pm

Viewing: **CHEM 2410 : Physical Chemistry I**

File: 4974

Last edit: 04/10/23 3:09 pm

Changes proposed by: tschuman

Programs
referencing this
course

[CHEM-BS: Chemistry BS](#)

Requested	Fall 2023
Effective Change Date	
Department	Chemistry
Discipline	Chemistry (CHEM)
Course Number	2410
Title	

In Workflow

1. **RCHEMIST Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. Campus Curricula
Committee Chair

7. FS Meeting
Agenda

8. Faculty Senate
Chair

9. Registrar

10. CAT entry

11. Peoplesoft

Approval Path

1. 04/05/23 7:57 pm
Chariklia Sotiriou-
Leventis

(cslevent):

Approved for
RCHEMIST Chair

2. 04/14/23 9:49 am
Jennifer
Pohlsander

- (jpnfd): Approved for CCC Secretary
- 3. 04/17/23 9:24 pm
Katie Shannon
(shannonk):
Approved for Sciences DSCC Chair
- 4. 04/18/23 10:09 am
Jennifer Pohlsander
(jpnfd): Approved for Pending CCC Agenda post

Physical Chemistry I

Abbreviated Course Title Physical Chemistry I

Catalog

Description

A study of the laws of thermodynamics, transport phenomena, kinetic theory, and chemical kinetics with applications to states of matter, solutions, chemical reactions, and equilibria.

Prerequisites

Physics 1111 or Physics 1135, and Math 1215 or Math 1221.

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
Total: 3				

Required for Majors Yes

Elective for No
Majors

Justification for
new course:

New p-chem course to be activated along with the new 120h chemistry BS degree plan

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

jpnfd (04/10/23 3:09 pm): Added punctuation to prerequisites.

Key: 4974

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 03/30/23 12:12 pm

Viewing: **CHEM 2420 : Physical Chemistry II**

File: 4975

Last edit: 04/10/23 3:10 pm

Changes proposed by: tschuman

Programs
referencing this
course

[CHEM-BS: Chemistry BS](#)

Requested	Fall 2023
Effective Change Date	
Department	Chemistry
Discipline	Chemistry (CHEM)
Course Number	2420
Title	

In Workflow

1. **RCHEMIST Chair**
2. **CCC Secretary**
3. **Sciences DSCC
Chair**
4. **Pending CCC
Agenda post**
5. **CCC Meeting
Agenda**
6. Campus Curricula
Committee Chair
7. FS Meeting
Agenda
8. Faculty Senate
Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 04/05/23 7:58 pm
Chariklia Sotiriou-
Leventis
(cslevent):
Approved for
RCHEMIST Chair
2. 04/14/23 9:49 am
Jennifer
Pohlsander

- (jpnfd): Approved
for CCC Secretary
3. 04/17/23 9:24 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Physical Chemistry II

Abbreviated Course Title Physical Chemistry II

Catalog

Description

A study of statistical approaches to thermodynamics, kinetic theory, and chemical kinetics, including the quantum theory of atoms, molecular structures, and molecular spectroscopy.

Prerequisites

Physics 2111 or Physics 2135, and Math 2222.

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
Total: 3				

Required for Majors Yes

Elective for No
Majors

Justification for
new course:

New p-chem course to be activated along with the new 120h chemistry BS degree plan. Will be dropping the current quantum mechanics course by combining content of current three physical chem courses into two new required courses, which will have same structure as our other three disciplines with two core courses each: inorganic, organic, and analytical divisions

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

jpnfd (04/10/23 3:10 pm): Added punctuation to prerequisites.

Key: 4975

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/30/23 12:18 pm

Viewing: **CHEM 2459 ~~3459~~ : Accelerated**

Physical Chemistry Laboratory

File: 4108.4

Last approved: 12/01/14 3:49 am

Last edit: 04/13/23 1:04 pm

Changes proposed by: tschuman

Programs
referencing this
course

[CHEM-BS: Chemistry BS](#)

Requested Fall 2023 ~~01/13/2015~~

Effective Change

Date

Department Chemistry

Discipline Chemistry (CHEM)

Course Number 2459 ~~3459~~

Title

In Workflow

1. **RCHEMIST Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. Campus Curricula
Committee Chair

7. FS Meeting
Agenda

8. Faculty Senate
Chair

9. Registrar

10. CAT entry

11. Peoplesoft

Approval Path

1. 04/05/23 7:58 pm
Chariklia Sotiriou-
Leventis

(cslevent):

Approved for
RCHEMIST Chair

2. 04/13/23 2:42 pm
Jennifer
Pohlsander

- (jpnfd): Approved
for CCC Secretary
3. 04/17/23 9:24 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Dec 1, 2014 by
woelk (woelkk)

Accelerated Physical Chemistry Laboratory

Abbreviated Accelerated PChem Lab
Course Title

Catalog

Description

A laboratory course ~~combined and accelerated version of Chem 3419 and Chem 3429~~ consisting of exploratory physical chemistry experiments.

Prerequisites

Preceded or accompanied by both Chem 2420 ~~3420~~ and Chem 1100.

Field Trip

Statement

Credit Hours	LEC: 0	LAB: 2	IND: 0	RSD: 0
Total: 2				
Required for Majors	Yes			
Elective for Majors	No			

Justification for
change:

Renumbering to be consistent with new required physical chemistry courses and 120h chemistry BS degree

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

Key: 4108

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/30/23 12:19 pm

Viewing: **CHEM 3310 ~~2310~~ : Inorganic**

Chemistry I

File: 1825.4

Last approved: 05/04/15 3:20 am

Last edit: 04/17/23 3:26 pm

Changes proposed by: tschuman

Programs
referencing this
course

[CHEM-BS: Chemistry BS](#)

Requested Fall 2023 ~~08/17/2015~~

Effective Change

Date

Department Chemistry

Discipline Chemistry (CHEM)

Course Number 3310 ~~2310~~

Title

In Workflow

1. **RCHEMIST Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. Campus Curricula
Committee Chair

7. FS Meeting
Agenda

8. Faculty Senate
Chair

9. Registrar

10. CAT entry

11. Peoplesoft

Approval Path

1. 04/05/23 7:58 pm
Chariklia Sotiriou-
Leventis

(cslevent):

Approved for
RCHEMIST Chair

2. 04/13/23 3:21 pm
Jennifer
Pohlsander

- (jpnfd): Approved
for CCC Secretary
3. 04/17/23 9:25 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. May 4, 2015 by
imorgan (1825.1)

Inorganic Chemistry I

Abbreviated Course Title Inorganic Chemistry I

Catalog

Description

A study of modern concepts of atomic structure, chemical bonding, thermodynamics and kinetics as related to the periodic relationship of the elements. Reference to topics of current interests as applied to the above areas.

Prerequisites

[CHEM 1320, CHEM 1510](#)

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
Total:	3			
Required for Majors	Yes			
Elective for Majors	No			

Justification for
change:

Renumbering for the new 120h Chemistry BS degree

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

shannonk (04/17/23 3:26 pm): pre-reqs added per DSCC discussion and feedback from Tom Schuman

Course Change Request

Date Submitted: 03/30/23 12:20 pm

Viewing: **CHEM 3320 ~~2320~~ : Inorganic**

Chemistry II

File: 4173.2

Last approved: 06/29/15 3:51 am

Last edit: 04/13/23 3:25 pm

Changes proposed by: tschuman

Programs
referencing this
course

[CHEM-BS: Chemistry BS](#)

Requested Fall 2023 ~~08/17/2015~~

Effective Change

Date

Department Chemistry

Discipline Chemistry (CHEM)

Course Number 3320 ~~2320~~

Title

In Workflow

1. **RCHEMIST Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. Campus Curricula
Committee Chair

7. FS Meeting
Agenda

8. Faculty Senate
Chair

9. Registrar

10. CAT entry

11. Peoplesoft

Approval Path

1. 04/05/23 7:58 pm
Chariklia Sotiriou-
Leventis

(cslevent):

Approved for
RCHEMIST Chair

2. 04/13/23 3:25 pm
Jennifer
Pohlsander

- (jpnfd): Approved
for CCC Secretary
3. 04/17/23 9:25 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Jun 29, 2015 by
woelk (woelkk)

Inorganic Chemistry II

Abbreviated Course Title Inorganic Chemistry II

Catalog

Description

A study of coordination chemistry, organometallics, bioinorganic and solid-state inorganic chemistry. Reference to topics of current interest as applied to the above areas.

Prerequisites

CHEM 3310. ~~2310~~.

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
Total:	3			
Required for Majors	Yes			
Elective for Majors	No			

Justification for
change:

Renumbering for the new 120h chemistry BS degree plan

Semesters
previously
offered as an
experimental
course

N/A

Co-Listed
Courses:

Course Reviewer

Comments

jpnfd (04/13/23 3:25 pm): Updated prerequisite to new proposed course number, Chem 3310 (was Chem 2310).

Key: 4173

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/30/23 12:23 pm

Viewing: **CHEM 3329 ~~2319~~ : Inorganic**

Chemistry Laboratory

File: 598.4

Last approved: 04/25/14 3:06 pm

Last edit: 03/30/23 12:23 pm

Changes proposed by: tschuman

Programs
referencing this
course

[CHEM-BS: Chemistry BS](#)

Requested	Fall <u>2023</u> 2014
Effective Change Date	
Department	Chemistry
Discipline	Chemistry (CHEM)
Course Number	<u>3329</u> 2319
Title	

In Workflow

1. **RCHEMIST Chair**
2. **CCC Secretary**
3. **Sciences DSCC
Chair**
4. **Pending CCC
Agenda post**
5. **CCC Meeting
Agenda**
6. Campus Curricula
Committee Chair
7. FS Meeting
Agenda
8. Faculty Senate
Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 04/05/23 7:58 pm
Chariklia Sotiriou-
Leventis
(cslevent):
Approved for
RCHEMIST Chair
2. 04/13/23 3:26 pm
Jennifer
Pohlsander

- (jpnfd): Approved
for CCC Secretary
3. 04/17/23 9:25 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Apr 25, 2014 by
lahne (598.1)

Inorganic Chemistry Laboratory

Abbreviated Inorganic Chem Lab
Course Title

Catalog

Description

Synthesis and characterization of inorganic chemicals, high and low temperature syntheses, inert atmosphere and vacuum manipulations, electrochemistry, magnetochemistry, spectroscopy (NMR, IR, UV/VIS), superconductivity.

Prerequisites

Preceded or accompanied by Chem 3310 ~~2310~~ and Chem 1100.

Field Trip

Statement

Credit Hours	LEC: 0	LAB: 1	IND: 0	RSD: 0
Total: 1				
Required for Majors	Yes			
Elective for Majors	No			

Justification for
change:

Renumbering of courses for chemistry 120h BS degree plan

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

Key: 598

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 12/11/22 9:19 am

Viewing: **CIV ENG 5181 : Building Materials**

Physics

File: 4922

Last edit: 03/07/23 11:08 am

Changes proposed by: baur

Requested	Spring 2024
Effective Change Date	
Department	Civil, Architectural, and Environmental Engineering
Discipline	Civil Engineering (CIV ENG)
Course Number	5181
Title	

In Workflow

1. RCIVILEN Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 12/11/22 11:08 am
Joel Burken
(burken):
Approved for
RCIVILEN Chair
2. 03/14/23 9:29 am
Jennifer
Pohlsander

(jpnfd): Approved
for CCC Secretary
3. 03/22/23 12:05
pm
Mark Fitch
(mfitch):
Approved for
Engineering DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Building Materials Physics

Abbreviated Bldg Matls Physics
Course Title

Catalog

Description

Examines the effects of heat, air and moisture on the building envelop through engineering methods with examples and exercises.

Prerequisites

Civ Eng 3330 or Mech Eng 2527.

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
Total: 3				

Required for Majors	No
------------------------	----

Elective for Yes
Majors

Justification for
new course:

This course is to be co-listed as Arch Eng 5181.

Semesters
previously
offered as an
experimental
course

Spring 2020- 7, Spring 2021-11, Spring 2022- 12

Co-Listed

Courses:

ArchE 5181 - **Course Not Found**

Course Reviewer

Comments

jpofd (12/19/22 2:11 pm): Updated format for abbreviated title, prerequisites, & catalog description. Added enrollment numbers for semesters previously taught.

jpofd (03/07/23 11:08 am): Updated catalog description- removed course title from beginning of description.

Key: 4922

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 04/08/23 9:15 am

Viewing: **COMP SCI 5420 : Introduction to Machine Learning**

File: 4980

Last edit: 04/13/23 3:39 pm

Changes proposed by: taylorpat

Requested	Fall 2023
Effective Change Date	
Department	Computer Science
Discipline	Computer Science (COMP SCI)
Course Number	5420
Title	

In Workflow

1. RCOMPSCI Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 04/12/23 1:05 pm
Stephen Gao (sgao): Approved for RCOMPSCI Chair
2. 04/13/23 3:43 pm
Jennifer Pohlsander (jpnfd): Approved

- for CCC Secretary
- 3. 04/18/23 9:16 am
Mark Fitch
(mfitch):
Approved for
Engineering DSCC
Chair
- 4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Introduction to Machine Learning

Abbreviated Machine Learning
Course Title

Catalog

Description

This course introduces foundational theories and techniques in machine learning. Topics will include basics of machine learning, learning theory, various regression and classification models, as well as unsupervised learning methods. Students will implement course concepts in intensive programming assignments and mini-projects.

Prerequisites

A grade of "C" or better in Comp Sci 2500, Math 3108, and one of Stat 3113, Stat 3115, Stat 3117 or Stat 5643.

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
Total: 3				

Required for Majors	No
Elective for Majors	Yes

Justification for
new course:

Machine learning (ML) is a fundamental topic in computer science. CompSci already has a data mining course, various AI courses, computer vision, and advanced ML/AI, but no introduction to ML course. The topic is in-demand with students. It has been taught two times previously.

Semesters
previously
offered as an
experimental
course

FS 2022- enrollment 29 students

FS 2017- enrollment 45 students

Co-Listed
Courses:

Course Reviewer
Comments

jpnfd (04/13/23 1:47 pm): Added enrollment numbers to terms previously taught.

Key: 4980

[Preview Bridge](#)

Course Change Request

Date Submitted: 04/06/23 4:39 pm

Viewing: **ECON 4540 : Energy Economics**

File: 1747.8

Last approved: 11/23/20 6:00 am

Last edit: 04/13/23 11:06 am

Changes proposed by: davismc

Programs
referencing this
course

[SCTCPL-MI: Science, Tech, & Politics Minor](#)

[GS ECON-MI: Global Sustainable Economics Minor](#)

[E/T ECN-MI: E/T Economics Minor](#)

[SCITEC-CTU: UCT - Science, Technology, and Society](#)

[ECON-BA: Economics BA](#)

[ENV SCI-BS: Environmental Sciences BS](#)

[ECON-BS: Economics BS](#)

[PROPOSED: Energy Economics - CTU](#)

[PROPOSED: Quantitative Economics Minor](#)

[MC ENG-BS: Mechanical Engineering BS](#)

Requested Fall 2023 ~~Spring 2021~~

Effective Change

Date

Department Economics

Discipline Economics (ECON)

Course Number 4540

Title

In Workflow

1. **RECONOMI Chair**

2. **CCC Secretary**

3. **Social Sciences**

DSCC Chair

4. **Pending CCC**

Agenda post

5. **CCC Meeting**

Agenda

6. Campus Curricula

Committee Chair

7. FS Meeting

Agenda

8. Faculty Senate

Chair

9. Registrar

10. CAT entry

11. Peoplesoft

Approval Path

1. 04/06/23 4:43 pm

Melody Lo

(mlc2d):

Approved for

RECONOMI Chair

2. 04/13/23 3:27 pm

Jennifer

Pohlsander

(jpnfd): Approved

- for CCC Secretary
- 3. 04/13/23 3:47 pm
Cecil Eng Huang
Chua (cchua):
Approved for
Social Sciences
DSCC Chair
- 4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Feb 25, 2019 by
ershenb (1747.1)
2. Nov 21, 2019 by
ershenb (1747.3)
3. Nov 23, 2020 by
davismc (1747.4)

Energy Economics

Abbreviated Energy Economics
Course Title

Catalog

Description

For students interested in both economic and engineering issues of energy policy. Provides an assessment of economics and technology issues related to traditional and renewable energy resources. Presented in a framework that allows for analysis of the economic trade-offs between energy sources and the technologies associated with their use and extraction.

Prerequisites

Econ 1100 or Econ 1200.

Field Trip

Statement

Credit Hours	LEC: 3	LAB: 0	IND: 0	RSD: 0
--------------	--------	--------	--------	--------

Total: 3

Required for	No
--------------	----

Majors

Elective for	Yes
--------------	-----

Majors

Justification for

change:

Economics wanted to redefine the Energy Economics curriculum.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

~~CHEM ENG 4540 - Energy Economics~~

MIN ENG 4524 - Energy Economics

Course Reviewer

Comments

jpnfd (04/13/23 11:06 am): Per email 4/13/23 Dr. Christi Luks, Associate Chair in Chemical and Biochemical Engineering, approves of the removal of Chem Eng 4540 as a co-listed course.

Course Change Request

New Course Proposal

Date Submitted: 02/13/23 3:11 pm

Viewing: **ECON 5350 : Data Intelligence using Case Studies**

File: 4943

Last edit: 04/06/23 10:58 am

Changes proposed by: davismc

Programs
referencing this
course

[ECON-BA: Economics BA](#)

[ECON-BS: Economics BS](#)

[PROPOSED: Decision Data Analytics - CTU](#)

[PROPOSED: Quantitative Economics Minor](#)

Requested	Fall 2023
Effective Change Date	
Department	Economics
Discipline	Economics (ECON)
Course Number	5350
Title	

In Workflow

1. **RECONOMI Chair**
2. **CCC Secretary**
3. **Social Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 02/15/23 5:22 pm
Melody Lo
(mlc2d):
Approved for
RECONOMI Chair
2. 03/10/23 11:53
am
Jennifer
Pohlsander

- (jpnfd): Approved
for CCC Secretary
3. 03/10/23 12:13
pm
Cecil Eng Huang
Chua (cchua):
Approved for
Social Sciences
DSCC Chair
4. 03/22/23 10:05
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post
5. 04/06/23 9:51 am
Jennifer
Pohlsander
(jpnfd): Rollback
to RECONOMI
Chair for CCC
Meeting Agenda
6. 04/06/23 12:23
pm
Melody Lo
(mlc2d):
Approved for
RECONOMI Chair
7. 04/12/23 10:49
am
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary

8. 04/12/23 11:08
am

Cecil Eng Huang
Chua (cchua):
Approved for
Social Sciences
DSCC Chair

9. 04/18/23 10:09
am

Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Data Intelligence using Case Studies

Abbreviated Data Case Studies
Course Title

Catalog

Description

This course designates a corporate executive to teach students the processes of data collecting, analyzing, visualization, and statistical tests with case studies from various industries. Students will have the opportunity to do group projects showcasing their ability to apply data intelligence in real-world scenarios using Python programming.

Prerequisites

Econ 1100 and Econ 1200 and one of the following: Stat 1115, Stat 3111, Stat 3113 , Stat 3115, Stat 3117,or Stat 3546.

Field Trip

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0

Total: 3

Required for No

Majors

Elective for Yes

Majors

Justification for
new course:

This course is part of the new Undergraduate Certificates in Decision Data Analytics.

It is also part of the new emphasis area of Decision Data Analytics.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

jpnfd (02/24/23 4:03 pm): Updated prerequisite format.

jpnfd (03/09/23 2:18 pm): Stat 3111 added to prerequisite list.

jpnfd (04/06/23 9:50 am): Changed Required for Majors to "NO."

jpnfd (04/06/23 9:51 am): Rollback: Rolled back for catalog description revision.

Key: 4943

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/13/23 11:03 am

Viewing: **ELEC ENG 5570 : Extra High Voltage Engineering**

File: 306.4

Last approved: 02/08/21 6:02 am

Last edit: 03/21/23 2:45 pm

Changes proposed by: ss5ddp

Programs [ELPWSY-CT: Electrical Power Sys Eng CT](#)
referencing this
course

Requested Fall ~~2021~~ 2023

Effective Change
Date

Department Electrical and Computer Engineering

Discipline Electrical Engineering (ELEC ENG)

Course Number 5570

Title
Extra High Voltage Engineering

Abbreviated Extra High Voltage
Course Title Engineering

Catalog

Description

The physical phenomena associated with high voltage dielectric breakdown are presented. Methods of generating and measuring high voltages and currents are explained. Some Demonstration of standard testing of equipment design and methods are presented. ~~performance. Field trips to companies for laboratory testing of high voltage according to industry standards will serve as the lab part of the course.~~

Prerequisites

Senior standing.

Field Trip

In Workflow

1. RELECENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 03/13/23 12:02 pm
Jonathan Kimball (kimballjw): Approved for RELECENG Chair
2. 03/13/23 1:44 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 03/22/23 12:05 pm
Mark Fitch (mfitch): Approved for

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0
Total: 3

Required for No
Majors

Elective for Yes
Majors

Engineering DSCC
Chair

4. 04/18/23 10:09
am

Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Justification for
change:

The course no longer offers a lab that coincides with the lecture course EE 5570 for either section of the class offered.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

History

1. Feb 8, 2021 by
mlr6xd (306.1)

Course Reviewer **mfitch (03/21/23 2:45 pm):** Grammar issue in last sentence of description: "Some of
Comments standard testing of equipment and methods are presented."

Key: 306

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 03/20/23 10:51 am

Viewing: **ENV SCI 4000 : Special Problems**

File: 4966

Last edit: 03/20/23 1:43 pm

Changes proposed by: jpnfd

Requested Fall 2023

Effective Change

Date

Department Biological Sciences

Discipline Environmental Sciences (ENV SCI)

Course Number 4000

Title

Special Problems

Abbreviated Special Problems

Course Title

Catalog

Description

Problems or readings on specific subjects or projects in the program. Consent of instructor required.

Prerequisites

Field Trip

Statement

Credit Hours LEC: 0 LAB: 0 IND: 0-6 RSD: 0

Total: 0-6

Required for No

Majors

Elective for No

Majors

In Workflow

1. **RBIOLSCI Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. **Campus Curricula
Committee Chair**

7. **FS Meeting
Agenda**

8. **Faculty Senate
Chair**

9. **Registrar**

10. **CAT entry**

11. **Peoplesoft**

Approval Path

1. 03/20/23 10:55
am

David Duvernell
(duvernell):

Approved for
RBIOLSCI Chair

2. 03/24/23 4:03 pm

Jennifer

Pohlsander

(jpnfd): Approved
for CCC Secretary

3. 04/03/23 12:27

pm

Katie Shannon

(shannonk):

Approved for

Justification for
new course:

Part of a standard list of degree options needed for the major.

Semesters
previously
offered as an
experimental
course
None

Co-Listed
Courses:

Course Reviewer **jpnfd (03/20/23 1:43 pm):** Updated credit hours to 0-6 & updated catalog
Comments description per email from Dr. Duvernell 3/20/23

Sciences DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Key: 4966

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 03/20/23 11:28 am

Viewing: **ENV SCI 4002 : Cooperative Environmental Scientist Training**

File: 4968

Last edit: 04/03/23 9:27 am

Changes proposed by: jpnfd

Requested Fall 2023

Effective Change

Date

Department Biological Sciences

Discipline Environmental Sciences (ENV SCI)

Course Number 4002

Title

Cooperative Environmental Scientist Training

Abbreviated Cooperative Training

Course Title

Catalog

Description

On-the-job experience gained through cooperative education with industry, with credit arranged through departmental cooperative advisor. Grade received depends on quality of reports submitted and work supervisor's evaluation.

Prerequisites

Field Trip

Statement

Credit Hours LEC: 0 LAB: 0 IND: 0-6 RSD: 0

Total: 0-6

Required for No

Majors

In Workflow

1. **RBIOLSCI Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. **Campus Curricula
Committee Chair**

7. **FS Meeting
Agenda**

8. **Faculty Senate
Chair**

9. **Registrar**

10. **CAT entry**

11. **Peoplesoft**

Approval Path

1. 03/20/23 4:11 pm
David Duvernell

(duverneld):
Approved for
RBIOLSCI Chair

2. 04/03/23 11:08
am

Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary

3. 04/06/23 8:55 am
Katie Shannon

(shannonk):
Approved for
Sciences DSCC

Elective for Majors No

Justification for new course:

Part of a standard list of degree options needed for the major.

Semesters previously offered as an experimental course

None

Co-Listed

Courses:

Course Reviewer **jpnfd (03/20/23 1:46 pm)**: Updated credit hours to 0-6 per dept. email 3/20/23.

Comments **jpnfd (04/03/23 9:27 am)**: Updated abbreviated course title from co-op to Cooperative Training.

Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Key: 4968

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 03/20/23 11:04 am

Viewing: **ENV SCI 4010 : Seminar**

File: 4967

Last edit: 03/20/23 1:45 pm

Changes proposed by: jpnfd

Requested	Fall 2023
Effective Change Date	
Department	Biological Sciences
Discipline	Environmental Sciences (ENV SCI)
Course Number	4010
Title	Seminar
Abbreviated Course Title	Seminar

In Workflow

1. **RBIOLSCI Chair**
2. **CCC Secretary**
3. **Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Catalog

Description

Students will work in groups to propose, research, develop, complete, and present service-learning projects that are related to the environmental sciences.

Prerequisites

Senior Standing.

Field Trip

Statement

Credit Hours	LEC: 0	LAB: 0	IND: 0	RSD: 1
Total: 1				

Required for Majors	No
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Elective for Majors	Yes
---------------------	-----

Approval Path

1. 03/20/23 4:11 pm
David Duvernell (duverneld):
Approved for
RBIOLSCI Chair
2. 03/24/23 4:00 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/06/23 8:55 am
Katie Shannon (shannonk):
Approved for
Sciences DSCC
Chair

Justification for
new course:

Part of a standard list of degree options needed for the major.

Semesters
previously
offered as an
experimental
course

None

Co-Listed
Courses:

Course Reviewer **jpnfd (03/20/23 1:45 pm)**: Updated prerequisite to Senior Standing. Per email from
Comments Dept 3/20/23.

4. 04/18/23 10:10
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Key: 4967

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 03/20/23 11:56 am

Viewing: **ENV SCI 4099 : Undergraduate Research**

File: 4969

Last edit: 03/20/23 2:40 pm

Changes proposed by: jpnfd

Requested Fall 2023

Effective Change

Date

Department Biological Sciences

Discipline Environmental Sciences (ENV SCI)

Course Number 4099

Title

Undergraduate Research

Abbreviated Undergraduate Research

Course Title

Catalog

Description

Designed for the undergraduate student who wishes to engage in research. Not for graduate credit. Not more than six credit hours for graduation credit. Subject and credit to be arranged with the instructor.

Prerequisites

Consent of instructor.

Field Trip

Statement

Credit Hours LEC: 0 LAB: 0 IND: 0-6 RSD: 0

Total: 0-6

Required for No

Majors

Elective for No

In Workflow

1. **RBIOLSCI Chair**

2. **CCC Secretary**

3. **Sciences DSCC
Chair**

4. **Pending CCC
Agenda post**

5. **CCC Meeting
Agenda**

6. **Campus Curricula
Committee Chair**

7. **FS Meeting
Agenda**

8. **Faculty Senate
Chair**

9. **Registrar**

10. **CAT entry**

11. **Peoplesoft**

Approval Path

1. 03/20/23 4:13 pm

David Duvernell
(duverneld):

Approved for
RBIOLSCI Chair

2. 04/03/23 11:09
am

Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary

3. 04/03/23 12:28
pm

Katie Shannon
(shannonk):
Approved for

Majors

Justification for
new course:

Part of a standard list of options for degree.

Semesters
previously
offered as an
experimental
course

None

Co-Listed

Courses:

Course Reviewer **jpnfd (03/20/23 1:49 pm):** Updated to 0-6 credit hours & "consent of instructor"
Comments under prerequisites per dept. email 3/20/23
jpnfd (03/20/23 2:40 pm): Updated course description per dept. email 3/20/23.

Sciences DSCC

Chair

4. 04/18/23 10:10

am

Jennifer

Pohlsander

(jpnfd): Approved

for Pending CCC

Agenda post

Key: 4969

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/23/23 3:08 pm

Viewing: **MECH ENG 6657 : Laser Aided Manufacturing
And Materials Processing**

File: 1066.1

Last edit: 04/13/23 3:12 pm

Changes proposed by: nisbett

Requested Spring 2024 ~~Fall 2014~~

Effective Change

Date

Department Mechanical & Aerospace Engineering

Discipline Mechanical Engineering (MECH ENG)

Course Number 6657

Title

Laser Aided Manufacturing And Materials Processing

Abbreviated Laser Aid Mfg&Mtrls Proc

Course Title

Catalog

Description

Fundamental studies in laser aided manufacturing and materials processing including laser principles and optics, physics of laser-materials interaction, interface responses for rapid solidification, theories on non-equilibrium synthesis, modeling of transport phenomena, optical sensing techniques, current topics and considerations for lasers in manufacturing.

Prerequisites

Mech Eng 5519. ~~5525~~.

Field Trip

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0

Total: 3

Required for No

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 04/07/23 4:25 pm
David Bayless (djbkqf):
Approved for RMECHENG Chair
2. 04/12/23 11:28 am
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/18/23 9:16 am
Mark Fitch (mfitch):
Approved for Engineering DSCC

Majors

Elective for Yes ~~No~~
Majors

Justification for
change:

Adding Aero Eng co-list since this topic is applicable to the AE manufacturing industry.

Changing the prerequisite to incorporate a course that is appropriate to the content, and regularly offered.

Semesters
previously
offered as an
experimental
course

Co-Listed AERO ENG 6657 - Course Not Found
Courses:

Course Reviewer **jpnfd (04/12/23 11:22 am)**: Updated catalog description. Exceeded character limit.
Comments **jpnfd (04/13/23 3:12 pm)**: Updated description format.

Chair

4. 04/18/23 10:10
am

Jennifer

Pohlsander

(jpnfd): Approved
for Pending CCC

Agenda post

Course Change Request

Date Submitted: 03/12/23 2:07 pm

Viewing: **SYS ENG 6213 : Deep Learning and Advanced Neural Networks**

File: 805.8

Last approved: 11/23/17 3:31 am

Last edit: 03/13/23 1:50 pm

Changes proposed by: dagli

Programs referencing this course

- [CMPINTC-CT: Computational Intelligence CT](#)
- [CMPINTS-CT: Computational Intelligence](#)
- [GEINTEL-CT: Geoanalytics and Geointelligence Certificate](#)
- [CMPINTE-CT: Computational Intelligence CT](#)

Requested [Fall 2023](#) ~~01/09/2018~~

Effective Change Date

Department Engineering Management and Systems Engineering

Discipline Systems Engineering (SYS ENG)

Course Number 6213

Title Deep Learning ~~and Advanced Neural Networks~~

Abbreviated [Deep Learning](#) ~~Deep Learn~~
Course Title ~~Neural Nets~~

Catalog

Description

Use of deep learning and advance neural networks in the design of cyber physical complex adaptive systems. Machine learning basics, deep feed forward networks, regularization for deep learning, optimization for training deep models, convolutional networks, recurrent and recursive nets, [practical](#), ~~practical~~, vision and natural language processing applications.

Prerequisites

Graduate Standing.

In Workflow

1. **RENGMNGT**
Chair
2. **CCC Secretary**
3. **Engineering DSCC**
Chair
4. **Pending CCC**
Agenda post
5. **CCC Meeting**
Agenda
6. Campus Curricula
Committee Chair
7. FS Meeting
Agenda
8. Faculty Senate
Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 03/12/23 4:42 pm
David Enke
(enke): Approved
for RENG MNGT
Chair
2. 03/13/23 4:27 pm
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 03/22/23 12:05
pm
Mark Fitch
(mfitch):
Approved for

Field Trip
Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0
Total: 3

Required for No
Majors

Elective for No
Majors

Engineering DSCC
Chair
4. 04/18/23 10:10
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Justification for
change:

Modified title represents what is being covered in the course much better.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

History

1. Nov 23, 2017 by
dagli (805.1)

Course Reviewer **jpnfd (03/13/23 1:49 pm):** Updated term to Fall 2023

Comments **jpnfd (03/13/23 1:50 pm):** Removed extra space after "practical" in description.

Key: 805

[Preview Bridge](#)

Course Change Request

Date Submitted: 04/03/23 12:53 pm

Viewing: **SYS ENG 6543 ~~6541~~ : Digital Engineering**

File: 1917.5

Last approved: 11/28/22 6:01 am

Last edit: 04/03/23 12:53 pm

Changes proposed by: dagli

Requested Fall 2023
Effective Change
Date
Department Engineering Management and Systems Engineering
Discipline Systems Engineering (SYS ENG)
Course Number 6543 ~~6541~~
Title
 Digital Engineering
Abbreviated Digital Engineering
Course Title

Catalog

Description

This course discusses issues related to distributed systems architecting, modeling, analysis and representation, with specific focus on the digital system engineering domain. Distributed modeling techniques and other model decomposition methods using simulation modeling and scalability issues will also be addressed.

Prerequisites

[Sys Eng 6542.](#)

Field Trip

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0

Total: 3

Required for
Majors No

In Workflow

1. **RENGMNGT**
 Chair
2. **CCC Secretary**
3. **Engineering DSCC**
 Chair
4. **Pending CCC**
 Agenda post
5. **CCC Meeting**
 Agenda
6. Campus Curricula
 Committee Chair
7. FS Meeting
 Agenda
8. Faculty Senate
 Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 03/12/23 6:55 pm
 David Enke
 (enke): Approved
 for RENG MNGT
 Chair
2. 03/13/23 4:23 pm
 Jennifer
 Pohlsander
 (jpnfd): Rollback
 to Initiator
3. 03/14/23 12:49
 pm
 David Enke
 (enke): Approved
 for RENG MNGT

Elective for Majors No

Justification for change:

SysEng 6541 Digital Engineering course builds on the knowledge gained in SysEng 6542 Model Based Engineering course. Hence, SysEng 6542 needs to be added as a prerequisite for SysEng 6541 and the number needs to change to SysEng 6543 to reflect the sequence of taking these two courses.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

jpnfd (03/13/23 4:23 pm): Rollback: Course numbers cannot be switched or reused. Please resubmit form with a new unique course number.

jpnfd (03/30/23 1:22 pm): Updated prerequisite format.

jpnfd (04/03/23 10:47 am): Rollback: Rollback to department for new course number creation.

jpnfd (04/03/23 12:47 pm): Rollback: Update course number

Key: 1917

Chair

4. 04/03/23 10:47 am

Jennifer Pohlsander (jpnfd): Rollback to RENGMNGT Chair for CCC Secretary

5. 04/03/23 12:47 pm

Jennifer Pohlsander (jpnfd): Rollback to Initiator

6. 04/03/23 1:06 pm

David Enke (enke): Approved for RENGMNGT Chair

7. 04/03/23 2:25 pm

Jennifer Pohlsander (jpnfd): Approved for CCC Secretary

8. 04/12/23 8:52 am

Mark Fitch (mfitch): Approved for Engineering DSCC Chair

9. 04/18/23 10:10 am

Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Nov 28, 2022 by

dagli (1917.1)

[Preview Bridge](#)

Course Change Request

Date Submitted: 03/15/23 11:18 am

Viewing: **TCH COM 5085 ~~4085~~ : Internship**

File: 2442.3

Last approved: 10/19/15 3:34 am

Last edit: 04/03/23 11:17 am

Changes proposed by: kswenson

Requested 01/12/2016

Effective Change

Date

Department English and Technical Communication

Discipline Technical Communication (TCH COM)

Course Number 5085 ~~4085~~

Title

Internship

Abbreviated Internship

Course Title

Catalog

Description

Internship will involve students applying critical thinking skills and discipline specific knowledge in a work setting based on a project designed by the advisor and employee. Activities will vary depending on the student's background and the setting. [The course may be taken for undergraduate credit and/or graduate credit for up to 6 hours total.](#)

Prerequisites

Must have completed 24 hours in the major core curriculum.

Field Trip

Statement

Credit Hours LEC: 0 LAB: 0 IND: 0 RSD: 0

Total: 0-6

Required for No

Majors

In Workflow

1. **REGLISH Chair**
2. **CCC Secretary**
3. **Arts & Humanities DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 03/15/23 11:32 am
Kristine Swenson (kswenson):
Approved for
REGLISH Chair
2. 04/03/23 11:10 am
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/03/23 11:17 am
Petra Dewitt

Elective for Yes ~~No~~

Majors

Justification for
change:

This course is largely taken by graduate students rather than undergraduates. A 5000-level designation is more accurate and will not require special permission paperwork for graduate students.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

dewittp (04/03/23 11:17 am): Changed to Yes for Elective for Majors.

(dewittp):
Approved for Arts
& Humanities
DSCC Chair
4. 04/18/23 10:10
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Oct 19, 2015 by
kswenson
(2442.1)

Key: 2442

[Preview Bridge](#)

Program Change Request

Date Submitted: 03/10/23 12:00 pm

Viewing: **AE ENG-BS : Aerospace Engineering BS**

File: 141.40

Last approved: 05/02/22 1:30 pm

Last edit: 03/10/23 12:00 pm

Changes proposed by: nisbett

Catalog Pages Using this Program

[Aerospace Engineering](#)

Start Term

Fall ~~2022~~ 2023

Program Code

AE ENG-BS

Department

Mechanical & Aerospace Engineering

Title

Aerospace Engineering BS

Program Requirements and Description

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 03/16/23 1:37 pm
David Bayless (djbkqf): Approved for RMECHENG Chair
2. 04/05/23 3:46 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/12/23 8:51 am
Mark Fitch (mfitch): Approved for Engineering DSCC Chair
4. 04/18/23 10:08 am
Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by J. Keith Nisbett (nisbett)
2. Aug 1, 2014 by pantaleoa

3. Jul 14, 2015 by pantaleoa
4. Mar 27, 2017 by Shauntae Ellis (smetg6)
5. Nov 2, 2018 by Kakkattukuzhy Isaac (isaac)
6. Jun 14, 2019 by ershenb
7. Mar 3, 2020 by ershenb
8. Oct 28, 2021 by J. Keith Nisbett (nisbett)
9. May 2, 2022 by J. Keith Nisbett (nisbett)

Bachelor of Science Aerospace Engineering

The aerospace engineering program at Missouri S&T is characterized by its focus on the scientific basics of engineering and its innovative application. Indeed, the underlying theme of this educational program is the application of the scientific basics to engineering practice through attention to problems and needs of the public. The necessary interrelations among the various topics, the engineering disciplines, and the other professions as they naturally come together in the solution of real world problems are emphasized as research, analysis, synthesis, and design are presented and discussed through classroom and laboratory instruction.

Students must comply with the requirements specified in the current online catalog published by the registrar. For the bachelor of science degree in aerospace engineering a minimum of 128 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. An average of at least two grade points per credit hour must be attained. At least two grade points per credit hour must also be attained in all courses taken in aerospace engineering. Each student's program of study must contain a minimum of 24 credit hours of course work in general education and must be chosen to satisfy the following requirements:

1. [ENGLISH 1120](#).
2. [HISTORY 1200](#), [HISTORY 1300](#), [HISTORY 1310](#), or [POL SCI 1200](#)
3. [ECON 1100](#) or [ECON 1200](#)
4. [ENGLISH 1160](#) or [ENGLISH 3560](#) or [SP&M S 1185](#)
5. A literature elective*
6. An ethics elective*
7. Depth elective. A humanities or social science elective that has a humanities or social science course already taken as a prerequisite*
8. A humanities or social science elective*

*Humanities and social science elective must be at least 3 credit hours of lecture designation, and also meet the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.

Freshman Year

First Semester	Credits	Second Semester	Credits
FR ENG 1100	1	MECH ENG 1720	3
CHEM 1310 ⁴	4	MATH 1215 ⁴	4
CHEM 1319	<u>1</u>	PHYSICS 1135 ⁴	4
ENGLISH 1120	3	H/SS Economics elective ³	3
MATH 1214 or 1211 ⁴	4		
H/SS History Elective ²	3		
	16		14
Sophomore Year			
First Semester	Credits	Second Semester	Credits
COMP SCI 1570 or 1972	2-3	AERO ENG 2780	2
COMP SCI 1580 or 1982	4	AERO ENG 2360 ⁴	3
CIV ENG 2200 ⁴	3	MECH ENG 2519 ⁴	3
MATH 2222 ⁴	4	MATH 3304 ⁴	3
PHYSICS 2135 ⁴	4	CIV ENG 2210 ⁴	3
AERO ENG 2861 ⁴	3	AERO ENG 2790	2
Programming elective ¹	<u>3</u>		
	17		16
Junior Year			
First Semester	Credits	Second Semester	Credits
AERO ENG 3613 ⁴	3	AERO ENG 3251 ⁴	3
AERO ENG 3131 ⁴	3	AERO ENG 3361	3
AERO ENG 3877	3	AERO ENG 3171	3
ELEC ENG 2800	3	AERO ENG 4882	2
MET ENG 2110	<u>3</u>	Elective/Ethics ⁹	3
Electives-Advanced Math/Cmp Sci ⁵	3	Elective/Communications ⁷	3
	15		17
Senior Year			
First Semester	Credits	Second Semester	Credits
AERO ENG 4535	3	AERO ENG 4781 or 4791	3
AERO ENG 4253	3	Electives-Technical ⁶	3
AERO ENG 4780 or 4790	3	Electives-Technical ⁶	3
AERO ENG 4883	2	AERO ENG 4885	1
Electives-Technical ⁶	3	Electives-Hum/Soc Sci	3
Depth Elective/Hum/Soc Sci ⁸	3	Elective/Literature	3
	17		16

1 The programming elective consists of a lecture and lab combination, and may be selected from [COMP SCI 1972/COMP SCI 1982](#), or [COMP SCI 1570/COMP SCI 1580](#). Note that [COMP SCI 1570/COMP SCI 1580](#) requires one more credit hour.

2 Must be one of the following: [POL SCI 1200](#), [HISTORY 1200](#), [HISTORY 1300](#), or [HISTORY 1310](#).

3 Must be one of the following: [ECON 1100](#) or [ECON 1200](#).

4 A grade of "C" or better in [CHEM 1310](#), [MATH 1214](#) or [MATH 1211](#), [MATH 1215](#), [MATH 2222](#), [MATH 3304](#), [PHYSICS 1135](#), [PHYSICS 2135](#), [CIV ENG 2200](#), [CIV ENG 2210](#), and computer programming elective, [AERO ENG 2360](#), [AERO ENG 2861](#), and [MECH ENG 2519](#), as prerequisite for follow-up courses in the curriculum and for graduation.

5 Must be one of the following: [AERO ENG 5830](#), [COMP SCI 3200](#), [MATH 3108](#), [STAT 3113](#), [STAT 3115](#), or any 5000-level math or computer science course approved by the student's advisor.

6 Electives must be approved by the student's advisor. Nine hours of technical electives must be in mechanical and aerospace engineering. Three hours of departmental technical electives must be at the 5000-level. [AERO ENG 3877](#) and the 5000-level Asteroid Mining course co-listed with geological engineering are not to be used for 5000-level technical elective.

7 This course can be selected from [ENGLISH 1160](#), [ENGLISH 3560](#), [SP&M S 1185](#), or the complete four-course sequence in advanced ROTC ([MIL ARMY 3250](#), [MIL ARMY 3500](#), [MIL ARMY 4250](#), and [MIL ARMY 4500](#); or [MIL AIR 3110](#), [MIL AIR 3120](#), [MIL AIR 4110](#) and [MIL AIR 4120](#)).

8 To satisfy the depth requirement, this course should have a humanities and social science course already taken as a prerequisite.

9 Must be a course on engineering ethics, business ethics, bio ethics, social ethics, or any ethics course approved by the student's advisor.

Justification for request

1. Aero Eng 3877 is being replaced with Mt Eng 2110. Mt Eng 2110 is similar in content and is offered every semester.
2. Aero Eng 4780 is being changed from 2 credits to 3 credits. This makes it consistent with the alternative course Aero Eng 4790. The CC form to is being submitted simultaneously, with a later effective date consistent with when the students with a Fall 2023 catalog year should be taking the course.
3. Chem 1100 is being deleted as a requirement. The Aero Eng degree does not need this safety training as part of its curriculum. Other engineering programs at S&T do not require it. Transfer students are not expected to take it. This reduction of 1 credit hour offsets the increase in one hour for AE 4780, keeping the total credits at 128.
4. The programming elective options are the same, but are being shown as a footnote to allow the difference in credit hours for the elective options to be moved out of the primary degree plan. This way, the primary degree plan shows as 128 credits rather than 128 or 129 credits.

Supporting Documents

Course Reviewer Comments

Program Change Request

Date Submitted: 04/07/23 3:26 pm

Viewing: **CAD/CAM-CT : CAD/CAM & Rapid
Prdct Real CT**

File: 308.3

Last approved: 06/12/19 10:48 am

Last edit: 04/07/23 3:26 pm

Changes proposed by: nisbett

Catalog Pages Using this Program

[Manufacturing Engineering](#)

Start Term

Fall ~~2019~~ 2023

Program Code

CAD/CAM-CT

Department

Mechanical & Aerospace Engineering

Title

CAD/CAM & Rapid Prdct Real CT

Program Requirements and Description

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 04/07/23 4:25 pm
David Bayless (djbkqf): Approved for RMECHENG Chair
2. 04/13/23 2:41 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/18/23 9:16 am
Mark Fitch (mfitch): Approved for Engineering DSCC Chair
4. 04/18/23 10:09 am
Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Jun 12, 2019 by ershenb

CAD/CAM & Rapid Product Realization Certificate

One each from the four core areas in the Manufacturing Engineering program as outlined below:

Course I	
MECH ENG 5763	Computer Aided Design: Theory and Practice
MECH ENG 5653	Computer Numerical Control of Manufacturing Processes
Course II	
MECH ENG 6659	Advanced Topics in Design and Manufacturing
MECH ENG 6653	Advanced Cnc Of Manufacturing Processes & Engineering Metrology
MECH ENG 6663	Advanced Digital Design and Manufacturing
Course III	
Select one of the following:	
ENG MGT 5515/MECH ENG 5757	Integrated Product And Process Design
MECH ENG 5708	Rapid Product Design And Optimization
MECH ENG 5757/ENG MGT 5515	Integrated Product And Process Design
Course IV	
Select one of the following:	
AERO ENG 5760	Probabilistic Engineering Design
MECH ENG 5212	Introduction to Finite Element Analysis
MECH ENG 5656	Design For Manufacture
MECH ENG 5760/AERO ENG 5760	Probabilistic Engineering Design

Justification for request

Updated elective options to correlate with currently available courses.

Supporting Documents

Course Reviewer Comments

Program Change Request

Date Submitted: 03/30/23 4:28 pm

Viewing: **CHEM-BS : Chemistry BS**

File: 16.40

Last approved: 06/14/22 4:24 pm

Last edit: 03/30/23 4:28 pm

Changes proposed by: tschuman

Catalog Pages Using this Program

[Chemistry](#)

Start Term

Fall 2023 ~~2022~~

Program Code

CHEM-BS

Department

Chemistry

Title

Chemistry BS

Program Requirements and Description

In Workflow

1. **RCHEMIST Chair**
2. **CCC Secretary**
3. **Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 04/05/23 7:58 pm
Chariklia Sotiriou-Leventis (cslevent):
Approved for
RCHEMIST Chair
2. 04/14/23 9:49 am
Jennifer Pohlsander (jpnfd): Approved
for CCC Secretary
3. 04/17/23 9:25 pm
Katie Shannon (shannonk):
Approved for
Sciences DSCC
Chair
4. 04/18/23 10:09 am
Jennifer Pohlsander (jpnfd): Approved
for Pending CCC
Agenda post

History

1. Apr 28, 2014 by
Thomas Schuman
(tschuman)
2. Jun 19, 2015 by

- woelk (woelkk)
3. Jun 28, 2017 by Thomas Schuman (tschuman)
 4. May 3, 2018 by Thomas Schuman (tschuman)
 5. Dec 3, 2019 by Thomas Schuman (tschuman)
 6. Sep 2, 2020 by Crystal Wilson (wilsoncry)
 7. Jun 10, 2021 by Thomas Schuman (tschuman)
 8. Jun 14, 2022 by Thomas Schuman (tschuman)

Bachelor of Science Chemistry

A minimum ~~of 120~~ ~~of 127~~ credit hours is required for a Bachelor of Science degree in Chemistry and an average of at least two grade points per credit hour must be obtained. These requirements for the B.S. degree are in addition to credit received for algebra, trigonometry, and basic ROTC.

The Chemistry science curriculum requires ~~twelve (12)~~ ~~nine~~ semester hours in humanities and must include ENGLISH 1120 and ENGLISH 1160 or ENGLISH 3560. A minimum of ~~six (6)~~ ~~nine~~ semester hours is required in social sciences, including either HISTORY 1300, HISTORY 1310, HISTORY 1200, or POL SCI 1200. Specific requirements for the bachelor degree are outlined in the sample program listed below.

Freshman Year			
First Semester	Credits	Second Semester	Credits
<u>CHEM 1100</u>	1	<u>CHEM 1320</u>	3
<u>CHEM 1110</u>	1	<u>CHEM 1510</u>	2
<u>CHEM 1310</u>	4	<u>MATH 1215</u>	4
<u>CHEM 1319</u>	1	Electives	6
<u>MATH 1214</u> or <u>1210</u> and <u>1211</u>	4	<u>COMP SCI 1500</u>	<u>3</u>
<u>ENGLISH 1120</u>	3	<u>ENGLISH 1160</u>	<u>3</u>
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3		
	14		15
Sophomore Year			

First Semester	Credits	Second Semester	Credits
CHEM 2210	3	CHEM 2220	3
CHEM 2219	1	CHEM 2229	1
MATH 2222	4	CHEM 3410	3
PHYSICS 1135	4	CHEM 2410	<u>3</u>
Electives	4	CHEM 2510	<u>4</u>
Elective	<u>3</u>	PHYSICS 2135	4
		Select one of the following sequences:	3
		COMP SCI 1972 & COMP SCI 1982	-
		IS&T 1561 or COMP SCI 1500	-
		COMP SCI 1974 & COMP SCI 1984	-
	15		15
Junior Year			
First Semester	Credits	Second Semester	Credits
CHEM 2310	3	CHEM 2319	4
CHEM 2510	4	CHEM 2320	3
CHEM 3430	3	CHEM 3420	3
CHEM 2420	<u>3</u>	CHEM 3459	2
CHEM 3310	<u>3</u>	CHEM 2459	<u>2</u>
CHEM 3510	<u>4</u>	CHEM 3320	<u>3</u>
STAT 3113 or 3115	3	CHEM 3329	<u>1</u>
ENGLISH 1160 or 3560	3	CHEM 4010 or 4099	<u>1</u>
ELECTIVE	<u>3</u>	CHEM 4099	<u>1</u>
		Electives	6
	16		14
Senior Year			
First Semester	Credits	Second Semester	Credits
CHEM 3510	4	CHEM 4010	4
CHEM 4099	1	CHEM 4297	3
CHEM 4610	3	Electives	12
CHEM 4810	3		
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	<u>3</u>		
Electives	6		
	16		15

Notes:

Grade Requirements: A minimum grade of "C" is required for each chemistry course counted towards the degree.

ROTC: Basic ROTC may be taken in the freshman and sophomore year, but does not count towards the degree.

Electives: ~~There are thirty-three (33) hours of electives, not to include Math courses that are prerequisite to calculus. The degree has six (6) Twelve (12) hours of general electives credit that may not include Math courses prerequisite to calculus. Twelve (12) hours upper technical electives must be 2xxx, 3xxx, 4xxx (or 5xxx or higher with permission) level in chemistry chemistry, to include up to a maximum of 9 credit hours of Chem 4099, or can be taken in another technical technical area with permission of department. Not more than one (1) credit hour of CHEM 4010 can be included for degree credit. department. Up to five (5) credit hours may be taken of CHEM 4099.~~

~~Chem 4099. Three (3) elective hours must be completed in the social sciences.~~

~~Six (6) elective hours must be completed in the social sciences. Six (6) elective hours are required in the humanities. Chemistry~~

Biochemistry Emphasis Area

Freshman Year			
First Semester	Credits	Second Semester	Credits
CHEM 1100	1	BIO SCI 2213	3
CHEM 1110	1	BIO SCI 2219	1
CHEM 1310	4	Electives	3
CHEM 1319	1	CHEM 1320	3
ENGLISH 1120	3	CHEM 1510	2
MATH 1214 or 1210 and 1211	4	ENGLISH 1160	<u>3</u>
HISTORY 1200, or 1300, or 1310, or POL SCI 4200	3	MATH 1215	4
	14		16
Sophomore Year			
First Semester	Credits	Second Semester	Credits
CHEM 2210	3	CHEM 2220	3
CHEM 2219	1	CHEM 2229	1
COMP SCI 1500	<u>3</u>	CHEM 3410	3
MATH 2222	4	CHEM 2410	<u>3</u>
PHYSICS 1135	4	CHEM 2510	<u>4</u>
Electives	4	PHYSICS 2135	4
		Select one of the following sequences:	3
		COMP SCI 1972 & COMP SCI 1982	-

IS&T 1561 or COMP SCI 1500

-

COMP SCI 1971

-

& COMP SCI 1981

15

15

Junior Year

First Semester	Credits	Second Semester	Credits
CHEM 2310	3	CHEM 2319	4
CHEM 3430	3	CHEM 2320	3
<u>CHEM 2420</u>	<u>3</u>	CHEM 2510	4
<u>CHEM 3310</u>	<u>3</u>	CHEM 3420	3
CHEM 4610	3	CHEM 3459	2
CHEM 4619	2	<u>CHEM 3329</u>	<u>1</u>
STAT 3113 or 3115	3	<u>CHEM 3320</u>	<u>3</u>
ENGLISH 1160 or 3560	3	<u>CHEM 2459</u>	<u>2</u>
		CHEM 4620	3
		<u>CHEM 4099</u>	<u>1</u>
		<u>CHEM 4010 or 4099</u>	<u>1</u>
		<u>Elective</u>	<u>3</u>
	14		14
Senior Year			
First Semester	Credits	Second Semester	Credits
CHEM 3510	4	CHEM 4010	4
CHEM 4099	1	CHEM 4297	3
CHEM 4810	3	Electives	12
CHEM 4630	3		
Electives	4		
<u>HISTORY 1200, or 1300, or 1310, or POL SCI 1200</u>	<u>3</u>		
<u>Elective</u>	<u>3</u>		
	17		15
Total Credits: 120			

Notes:

Grade Requirements: A minimum grade of "C" is required for each chemistry course counted towards the degree.

ROTC: Basic ROTC may be taken in the freshman and sophomore years, but does not count towards the degree.

Electives: The degree has six (6) ~~There are twenty-one (21) hours of electives, to include up to twelve (12) hours must be 2xxx, 3xxx, 4xxx (or 5xxx or higher with permission) level in chemistry, to include up to a maximum of 9~~ credit hours of general electives credit

~~Chem 4099 or another technical area with permission of department, not to include Math courses~~ that may not include Math courses are prerequisite to calculus. Three (3) hours upper technical elective credit must be 2xxx, 3xxx, 4xxx (or 5xxx or higher with permission) level in chemistry or can be taken in another technical area with permission of department. Not more than 1 credit hour of CHEM 4010 can be included for degree credit. Up to five (5) credit hours may be taken of CHEM 4099.

~~Six (6) elective hours must be completed in the socialsciences. Six (6) elective hours are required in the humanities.~~ **Polymer & Coatings Science Emphasis Area**

Freshman Year			
First Semester	Credits	Second Semester	Credits
CHEM 1100	1	CHEM 1320	3
CHEM 1110	1	CHEM 1510	2
CHEM 1310	4	COMP SCI 1500	<u>3</u>
CHEM 1319	1	ENGLISH 1160	<u>3</u>
MATH 1214 or 1210 and 1211	4	MATH 1215	4
ENGLISH 1120	3	Electives	6
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3		
	14		15
Sophomore Year			
First Semester	Credits	Second Semester	Credits
CHEM 2210	3	CHEM 2220	3
CHEM 2219	1	CHEM 2229	1
CHEM 4810	<u>3</u>	CHEM 2349	4
MATH 2222	4	CHEM 3410	3
PHYSICS 1135	4	CHEM 2410	<u>3</u>
CHEM 2340	3	CHEM 2510	<u>4</u>
		PHYSICS 2135	4
		Select one of the following sequences:	3
		COMP SCI 1972 & COMP SCI 1982	-
		IS&T 1561 or COMP SCI 1500	-
		COMP SCI 1974 & COMP SCI 1984	-
	15		15
Junior Year			
First Semester	Credits	Second Semester	Credits
CHEM 2510	4	CHEM 2320	3
CHEM 3430	3	CHEM 3420	3

CHEM 4810	3	CHEM 3459	2
<u>CHEM 2420</u>	<u>3</u>	<u>CHEM 2459</u>	<u>2</u>
<u>CHEM 3310</u>	<u>3</u>	<u>CHEM 3320</u>	<u>3</u>
<u>CHEM 3510</u>	<u>4</u>	<u>CHEM 4850</u>	3
<u>PHYSICS 4523</u>	<u>3</u>	<u>CHEM 3329</u>	<u>1</u>
<u>STAT 3113 or 3115</u>	3	<u>CHEM 4099</u>	2
<u>ENGLISH 1160 or 3560</u>	3	CHEM 4819	4
		Elective	3
	16		14
Senior Year			
First Semester	Credits	Second Semester	Credits
CHEM 3510	4	<u>CHEM 4297</u>	3
<u>CHEM 4010</u>	<u>1</u>	CHEM 4099	1-3
<u>CHEM 4099</u>	1	Electives	12
<u>CHEM 4610</u>	3		
PHYSICS 4523	3		
<u>CHEM 4819</u>	<u>1</u>		
<u>HISTORY 1200, or 1300, or 1310, or POL SCI 1200</u>	<u>3</u>		
Electives	7		
	16		15
Total Credits: 120			

Notes:

Grade Requirements: A minimum grade of "C" is required for each chemistry course counted towards the degree.

ROTC: Basic ROTC may be taken in the freshman and sophomore years, but does not count towards the degree.

Undergraduate Research: The undergraduate research CHEM 4099 CHEM 4099 must be done in Polymers and Coatings Science.

Electives: The degree has six (6) There are twenty-three (23) hours of electives, including twelve (12) hours must be 2xxx, 3xxx, 4xxx (or 5xxx or higher with permission) level in chemistry, to include up to a maximum of 9 credit hours of general electives credit Chem 4099 or another technical area with permission of department, not to include Math courses that may not include Math courses are prerequisite to calculus. Seven (7) hours upper technical electives credit must be 2xxx, 3xxx, 4xxx (or 5xxx or higher with permission) level in chemistry or can be taken in another technical area with permission of department. Not more than 1 credit hour of CHEM 4010 can be included for degree credit. Up to five (5) credit hours may be taken of CHEM 4099.

~~Six (6) elective hours must be completed in the socialsciences. Six (6) elective hours are required in the humanities.~~ Pre-medicine Emphasis Area

Freshman Year			
First Semester	Credits	Second Semester	Credits

CHEM 1100	1	BIO SCI 1113	3
CHEM 1110	1	BIO SCI 1219	1
CHEM 1310	4	ENGLISH 1120	3
CHEM 1319	1	CHEM 1320	3
ENGLISH 1120	<u>3</u>	CHEM 1510	2
MATH 1214 or 1210 and 1211	4	ENGLISH 1160	<u>3</u>
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3	MATH 1215	4
	14		16
Sophomore Year			
First Semester	Credits	Second Semester	Credits
BIO SCI 2213	3	CHEM 2220	3
BIO SCI 2219	1	CHEM 2229	1
CHEM 2210	3	CHEM 3410	3
CHEM 2219	1	CHEM 2410	<u>3</u>
MATH 2222	4	CHEM 2510	<u>4</u>
PHYSICS 1135	4	PHYSICS 2135	4
		Select one of the following sequences:	3
		COMP SCI 1972 & COMP SCI 1982	-
		IS&T 1561 or COMP SCI 1500	-
		COMP SCI 1974 & COMP SCI 1981	-
	16		15
Junior Year			
First Semester	Credits	Second Semester	Credits
CHEM 3430	3	CHEM 2510	4
CHEM 2420	<u>3</u>	CHEM 3420	3
CHEM 3310	<u>3</u>	CHEM 2459	<u>2</u>
CHEM 4610	3	CHEM 3320	<u>3</u>
CHEM 4619	2	CHEM 3329	<u>1</u>
CHEM 4010 or 4099	4	CHEM 4010 or 4099	<u>1</u>
BIO SCI 3333	3	CHEM 4620	3
BIO SCI 3359	1	CHEM 4099	<u>1</u>
ENGLISH 1160 or 3560	3	STAT 3113 or 3115	3
		BIO SCI 3343	3
	15		14

Senior Year			
First Semester	Credits	Second Semester	Credits
CHEM 2310	3	CHEM 2319	1
CHEM 3510	4	CHEM 2320	3
CHEM 3459	2	CHEM 4099	4
CHEM 4010 or 4099	4	BIO SCI 3343	3
CHEM 4099	1	CHEM 4297	3
CHEM 4810	3	Electives	9
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3		
Electives	4		
	15		15
Total Credits: 120			

Notes:

Grade Requirements: A minimum grade of “C” is required for each chemistry course counted towards the degree.

ROTC: Basic ROTC may be taken in the freshman and sophomore years, but does not count towards the degree.

Electives: The degree has four (4) credit ~~There are eleven (11)~~ hours of general electives credit ~~electives, not to include Math courses~~ that may not include Math courses ~~are~~ prerequisite to calculus. All technical electives credit are included within the plan of study. Not more than 1 credit hour of CHEM 4010 can be included for degree credit. Up to five (5) credit hours may be taken of CHEM 4099.

~~Up to five (5) credit hours may be taken of Chem 4099. Three (3) elective hours must be completed in the socialsciences. Three (3) elective hours are required in thehumanities.~~

Justification for request

We are reducing the required degree hours to 120 from 127.

Removed one social science course, to 6 hours total from 9. Combined three courses into 2 physical chemistry to align p-chem series with the other core disciplines of organic, inorganic, and analytical chemistry. Increased the amount of research required by one to two credit hours for most degree plans. We also removed a general elective hour. In addition, we are renumbering our inorganic and p-chem series to align them with typical year taken. CC forms are submitted for all course changes, which should align with the fall 23 semester. We are not seeking deactivation for some of the changed courses until some remaining earlier catalog year students complete their degree requirements. We seek a temporary waiver of course title duplicity for the inorganic courses, which are merely renumbered (and could deactivate but retain capability for degree completion).

Supporting Documents

Course Reviewer Comments

Program Change Request

Date Submitted: 04/06/23 12:20 pm

Viewing: **CP ENG-BS : Computer Engineering
BS**

File: 153.82

Last approved: 09/26/22 8:20 am

Last edit: 04/13/23 3:57 pm

Changes proposed by: stanleyj

Catalog Pages Using this Program
[Computer Engineering](#)

Start Term

Fall 2023

Program Code

CP ENG-BS

Department

Electrical and Computer Engineering

Title

Computer Engineering BS

Program Requirements and Description

In Workflow

1. RELECENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 11/11/22 7:29 pm
Jonathan Kimball (kimballjw):
Approved for RELECENG Chair
2. 02/07/23 3:15 pm
Jennifer Pohlsander (jpnfd): Rollback to RELECENG Chair for CCC Secretary
3. 04/05/23 11:43 am
Jonathan Kimball (kimballjw):
Rollback to Initiator
4. 04/06/23 12:21 pm
Jonathan Kimball (kimballjw):
Approved for RELECENG Chair
5. 04/13/23 3:59 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
6. 04/18/23 9:16 am
Mark Fitch (mfitch):
Approved for Engineering DSCC Chair

7. 04/18/23 10:09 am
Jennifer Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Aug 6, 2014 by Stanley (stanleyj)
2. Aug 13, 2014 by pantaleoa
3. Sep 21, 2015 by kleb6b
4. Apr 25, 2016 by Stanley (stanleyj)
5. Dec 1, 2016 by Stanley (stanleyj)
6. Sep 19, 2017 by Stanley (stanleyj)
7. Jun 18, 2018 by Stanley (stanleyj)
8. Nov 2, 2018 by Stanley (stanleyj)
9. May 2, 2019 by Stanley (stanleyj)
10. May 14, 2019 by ershenb
11. Mar 3, 2020 by Stanley (stanleyj)
12. May 2, 2022 by Stanley (stanleyj)
13. Sep 26, 2022 by Stanley (stanleyj)

Bachelor of Science Computer Engineering¹

For the Bachelor of Science degree in Computer Engineering, a minimum of 128 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. An average of at least two grade points per credit hour must be attained. At least two grade points per credit hour must also be attained in all courses taken in Computer Engineering.

Electrical and Computer Engineering degree programs will require a minimum of 21 credit hours of humanities/social-sciences as specified below:

- [ENGLISH 1120](#)
- [HISTORY 1200](#) or [HISTORY 1300](#) or [HISTORY 1310](#) or [POL SCI 1200](#)
- [ECON 1100](#) or [ECON 1200](#)
- Technical Communication Elective: [ENGLISH 1160](#) or [ENGLISH 3560](#)
- [SP&M S 1185](#)

- The remaining minimum of 6 additional credit hours must be three-credit hour lecture courses offered in disciplines in the humanities and social sciences. Humanities courses are defined as those in: Art, English and Technical Communication, Etymology, Foreign Languages, Music, Philosophy, Speech and Media Studies, and Theatre. Social Sciences courses are defined as those in: Economics, History, Political Science, and Psychology. Study abroad courses may count as H/SS courses. H/SS courses numbered 2001, 3001, and 4001 (experimental courses) may also be used to complete these elective requirements.

Courses in business, education, information science and technology, or any other discipline not listed above will **not** satisfy the humanities/social sciences elective requirement, although such courses may count toward general education requirements.

Transfer credits from other universities in sociology and general humanities may count as humanities or social science electives.

The Computer Engineering program at Missouri S&T is characterized by its focus on the scientific basics of engineering and its innovative application; indeed, the underlying theme of this educational program is the application of the scientific basics to engineering practice through attention to problems and needs of the public. The necessary interrelations among the various topics, the engineering disciplines, and the other professions as they naturally come together in the solution of real world problems are emphasized as research, analysis, synthesis, and design. These interrelations are presented and discussed through classroom and laboratory instruction.

Free Electives Footnote:

Each student is required to take three hours of free electives in consultation with his/her academic advisor. Credits which do not count towards this requirement are deficiency courses (such as algebra and trigonometry), and extra credits in required courses. Any courses outside of engineering and science must be at least three credit hours.

Freshman Year			
First Semester	Credits	Second Semester	Credits
FR ENG 1100 ²	1	COMP SCI 1500	3
MATH 1214 or 1211 ^{3,21}	4	MATH 1215 ³	4
CHEM 1310	4	PHYSICS 1135 ^{3,4}	4
CHEM 1319	1	ECON 1100 or 1200	3
HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200	3	Elective-Hum or Soc (any level) ⁵	3
ENGLISH 1120	3		
	16		17
Sophomore Year			
First Semester	Credits	Second Semester	Credits
ELEC ENG 2100 ^{3,6,7}	3	COMP ENG 2210 ^{3,6,8}	3
ELEC ENG 2101 ^{3,6}	1	COMP ENG 2211 ^{3,6}	1
MATH 2222 ³	4	ELEC ENG 2120 ^{3,7,9}	3
COMP SCI 1570 ³	3	MATH 3304 ³	3
COMP SCI 1580 ³	1	COMP SCI 1200 ³	3
PHYSICS 2135 ^{3,4}	4	COMP SCI 1575	3
	16		16

Junior Year

First Semester	Credits	Second Semester	Credits
COMP ENG 3110 ^{3,8}	3	COMP ENG Elective A ^{3,14}	3
COMP ENG 3150 ^{3,6,8}	3	ELEC ENG 3410 ^{3,6,9}	3
COMP ENG 3151 ^{3,6,8}	1	COMP SCI 3800 or 2500 ³	3
ELEC ENG 2200 ^{3,6,7}	3	STAT 3117 ¹²	3
ELEC ENG 2201 ^{3,6,7}	1	Communication Elective ¹³	3
Mathematics Elective ¹⁰	3		
SP&M S 1185 ¹³	3		
	17		15

Senior Year

First Semester	Credits	Second Semester	Credits
COMP ENG 5410 ³	3	COMP ENG Elective D ^{3,15,16}	3
COMP ENG Elective C ^{3,19}	3	COMP ENG Elective E ^{3,15,16}	3
COMP ENG 4096 ^{3,17}	1	COMP ENG 4097 ^{3,17}	3
Elective-Hum or Soc (any level) ⁵	3	Professional Development Elective ²⁰	3
Engineering Science Elective ¹¹	3	Free Elective ¹⁸	3
COMP ENG Elective B ^{3,14}	3		
	16		15
Total Credits: 128			

1

The minimum number of hours required for a degree in Computer Engineering is 128.

2

Students that transfer to Missouri S&T after their freshman year are not required to enroll in Foundational Engineering and Computing Seminars.

3

A minimum grade of "C" must be attained in [MATH 1214](#) or [MATH 1211](#), [MATH 1215](#), [MATH 2222](#), and [MATH 3304](#), [PHYSICS 1135](#) and [PHYSICS 2135](#) (or their equivalents), [COMP SCI 1570](#), [COMP SCI 1580](#), [COMP SCI 1575](#), [COMP SCI 1200](#), [COMP SCI 2500](#) or [COMP SCI 3800](#), [COMP ENG 2210](#), [COMP ENG 2211](#), [COMP ENG 3150](#), [COMP ENG 3151](#), [COMP ENG 3110](#), [COMP ENG 5410](#), [COMP ENG 4096](#), and [ELEC ENG 2100](#), [ELEC ENG 2101](#), [ELEC ENG 2120](#), [ELEC ENG 2200](#), [ELEC ENG 2201](#), and [ELEC ENG 3410](#) and the COMP ENG electives A, B, C, D and E. Also, students may not enroll in other courses that use these courses as prerequisites until the minimum grade of "C" is attained.

4

Students may take [PHYSICS 1111](#) and [PHYSICS 1119](#) in place of [PHYSICS 1135](#). Students may take [PHYSICS 2111](#) and [PHYSICS 2119](#) in place of [PHYSICS 2135](#).

5

All electives must be approved by the student's advisor. Students must comply with the general education requirements with respect to selection and depth of study. These requirements are specified in the current catalog.

6

Students who drop a lecture course prior to the deadline to drop a class must also drop the corequisite lab course.

7

Students must earn a passing grade on the ELEC ENG Advancement Exam I (associated with [ELEC ENG 2100](#)) before they enroll in [ELEC ENG 2120](#) or [ELEC ENG 2200](#) and [ELEC ENG 2201](#).

8

Students must earn a passing grade on the COMP ENG Advancement Exam (associated with [COMP ENG 2210](#)) before they enroll in any course with [COMP ENG 2210](#) and [COMP ENG 2211](#) as prerequisites.

9

Students must earn a passing grade on the ELEC ENG Advancement Exam II (associated with [ELEC ENG 2120](#)) before they enroll in [ELEC ENG 3410](#).

10

Students must take one of the following courses:

[MATH 3108](#), [MATH 3109](#), [MATH 5302](#), [MATH 5603](#), [MATH 5105](#), [MATH 5106](#), [MATH 5107](#), [MATH 5108](#), [MATH 4209](#), [MATH 4211](#), [MATH 5215](#), [MATH 5222](#), [MATH 5325](#), [MATH 4530](#), [MATH 5737](#), [MATH 5351](#), [MATH 5154](#), [MATH 4096](#), [MATH 5483](#), [MATH 5585](#), [STAT 5644](#), [STAT 5346](#), [STAT 5353](#).

11

Students must take one of [MECH ENG 2340](#), [MECH ENG 2519](#), [MECH ENG 2527](#), [PHYSICS 2311](#), [PHYSICS 2401](#), [CHEM 2210](#), [BIO SCI 2213](#), [BIO SCI 2223](#), [CIV ENG 2200](#), [MECH ENG 2350](#), [PHYSICS 2305](#), [PHYSICS 4311](#), [CER ENG 4240](#), or [NUC ENG 3205](#).

12

Students may replace [STAT 3117](#) with [STAT 3115](#) or [STAT 5643](#).

13

Student must take [ENGLISH 3560](#) or [ENGLISH 1160](#). Students may replace [SP&M S 1185](#) with the ROTC sequence of [MIL ARMY 4250](#) and [MIL ARMY 4500](#) or [MIL AIR 4110](#) and [MIL AIR 4120](#).

14

Comp Eng Senior Electives A and B, respectively, must be selected from 4xxx or 5xxx courses in Comp Eng, except Comp Eng 4000, 4099, 4096, 4097, 5000, and 5099. The two courses selected for electives A and B, respectively, should be from two different Comp Eng emphasis areas. The emphasis areas, with course number options, are as follows:

Integrated Circuits and Logic Design: 42xx/52xx

Computational Intelligence 53xx

Computer Architecture and Embedded Systems: 41xx/51xx, 45xx/55xx, 46xx/56xx

Networking, Security, and Reliability: 44xx/54xx, except Comp Eng 5410

Students admitted to the Accelerated BS/MS program must satisfy Comp Eng Electives A and B with 5000 or 6000-level courses with a minimum grade of B.

15

Comp Eng Senior Electives D and E must be selected from an approved list that contains most 3xxx, 4xxx and 5xxx courses in science, mathematics, and engineering except required courses in Comp Eng, Elec Eng, and Comp Sci and except COMP SCI 3610 and COMP SCI 5600.

16

COMP ENG Electives D and E cannot include more than three hours of Comp Eng/Elec Eng 3002, Comp Eng/Elec Eng/Comp Sci 4000 or 4099.

17

Students pursuing dual degrees in COMP ENG and ELEC ENG may take either [COMP ENG 4096](#) or [ELEC ENG 4096](#) and [COMP ENG 4097](#) or [ELEC ENG 4097](#). Students may not receive credit for both [COMP ENG 4096](#) and [ELEC ENG 4096](#) or [COMP ENG 4097](#) and [ELEC ENG 4097](#) in the same degree program.

18

Students are required to take at least three credit hours. [ELEC ENG 2800](#) level, [ELEC ENG 4096](#), [ELEC ENG 4097](#), [COMP ENG 4096](#) and [COMP ENG 4097](#) may not be used for free electives. No more than one credit hour of [COMP ENG 3002](#) or [ELEC ENG 3002](#) may be applied to the BS degree for free electives.

19

Comp Eng Senior Elective C must be selected from 3xxx, 4xxx or 5xxx courses in Comp Eng, Elec Eng, or Comp Sci, except Comp Eng/Elec Eng/Comp Sci 3000, 4000, 4096, 4097, 4099, 5000, and 5099 and Comp Sci 4010, 3610 and 5600.

20

Students must take one of the following courses: [BUS 5980](#), [ECON 4430](#), [ECON 5337](#), [ENG MGT 2310](#), [ENG MGT 3320](#), [ENG MGT 4110](#), [ENG MGT 5514](#), [PHILOS 3225](#).

21

The course combination [MATH 1210](#) and [MATH 1211](#) may be taken in place of [MATH 1214](#).

An accelerated BS/MS program is optional.

Emphasis Areas for Computer Engineering

Note: The following emphasis areas identify courses from which a student may opt to develop a specific emphasis. It is not required that students obtain an emphasis specialty within computer engineering.

Computational Intelligence

Highly Recommended		
COMP ENG 5310	Computational Intelligence	3
Suggested		
ELEC ENG 5330	Fuzzy Logic Control	3
COMP ENG 5450	Digital Image Processing	3
COMP ENG 5460	Machine Vision	3

Computer Architecture and Embedded Systems

Highly Recommended		
COMP ENG 5110	Principles of Computer Architecture	3
COMP ENG 5120	Digital Computer Design	3
COMP ENG 5151	Digital Systems Design Laboratory	3
COMP ENG 5160	Embedded Processor System Design	3
COMP ENG 5170	Real-Time Systems	3
Suggested		
COMP ENG 5610	Real-Time Digital Signal Processing	3
COMP ENG 5130	Advanced Microcomputer System Design	3
ELEC ENG 3100	Electronics I	3
COMP SCI 3100	Software Engineering I	3

Integrated Circuits and Logic Design

Highly Recommended		
COMP ENG 2210	Introduction to Digital Logic	3
COMP ENG 5210	Introduction To VLSI Design	3
COMP ENG 5220	Digital System Modeling	3
Suggested		
ELEC ENG 3100	Electronics I	3
COMP ENG 5110	Principles of Computer Architecture	3
COMP ENG 5151	Digital Systems Design Laboratory	3
COMP ENG 5120	Digital Computer Design	3
COMP ENG 5130	Advanced Microcomputer System Design	3
COMP ENG 5510	Fault-Tolerant Digital Systems	3

Networking, Security, and Dependability

Highly Recommended		
COMP ENG 5420	Introduction to Network Security	3
COMP ENG 5430	Wireless Networks	3
Suggested		
COMP ENG 5510	Fault-Tolerant Digital Systems	3

Accelerated BS/MS Program Option for EE and CpE Majors

Electrical engineering or computer engineering undergraduates in ECE at Missouri S&T may opt to apply for an accelerated BS/MS ECE program where a student can achieve both degrees faster than if pursuing the degrees separately. The degrees may be BS EE and MS EE, BS CpE and MS CpE, BS EE and MS CpE, or BS CpE and MS EE. The benefits of the program for admitted students are:

- Undergraduate and graduate courses may be chosen with greater flexibility,
- Up to nine hours of 5000-level or above ECE coursework may apply to both the BS and MS requirements,
- The classes taken for shared BS/MS credit may be taken at the lower undergraduate tuition rate,
- The GRE is not required for admission,
- Other graduate credit courses may be taken anytime after entering the program, and
- Work on a thesis project may begin before the BS requirements are completed.

To be eligible for the accelerated BS/MS ECE program, an EE or CpE undergraduate must be at or beyond the junior level with a minimum of 60 credit hours and must have completed 18 credit hours of EE and/or CpE courses at Missouri S&T with at least a 3.50 GPA in the ECE courses. To be admitted, the student must complete the program application and must have the recommendation of an ECE faculty member who agrees to serve as the graduate thesis advisor. No other MS degree requirements are changed. The MS degree must be for the thesis option. The program may be combined with existing honors research and emphasis area options. Admitted students will have both undergraduate and graduate records in the Registrar's Office.

The Accelerated program application must be completed within one semester after the shared-credit courses are completed. Courses taken for shared credit will be identified on this application form and on Graduate Form 1, which is submitted after the student enters the graduate program. The nine hours of shared-credit coursework will be taken as undergraduate credit, and may not be undergraduate research, special problems, or transfer courses (a co-listed course can only apply for these undergraduate requirements if it is under an EE or CpE registration. Note that the choice of EE or CpE registration may affect how a course can apply within an MS program.) An additional nine credit hours of coursework for graduate credit (beyond the shared BS/MS credits) can be taken while in the undergraduate program by applying for dual undergraduate/graduate enrollment. Taking additional courses for graduate credit will require formal application to the graduate program. Acceptance to the MS degree from the Accelerated Program is automatic so long as the student meets ECE graduate student academic performance requirements. To remain in the program, the student must maintain good standing within the undergraduate EE or CpE program and must maintain continuous enrollment at Missouri S&T. If the student exits the program before completion of the MS degree requirements or fails to maintain continuous enrollment at Missouri S&T, the shared-credit courses may not apply toward graduate requirements in the event of future readmission.

The student is responsible for checking on how dual-enrollment status and graduate coursework will affect scholarships and other financial aid. Once you become a graduate student, you **are not** eligible for Federal Pell Grants, though are still eligible for Federal Financial Aid and will be eligible for fellowships and teaching/research assistantships. International students should check with international affairs during completion of an accelerated BS/MS to ensure immigration status will be maintained throughout the program.

Justification for request

The Electrical and Computer Engineering faculty approved (4/5/23) changes to the Computer Engineering BS degree program Senior Electives. Senior Electives A and B require students to take Comp Eng 4xxx or 5xxx courses in two different emphasis areas (see footnote 14) with course number ranges specified for each emphasis area. This change is made to promote Computer Engineering BS students to obtain greater breadth of knowledge in core computer engineering emphasis areas. Senior Electives CDE match up with the previous Senior Electives A, D, and E. Wording changes in the new Senior Electives CDE have been made to accommodate for Comp Sci course number changes and to include Comp Eng/Elec Eng 3002 options and credit hour restrictions (3) toward Senior Electives D and E.

Footnote 14 has also been updated to specify Senior Elective requirements (A and B) toward the Accelerated BS/MS program.

Supporting Documents

Course Reviewer Comments

jpnfd (02/07/23 3:15 pm): Rollback: Rolled back for further review by the department and to update the justification.

kimballjw (04/05/23 11:43 am): Rollback: Need to update per recent department vote.

jpnfd (04/13/23 3:50 pm): Updated footnote format.

jpnfd (04/13/23 3:57 pm): Updated course format in footnotes.

Program Change Request

Date Submitted: 03/02/23 3:02 pm

Viewing: **ECON-BA : Economics BA**

File: 38.33

Last approved: 06/10/21 4:07 pm

Last edit: 04/14/23 10:41 am

Changes proposed by: davismc

Catalog Pages Using this Program

[Economics](#)

Start Term

Fall 2023 ~~2024~~

Program Code

ECON-BA

Department

Economics

Title

Economics BA

Program Requirements and Description

In Workflow

1. **RECONOMI Chair**
2. **CCC Secretary**
3. **Social Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. **Campus Curricula Committee Chair**
7. **FS Meeting Agenda**
8. **Faculty Senate Chair**
9. **Registrar**

Approval Path

1. 03/03/23 10:16 pm
Melody Lo (mlc2d):
Approved for
RECONOMI Chair
2. 03/10/23 11:54 am
Jennifer Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 03/10/23 12:12 pm
Cecil Eng Huang
Chua (cchua):
Approved for Social
Sciences DSCC
Chair
4. 03/22/23 10:05 am
Jennifer Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post
5. 04/06/23 9:51 am
Jennifer Pohlsander
(jpnfd): Rollback to
RECONOMI Chair
for CCC Meeting
Agenda
6. 04/06/23 4:43 pm
Melody Lo (mlc2d):
Approved for

- RECONOMI Chair
7. 04/10/23 12:03 pm
Jennifer Pohlsander
(jpnfd): Rollback to
RECONOMI Chair
for CCC Secretary
 8. 04/12/23 12:24 pm
Melody Lo (mlc2d):
Approved for
RECONOMI Chair
 9. 04/14/23 10:55 am
Jennifer Pohlsander
(jpnfd): Approved
for CCC Secretary
 10. 04/14/23 11:57 am
Cecil Eng Huang
Chua (cchua):
Approved for Social
Sciences DSCC
Chair
 11. 04/18/23 10:09 am
Jennifer Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. Aug 14, 2014 by
Lahne Black (lahne)
2. Jul 20, 2015 by
pantaleoa
3. Nov 18, 2015 by
Marcy Scott
(marcys)
4. Aug 14, 2017 by
Crystal Wilson
(wilsoncry)
5. Jun 18, 2018 by
Marcy Scott
(marcys)
6. Jun 10, 2021 by
Michael Davis
(davismc)

Bachelor of Arts Economics

In addition to the general university requirements for a bachelor of arts degree, a student must complete:

1. [ECON 1100](#), [ECON 1200](#), [ECON 2100](#), [ECON 2200](#), [ECON 3300](#) ~~ECON 2100~~ and [ECON 3333](#) ~~ECON 2200~~ with a minimum grade of “C” in each.
2. At least ~~12~~ 18 additional hours of economics electives, at or above the 2000 level, with a minimum grade of “C” in each.
3. [BUS 1210](#); and [STAT 3111](#), ~~STAT 1115 or ECON 1300; and ECON 4300.~~

Specific requirements for the Bachelor of Arts degree are outlined in the sample program listed below.

Freshman Year			
First Semester	Credits	Second Semester	Credits
ECON 1100 ¹	<u>3</u>	ECON 1200 ¹	<u>3</u>
BIO SCI 1113, or 1173, or 1223, or 1943	<u>3</u>	HISTORY 1100	<u>3</u>
ENGLISH 1120	<u>3</u>	MATH 1212	<u>4</u>
MATH 1140	<u>3</u>	Social Sciences (Political Science, Psychology or Sociology)	<u>3</u>
		COMP SCI 1972	<u>2</u>
		COMP SCI 1982	<u>1</u>
	12		16
Sophomore Year			
First Semester	Credits	Second Semester	Credits
ECON 2100 ¹	<u>3</u>	ECON 2200 ¹	<u>3</u>
ENGLISH 1211, or 1212, or 1221, or 1222, or 1223, or 1231, or 2230	<u>3</u>	Chemistry, Geology, Geophysics or Physics	<u>3</u>
HISTORY 1200	<u>3</u>	ART 1180, or 1185, or MUSIC 1150, or THEATRE 1190	<u>3</u>
Foreign Language	<u>4</u>	FOREIGN LANGUAGE	<u>4</u>
STAT 3111	<u>3</u>	BUS 1210	<u>3</u>
	16		16
Junior Year			
First Semester	Credits	Second Semester	Credits
ECON 3300 ¹	<u>3</u>	ECON 3333 ¹	<u>3</u>
Any Philosophy	<u>3</u>	Social Sciences (Political Science, Psychology or Sociology)	<u>3</u>
Social Sciences (Political Science, Psychology or Sociology)	<u>3</u>	Economics Elective ²	<u>3</u>
Economics Elective ²	<u>3</u>	Any course in Literature, Philosophy or Arts	<u>3</u>
Free Elective	<u>4</u>	FOREIGN LANGUAGE	<u>4</u>
	16		16
Senior Year			
First Semester	Credits	Second Semester	Credits
Economics Elective ²	<u>3</u>	Economics Elective ²	<u>3</u>

<u>Social Sciences (Political Science, Psychology or Sociology)</u>	<u>3</u>	<u>Free Elective</u>	<u>10</u>
<u>Free Electives</u>	<u>9</u>		
	15		13
Total Credits: 120			

1
=

A grade of C or better is required for ECON 1100, ECON 1200, ECON 2100, ECON 2200, ECON 3300 and ECON 3333.

2
=

Must be 2000 level or higher, with a minimum grade of C.

Decision Data Analytics Emphasis

<u>Junior and Senior Years</u>		
<u>ECON 5350</u>	<u>Course ECON 5350 Not Found</u>	<u>3</u>
<u>ECON 5360</u>	<u>Course ECON 5360 Not Found</u>	<u>3</u>

Financial Bachelor of Arts Economics and Technology Emphasis

<u>Junior and Senior Years</u>		
<u>ECON 4383</u>	<u>Course ECON 4383 Not Found</u>	<u>3</u>
<u>ECON 5337</u>	<u>Financial Mathematics</u>	<u>3</u>
<u>ECON 5360</u>	<u>Course ECON 5360 Not Found</u>	<u>3</u>

Energy Economics Emphasis

<u>Junior and Senior Years</u>		
<u>ECON 4440</u>	<u>Environmental And Natural Resource Economics</u>	<u>3</u>
<u>ECON 4540</u>	<u>Energy Economics</u>	<u>3</u>
<u>Choose one of the following courses:</u>		
<u>ECON 3512</u>	<u>Mining Industry Economics</u>	<u>3</u>
<u>ECON 5532</u>	<u>Advanced Mining Economics</u>	<u>3</u>
<u>Choose one of the following courses:</u>		
<u>ENG MGT 5513</u>	<u>Energy and Sustainability Management Engineering</u>	<u>3</u>
<u>CIV ENG 5642</u>	<u>Sustainability, Population, Energy, Water, and Materials</u>	<u>3</u>

Bachelor of Arts

Economics (Secondary Education Emphasis Emphasis Area)

You may earn a B.A. degree in economics from Missouri S&T and certification to teach at the secondary level in the schools of Missouri with the emphasis area program. This program can be completed in four academic years and student teaching is arranged with public schools anywhere in the state.

Students interested in this emphasis area should consult with the minor advisor in the economics department.

In order to successfully complete this emphasis area, students must attain at least a 3.0 GPA in content courses and professional

education courses. Students must also meet all requirements listed under the teacher education section of this catalog. Students who do not meet all the teacher certification requirements will not be eligible for the secondary education emphasis area, even if they have completed all course work.

A degree in this emphasis area requires 135-137 credit hours. The required courses are provided below. A minimum grade of "C" is required by the department in all mathematics and statistics courses counted toward this degree.

Communications Skills: 9 semester hours		
ENGLISH 1120	Exposition And Argumentation	3
ENGLISH 1160	Writing And Research	3
or ENGLISH 3560	Technical Writing	
SP&M S 1185	Principles Of Speech	3
Humanities: 9 semester hours		
Must include 9 hours from each of the following 3 areas: Art, Music or Theatre, Philosophy, Literature		9
Social Sciences: 21 semester hours		
HISTORY 1300	American History To 1877	3
HISTORY 1310	American History Since 1877	3
HISTORY 2110	World Regional Geography	3
HISTORY 4435	History of the American West	3
POL SCI 1200	American Government	3
PSYCH 1101	General Psychology	3
PSYCH 4600	Social Psychology	3
Natural Sciences: 7 semester hours (including 1 lab)		
Physics or Geology w/Lab		4
BIO SCI 1113	General Biology	3
Mathematics: 3 semester hours		
MATH 1120	College Algebra	3-5
or MATH 1140	College Algebra	
or higher		
Professional Requirements: 23 semester hours		
EDUC 1040	Perspectives In Education	2
EDUC 1174	School Organization and Administration For Teachers	2
EDUC 3216	Instructional Literacy in the Content Area	3
EDUC 3280	Instructional Strategies in the Content Area	3
EDUC 4298	Student Teaching Seminar	1
ENGLISH 3170	Teaching And Supervising Reading and Writing	3
PSYCH 2300	Educational Psychology	3
or EDUC 2102	Educational Psychology	
PSYCH 3310	Developmental Psychology	3

PSYCH 4310	Psychology Of The Exceptional Child	3
or EDUC 2310	Education Of The Exceptional Child	
Clinical Experience: 15 semester hours		
EDUC 1104	Teacher Field Experience I	1
EDUC 1164	Teacher Field Experience II	2
EDUC 4299	Student Teaching	12
Economics: 30 semester hours		
ECON 1100	Principles Of Microeconomics	3
ECON 1200	Principles Of Macroeconomics	3
ECON 2100	Intermediate Microeconomic Theory	3
ECON 2200	Intermediate Macroeconomic Theory	3
ECON 4300	Research Methods and Applications in Economics and Business	3
Econ Electives (3000 or 4000 level)		12
BUS 1210	Financial Accounting	3
Certification: 18 semester hours		
Am History (from approved DESE list)		6
European History (from approved DESE list)		9
Upper Pol Sci (from approved DESE list)		3

Justification for request

The addition of two more mathematical courses (ECON 3300 and ECON 3333) makes the program more quantitative, though not as quantitative as the new version of the BS. The stylistic changes are to make the program look like the BS degree.

Supporting Documents

[Econ-Emphasis.pdf](#)

[MST PC January 2023.pdf](#)

Course Reviewer Comments

jpnfd (03/08/23 1:43 pm): CIP code changed from CIP 450601 to CIP 450603.

jpnfd (03/08/23 1:46 pm): Updated term to Fall 2023.

jpnfd (03/09/23 2:49 pm): Sophomore year first semester- Added "or Econ 1300" to Stat 3111. Added footnote 3- Must be 2000 level or higher, with a minimum grade of C. Per department, revisions to the secondary education emphasis will be submitted once necessary approvals are received (DESE).

jpnfd (04/06/23 9:51 am): Rollback: Rolled back for revisions.

davismc (04/06/23 3:42 pm): Made the following changes: 1. Comp Sci 1971 and 1981 to replace IST courses (also removed old footnote 2 and footnote 3 became footnote 2) 2. Removed Lab requirement and SP&M 1185 and replaced with 4 free electives. 3. Changed Geo Eng to Geophysics. 4. Removed Econ 1300 from bullet point 3.

davismc (04/06/23 4:35 pm): Updated the Stat course.

jpnfd (04/10/23 11:33 am): Document attached regarding Econ BA & BS emphasis areas.

jpnfd (04/10/23 11:38 am): Added MDHE approval.

jpnfd (04/10/23 12:03 pm): Rollback: Add emphasis areas.

davismc (04/11/23 4:10 pm): Added the Emphasis areas.

jpnfd (04/14/23 10:41 am): Updated Comp Sci courses to Comp Sci 1972 & 1982.

Program Change Request

Date Submitted: 02/28/23 11:58 am

Viewing: **ECON-BS : Economics BS**

File: 39.31

Last approved: 06/10/21 4:07 pm

Last edit: 04/07/23 8:37 am

Changes proposed by: davismc

Catalog Pages Using this Program

[Economics](#)

Start Term

Fall ~~2024~~ 2023

Program Code

ECON-BS

Department

Economics

Title

Economics BS

Program Requirements and Description

In Workflow

1. RECONOMI Chair
2. CCC Secretary
3. Social Sciences DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 02/28/23 2:17 pm
Melody Lo (mlc2d):
Approved for
RECONOMI Chair
2. 03/10/23 11:54 am
Jennifer Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 03/10/23 12:12 pm
Cecil Eng Huang
Chua (cchua):
Approved for Social
Sciences DSCC
Chair
4. 03/22/23 10:05 am
Jennifer Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post
5. 04/06/23 9:52 am
Jennifer Pohlsander
(jpnfd): Rollback to
RECONOMI Chair
for CCC Meeting
Agenda
6. 04/06/23 4:11 pm
Melody Lo (mlc2d):
Approved for
RECONOMI Chair
7. 04/13/23 3:27 pm
Jennifer Pohlsander
(jpnfd): Approved
for CCC Secretary
8. 04/13/23 3:47 pm
Cecil Eng Huang
Chua (cchua):
Approved for Social

Sciences DSCC
 Chair
 9. 04/18/23 10:09 am
 Jennifer Pohlsander
 (jpnfd): Approved
 for Pending CCC
 Agenda post

History

1. May 28, 2015 by pantaleoa
2. May 28, 2015 by pantaleoa
3. Nov 18, 2015 by Marcy Scott (marcys)
4. Aug 14, 2017 by Crystal Wilson (wilsoncry)
5. Jun 10, 2021 by Michael Davis (davismc)

Bachelor of Science Economics

In addition to Economics, the general university requirements for a bachelor Bachelor of science degree, a student must complete: Science degrees consist of 120 credit hours.

1. ECON 1100, ECON 1200, ECON 2100, ECON 2200, ECON 3300, ECON 3333, and ECON 4538 with a minimum grade of "C" in each.
2. First, all undergraduate students in Economics are required to complete a prescribed General Education Requirements Core that corresponds to the recommendations of the Missouri State Coordinating Board for Higher Education and consists of 42 credit hours in the areas of Individual Expression, Natural Systems, and Human Institutions. In addition, there are a required 24 credit hour core consisting of courses in Information Technology, Management, Quantitative Skills, and Communication Skills. Finally, each degree includes 28 credit hours of free electives. The remaining 33 credit hours of the required 120 credit hours for the Economics degree are divided into a prescribed 15 credit hour degree core (ECON 1100, 1200, 2100, 2200 and 4300) and 18 credit hours of specific degree electives. At least 9 additional hours A minimum grade of economics electives, at or above "C" is required in the 2000 level, with a minimum grade of "C" in each. 15 credit core courses.
3. BUS 1210, ENG MGT 2110, and STAT 3111.

Specific requirements for the Bachelor of Science degree are outlined in the sample program listed below.

Freshman Year			
First Semester	Credits	Second Semester	Credits
ECON 1100 ³	3	ECON 1200 ³	3
ENGLISH 1120 ¹	3	HISTORY 1200, or 1300, or 1310	3
BIO SCI 1113, or 1173, or 1223, or 1943	3	MATH 1212	4
Lab w/Living or Physical Science Course	1	History	3
MATH 1140	3	PSYCH 1101	3
		IS&T 1551, or 1561, or COMP SCI 1971 ⁴	3
		OR	-
		COMP SCI 1980 or 1981	-
	13		16
Sophomore Year			

First Semester	Credits	Second Semester	Credits
ECON 2100 ³	3	ECON 2200 ³	3
SP&M S 1185	3	Chemistry, Geology, Geophysics, or Physics	3
ENGLISH 1211 , or 1212 , or 1231 , or 1221 , or 1222 , or 2230 , or 1223	3	ART 1180 , or 1185 , or MUSIC 1150 , or THEATRE 1190	3
STAT 3111	3	BUS 1210	3
Free Elective	3	Free Electives	3
	15		15
Junior Year			
First Semester	Credits	Second Semester	Credits
ECON 3300 ³	3	SP&M S 2181	3
ENGLISH 1600	3	Economics Electives ²	6
FINANCE 2150	3	ECON 3333 ³	3
POL SCI 1200	3	Culture, Society and Religion ²	3
Economics Elective ²	6	Economics Electives ⁵	3
ENG MGT 2110	3	Free Elective	6
Economics Elective ⁵	3		
	15		15
Senior Year			
First Semester	Credits	Second Semester	Credits
Culture, Sociology, Religion ³	3	Economics Elective ⁵	3
Economics Electives ²	3	ECON 4300	3
ECON 4538 ³	3	Free Electives	13
Free Electives	12		
	15		16
Total Credits: 120			

1

In-Major Writing Intensive

2

One of [ECON 3830](#), [ENGLISH 2242](#), [ENGLISH 2245](#), [ENGLISH 2410](#), [ENGLISH 3215](#), [ENGLISH 4290](#), Foreign Language Beyond Second Semester, [HISTORY 3321](#), [PHILOS 3225](#), [PHILOS 3235](#), [PHILOS 1175](#), [PHILOS 4340](#), Any Political Science, [PSYCH 4600](#), [PSYCH 4992](#), Any Sociology, [SP&M S 3235](#).

3

A Grade of "C" or better is required for [ECON 1100](#), [ECON 1200](#), [ECON 2100](#), [ECON 2200](#), [ECON 3300](#), [ECON 3333](#) and [ECON 4538](#).

4

[COMP SCI 1971](#) must also include [COMP SCI 1981](#).

5

Must be 2000 level or higher, with a minimum grade of C.

Decision Data Analytics Emphasis

Junior and Senior Years		
ECON 5350	Course ECON 5350 Not Found	3
ECON 5360	Course ECON 5360 Not Found	3

Financial Economics and Technology Emphasis

Junior and Senior Years		
ECON 4383	Course ECON 4383 Not Found	3

ECON 5337	Financial Mathematics	<u>3</u>
ECON 5360	Course ECON 5360 Not Found	<u>3</u>

Energy Economics Emphasis

<u>Junior and Senior Years</u>		
ECON 4440	Environmental And Natural Resource Economics	<u>3</u>
ECON 4540	Energy Economics	<u>3</u>
<u>Choose one of the following courses:</u>		
ECON 3512	Mining Industry Economics	<u>3</u>
ECON 5532	Advanced Mining Economics	<u>3</u>
<u>Choose one of the following courses:</u>		
ENG MGT 5513	Energy and Sustainability Management Engineering	<u>3</u>
CIV ENG 5642	Sustainability, Population, Energy, Water, and Materials	<u>3</u>

~~The Economics degree requires courses in advanced Micro, Macro and Statistics. The electives for this degree consist of courses from areas such as Law and Economics, Money and Banking, Energy Economics and E-Commerce.~~

Justification for request

The changes that have taken place are of three different types. The first is adding the emphasis areas that did not exist before and have been approved by MDHE. The second is making the curriculum more quantitative by requiring three econometric courses (3300, 3333 and 4538) in place of just one before (4300). This specific change coincides with the recently approved CIP code change from 45.0601 (Economics, General) to 45.0603 (Econometrics & Quantitative Economics), which will allow S&T's Economics to be designated as a science, technology, engineering, and mathematics (STEM) discipline. The last changes are just to clean up some issues not related to the current changes.

Supporting Documents

[Econ-Emphasis.pdf](#)

[MST PC January 2023.pdf](#)

[Substantive Curriculum Change Criteria \(11-17-2022\).pdf](#)

[Email MHHEWD Approval.pdf](#)

Course Reviewer Comments

jpndf (03/08/23 1:46 pm): Updated term to Fall 2023.

jpndf (03/09/23 2:39 pm): Sophomore year first semester- Added "or Econ 1300" to Stat 3111. Added Footnote 5: Must be 2000 level or higher, with a minimum grade of C.

jpndf (03/24/23 10:13 am): Omitted extra comma to correct typo.

jpndf (04/03/23 10:19 am): Attached documentation.

jpndf (04/06/23 9:52 am): Rollback: Rolled back for revisions

davismc (04/06/23 3:08 pm): Made the three suggested changes: Removed Econ 1300, changed Geo Eng to Geophysics and changed footnote 2.

jpndf (04/07/23 8:37 am): Econ 1300 removed from first semester sophomore year per email from Dr. Lo 4/6/23

Program Change Request

A deleted record cannot be edited

Program Deactivation Proposal

Date Submitted: 04/02/23 6:38 pm

Viewing: **ECON-MI : Economics Minor**

File: 221.4

Last approved: 05/07/14 10:37 am

Last edit: 04/02/23 6:38 pm

Changes proposed by: mlc2d

Catalog Pages Using this Program

[Economics](#)

Start Term

[Spring 2023](#) ~~Fall 2014~~

Program Code

ECON-MI

Department

Economics

Title

Economics Minor

Program Requirements and Description

In Workflow

1. **RECONOMI Chair**
2. **CCC Secretary**
3. **Pending CCC Agenda post**
4. **CCC Meeting Agenda**
5. Campus Curricula Committee Chair
6. FS Meeting Agenda
7. Faculty Senate Chair
8. Registrar

Approval Path

1. 04/03/23 11:32 am
Melody Lo (mlc2d):
Approved for
RECONOMI Chair
2. 04/13/23 3:28 pm
Jennifer Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/18/23 10:09 am
Jennifer Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

History

1. May 7, 2014 by
Lahne Black (lahne)
2. May 7, 2014 by
Lahne Black (lahne)
3. May 7, 2014 by
Lahne Black (lahne)

Students majoring in other disciplines are encouraged to develop a minor in economics. The formal minor in economics is designed to provide students with a solid understanding of economic principles and concepts and the ability to apply this knowledge to a host of economic, public policy and business problems. This program will be of particular benefit to those students whose major field of study may lead them to pursue a management position or later graduate studies in business.

The minor in economics requires the completion of a minimum of 15 hours of economics course work with a grade of "C" or better. Required courses in the minor program include both [ECON 1100](#) and [ECON 1200](#) and at least one of the intermediate theory courses, [ECON 2100](#) and/or [ECON 2200](#). The choice of which intermediate theory course depends on which 300 level economic electives the student, in consultation with the department's minor advisor, selects for their program.

Justification for request

The intent is to streamline the economics curriculum and offer non-economics majors (including business, engineering, and science students) the most valuable economics minor – quantitative economics minor, to strengthen their competitiveness in the job markets.

Supporting Documents

Course Reviewer Comments

Program Change Request

Date Submitted: 03/19/23 12:42 pm

Viewing: **ENG MG-BS : Engineering Management BS**

File: 44.45

Last approved: 06/14/22 9:37 am

Last edit: 04/05/23 9:34 am

Changes proposed by: schumanj

Catalog Pages Using this Program

[Engineering Management](#)

Start Term

Fall 2023 ~~2022~~

Program Code

ENG MG-BS

Department

Engineering Management and Systems Engineering

Title

Engineering Management BS

Program Requirements and Description

In Workflow

1. RENGMNGT Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 03/19/23 1:35 pm
David Enke (enke): Approved for RENGMNGT Chair
2. 04/13/23 4:07 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/18/23 9:16 am
Mark Fitch (mfitch): Approved for Engineering DSCC Chair
4. 04/18/23 10:09 am
Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Sep 24, 2013 by Lahne Black (lahne)
2. Apr 28, 2014 by Stephen Raper (sraper)
3. Jun 12, 2014 by pantaleoa
4. Nov 18, 2014 by kleb6b
5. Jan 30, 2015 by Stephen Raper (sraper)
6. Jul 20, 2015 by pantaleoa
7. Jun 27, 2016 by Stephen Raper

- (sraper)
- 8. Jun 18, 2018 by Stephen Raper (sraper)
- 9. Mar 3, 2020 by ershenb
- 10. Apr 6, 2022 by Stephen Raper (sraper)
- 11. Jun 14, 2022 by Jennifer Pohlsander (jpnfd)

Bachelor of Science Engineering Management

The engineering management program at Missouri S&T is characterized by its focus on the scientific basics of engineering and its innovative application; indeed, the underlying theme of this educational program is the application of the scientific basics to engineering practice through attention to problems and needs of the public. The necessary interrelations among the various topics, the engineering disciplines, and the other professions as they naturally come together in the solution of real world problems are emphasized as research, analysis, synthesis, and design are presented and discussed through classroom and laboratory instruction.

The bachelor of science degree in engineering management requires a minimum of ~~121~~ **128** credit hours. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. An average of at least two grade points per credit hour must be attained. At least two grade points per credit hour must also be attained in all courses taken in engineering management.

Each student's program of study must contain a minimum of 21 credit hours of course work in general education and must be chosen according to the following rules:

1. All students are required to take one American history course, one economics course, and [ENGLISH 1120](#). The history course is to be selected from [HISTORY 1200](#), [HISTORY 1300](#), [HISTORY 1310](#), or [POL SCI 1200](#). The economics course may be either [ECON 1100](#) or [ECON 1200](#). All students must choose one additional humanities or social science course that meets requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.
2. Depth requirement. Three credit hours must be taken in humanities or social sciences at the 2000-level or above and meets requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. This course must have as a prerequisite one of the humanities or social sciences courses already taken. Foreign language courses numbered 1180 will be considered to satisfy this requirement. Students may receive humanities credit for foreign language courses in their native tongue only if the course is at the 4000-level or above. All courses taken to satisfy the depth requirement must be taken after graduating from high school.
3. The remaining two courses are to be chosen and meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog and may include one communications course in addition to [ENGLISH 1120](#).
4. Any specific departmental requirements in the general studies area must be satisfied.
5. Special topics, special problems and honors seminars are allowed only by petition to and approval by the student's department chair.

Freshman Year			
First Semester	Credits	Second Semester	Credits
FR ENG 1100	1	MECH ENG 1720	3
CHEM 1310 ¹	4	MATH 1215 or 1221 ¹	4
CHEM 1319	1	PHYSICS 1135 ¹	4
CHEM 1100	1	ECON 1100 or 1200	3
MATH 1214 or 1211 ¹	4	COMP SCI 1972, or 1570, or 1974 ^{1,6}	2
ENGLISH 1120	3	COMP SCI 1982 or 1984 ⁶	4
HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200	3	Programing Elective ³	<u>3</u>
	17		17
Sophomore Year			

First Semester	Credits	Second Semester	Credits
MATH 2222 ¹	4	MATH 3304 ¹	3
PHYSICS 2135 ¹	4	STAT 3115 or 3117 ¹	3
CIV ENG 2200 ¹	3	ENG MGT 2110 ¹	3
ENG MGT 1210 ¹	2	ENG MGT 2211 ¹	3
ENG MGT 2310 ¹	3	MECH ENG 2350	2
		PSYCH 1101	3
	16		15
Junior Year			
First Semester	Credits	Second Semester	Credits
ENG MGT 3310 ¹	3	ENG MGT 4710 ¹	3
CIV ENG 2210	3	MECH ENG 2527	3
CIV ENG 2214	4	ELEC ENG 2800	3
ENG MGT 3510 ¹	3	ENGLISH 3560 or 1160	3
SP&M S 1185	3	ENG MGT 3320 ¹	3
Humanities and Social Sciences ²	3	MECH ENG 2350	<u>2</u>
	15		14
Senior Year			
First Semester	Credits	Second Semester	Credits
Emphasis Area Required Course	3	ENG MGT Technical Elective	3
Emphasis Area Required Course	3	Emphasis Area Required Course	3
Emphasis Area Required Course	3	ENG MGT 4907 ¹	3
ENG MGT 4110 ¹	3	Upper Level Hum/SS ²	3
ENG MGT Technical Elective	3	Free Elective ³	3
ELEC ENG 2800	<u>3</u>		
	15		12
Total Credits: 121			

Example Emphasis Area Programs for Engineering Management Students

One unique aspect of the engineering management degree is the student's ability to select an established emphasis area or create a specialized emphasis. Two examples of established emphasis areas are shown below.

Management of Technology

ENG MGT 5511	Technical Entrepreneurship	3
ENG MGT 5512	Legal Environment	3
ENG MGT 5410	Industrial System Simulation	3
ENG MGT 5614	Supply Chain Management Systems	3
ENG MGT Technical Electives (in consultation with your advisor)		6
ENG MGT Technical Elective (in consultation with your advisor)		<u>3</u>

Industrial Engineering

ENG MGT 4310	Materials Handling and Plant Layout	3
ENG MGT 4330	Human Factors	3
ENG MGT 5410	Industrial System Simulation	3

~~ENG MGT Technical Electives (in consultation with your advisor)~~~~6~~ENG MGT Technical Elective (in consultation with your advisor)3

General

Engineering Area Courses (Engineering Discipline)

12~~15~~ ENG MGT-Technical Elective (in consultation with your advisor)

3

Note: All electives must be chosen in consultation with the student's advisor. Students must satisfy the common freshman year academic requirements in addition to the sophomore, junior, and senior year requirements listed above with a minimum of 121 hours, ~~128 hours~~.

1

Must have a grade of "C" or better in these courses for graduation. MATH 1208 and MATH 1221 may be substituted for MATH 1214 and MATH 1215, respectively.

2

Humanities and social science electives must be approved by the student's advisor. Students must comply with the general education requirements with respect to selection and depth of study. These requirements are specified in the current catalog.

3

The programming elective consists of a lecture and lab combination, and may be selected from COMP SCI 1971/COMP SCI 1981, COMP SCI 1972/COMP SCI 1982, or COMP SCI 1570/COMP SCI 1580. Note that COMP SCI 1570/COMP SCI 1580 requires one more credit hour than the other options. The lecture component must be completed with a grade of "C" or better.

4

~~Students are required to select an emphasis area and maintain a minimum 2.0 GPA for these courses.~~⁵

~~All engineering management students must take the fundamentals of engineering (FE) exam prior to graduation. A passing grade on this examination is not required to earn a B.S. degree. This requirement is part of the Missouri S&T assessment process as described in assessment requirements found elsewhere in this catalog.~~

6

~~The programming elective consists of a lecture and lab combination, and may be selected from COMP SCI 1971/COMP SCI 1981, COMP SCI 1972/COMP SCI 1982, or COMP SCI 1570/COMP SCI 1580. Note that COMP SCI 1570/COMP SCI 1580 requires one more credit hour than the other options. The lecture component must be completed with a grade of "C" or better.~~

Accelerated BS/MS Program Option for Engineering Management

Undergraduates currently majoring in Engineering Management at Missouri S&T may opt to apply for a Graduate Track Pathway, which allows students to transfer nine credit hours from their Missouri S&T Engineering Management bachelor's degree to their Engineering Management or Systems Engineering master's degree. In this pathway, a student can achieve both degrees faster than if pursuing the degrees separately. The benefits of the pathway for admitted students include:

1. Nine hours of 5000 graduate-level ~~5000-level~~ or above EMSE courses may be ~~coursework may be~~ transferred from their Missouri S&T bachelor's degree to their EMSE master's degree,
2. The classes taken for shared BS/MS credit may be taken at the lower undergraduate tuition rate,
3. The GRE is not required for admission into the master's degree, and
4. Work on a thesis project may begin before the bachelor's degree requirements are completed (if thesis option is chosen)

No M.S. degree requirements are changed. The MS degree may be either a thesis or non-thesis option. To be admitted, the student must complete the Grad Track Pathway Admission and Course Approval Form. To be admitted to the student must have approval of their EMSE academic advisor. The program may be combined with existing honors research and emphasis area options. Admitted students will only have an undergraduate record in the Registrar's Office. Once they complete the bachelor's degree, and apply and are admitted into the master's degree then they will have a graduate record in the Registrar's Office. The Grad Track Pathway Admission and Course Approval Form must be completed when the student has one year left in the bachelor's program. Courses to be transferred will be identified on this form, and form, ~~and~~ on Graduate Form 1, which is submitted after the student has been accepted to the master's program. Students must apply for admission to the master's program but will not be fully accepted until meeting all undergraduate degree requirements and earning their bachelor's degree. The nine hours of transferred coursework that will be taken as undergraduate credit must be approved by the student's academic advisor, and may not be undergraduate research, special problems, or courses transferred to the bachelor's degree.

To be eligible for the Grad Track Pathway, an EMSE undergraduate student must be:

- One year from graduation of their bachelor's degree (excluding the semester they are currently enrolled)
- Have at least a 3.50 GPA in all EMSE courses taken at Missouri S&T,
- Have a 3.0 cumulative GPA.

Students will be admitted into the master's degree, so long as they meet EMSE graduate student academic performance requirements: To remain in the

pathway, the student must maintain good standing within the undergraduate EMSE program, and must maintain continuous enrollment at Missouri S&T. Students must maintain a cumulative GPA of at least 3.00 until they receive their bachelor's ~~degree.~~ ~~Students must receive grades of B or better in the graduate courses they enroll in as part of the pathway course sequence.~~ Students must receive grades of B or better in the graduate courses they enroll in as part of the pathway course sequence. The semester admit term for the master's degree immediately follows the semester that the bachelor's degree is awarded. If the student exits the pathway before completion of the MS degree requirements, or fails to maintain continuous enrollment at Missouri S&T, the courses taken as part of the pathway may not apply toward graduate requirements in the event of future readmission. Credits earned in graduate-level courses will be posted according to established registrar procedures to the undergraduate transcript and will apply toward the student's undergraduate degree hours as needed to obtain the undergraduate degree and thus ensure all stated degree requirements are met. Once the bachelor's degree is awarded, the student is fully admitted to the master's program, Form 1 is approved, the courses from the pathway will be included on the student's graduate degree ~~audit.~~ audit

~~Graduate Courses being placed in the pathway: For general: SYS ENG 5101 Systems Engineering and Analysis ENG MGT 5412 Operations Management Science ENG MGT 5511 Technical Entrepreneurship ENG MGT 5512 Legal Environment SYS ENG 6103 Systems Life Cycle Costing SYS ENG 6104 Systems Architecting~~ The student applicant is responsible for checking on how graduate coursework will affect scholarships and other financial aid. Once a student becomes a graduate student, they are not eligible for Federal Pell Grants, though are still eligible for Federal Financial Aid, and will be eligible for fellowships and teaching/research assistantships. International students should check with international affairs during completion of a Grad Track Pathway, to ensure immigration status will be maintained throughout the program.

Justification for request

These changes are in response to the request for reducing the minimum required credit hours for our program.

One free elective and one Engineering Management Technical elective were removed. Also, the lab associated with Civ Eng 2210 (2211) was dropped from the curriculum.

Faculty voted to approved these change and it drops us from 128 credit hours to 121.

Also, the wording was edited for the Graduate Track Pathway to allow nine hours of 5000-level graduate courses rather than any 5000-Level courses to be used in the program.

Supporting Documents

Course Reviewer Comments

jpnfd (04/03/23 11:36 am): Updated Freshman Year 2nd semester to Programing Elective, added footnote #5.

jpnfd (04/05/23 9:34 am): Updated footnotes

Program Change Request

Date Submitted: 02/21/23 2:31 pm

Viewing: **ENV SCI-BS : Environmental Sciences BS**

File: 382.20

Last approved: 02/17/23 10:03 am

Last edit: 03/23/23 8:54 am

Changes proposed by: nancym

Catalog Pages Using this Program

[Environmental Sciences](#)

Start Term

Fall 2023

Program Code

ENV SCI-BS

Department

Biological Sciences

Title

Environmental Sciences BS

Program Requirements and Description

In Workflow

1. **RBIOLSCI Chair**
2. **CCC Secretary**
3. **Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. **Campus Curricula Committee Chair**
7. **FS Meeting Agenda**
8. **Faculty Senate Chair**
9. **Registrar**

Approval Path

1. 02/20/23 6:02 pm
David Duvernell (duvernellid): Approved for RBIOLSCI Chair
2. 02/21/23 1:41 pm
Jennifer Pohlsander (jpnfd): Rollback to Initiator
3. 02/21/23 2:36 pm
David Duvernell (duvernellid): Approved for RBIOLSCI Chair
4. 03/09/23 8:30 am
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
5. 03/16/23 1:17 pm
Katie Shannon (shannonk): Approved for Sciences DSCC Chair
6. 04/18/23 10:10 am
Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Jan 24, 2022 by [Nancy Winterburg \(nancym\)](#)
2. Jan 24, 2022 by [Evie Sherlock](#)

- (esdk3)
3. Jan 24, 2022 by
Evie Sherlock
(esdk3)
 4. May 2, 2022 by
Katie Shannon
(shannonk)
 5. Feb 17, 2023 by
Robin Verble
(verbler)

Bachelor of Science in Environmental Sciences

An Environmental Science degree at Missouri S&T commences with a first-year seminar course that is taken concurrently with an introductory environmental science course, creating familiar student cohorts that can support and motivate one another through the program. Throughout their four years in the program, students are trained in five core areas: economics, biology, geology, environmental engineering, and humanities. In addition, they build foundational skills in mathematics, physical science, and communications. As they progress through the program, students increasingly connect ideas from among and within core areas to build their understanding of the integrated multidisciplinary concepts in environmental science. During their junior and senior years, students will be able to customize their degrees by selecting from a diverse array of elective courses within core areas. The degree's flexible upper division elective choices also allow students to specialize and earn minors in core areas if they choose to do so.

Students apply the skills they learn in the classroom in hands-on laboratory and field courses. Students will finish their senior year with a capstone course that will be designed to engage them in professional development, connect them to career opportunities, hone their research and presentation skills through hands-on projects, and foster lifelong collegial relationships with their peers and instructors through intensive group work.

This curriculum benefits from a flexible design that allows students who may be transitioning from other programs on campus to complete the program in a timely manner. In addition, the degree creates opportunities for students to complete multiple minors within the degree, adding focus and strength to the interdisciplinary foundation.

Freshman Year			
First Semester	Credits	Second Semester	Credits
BIO SCI 1173	3	ENGLISH 1160	3
ENV SCI 1110	1	CHEM 1320 or GEOLOGY 3410	3
CHEM 1310	4	BIO SCI 1223	3
CHEM 1100	1	BIO SCI 1229	1
CHEM 1319	1	MATH 1212 , or 1208 , or 1211 , or 1214	4
ECON 1100	3		
ENGLISH 1120	3		
	16		14
Sophomore Year			
First Semester	Credits	Second Semester	Credits
GEOLOGY 1110	3	BIO SCI 2263	3
ECON 4440 or MIN ENG 4523	3	HISTORY 1200 , or 1300 , or 1310	3
ENV ENG 2601 or CIV ENG 2601	3	ENV ENG 2602 or CIV ENG 2602	3
PHYSICS 1145 or 1135	4	GEO ENG 3148	3
POL SCI 1200	3	CIV ENG 5640 or ENV ENG 5640	3
	16		15
Junior Year			
First Semester	Credits	Second Semester	Credits

PHILOS 1130	3	HISTORY 4470 , or 2510 , or 3530 , or 3510	3
GEO ENG 5331	3	GEOLOGY 2611	3
ENV ENG 5642 or CIV ENG 5642	3	PHILOS 4350	3
ECON 4540 , or MIN ENG 4524 , or CHEM ENG 4540	3	STAT 3425 , or 3115 , or GEO ENG 4115	3-4
BIO SCI 4313	3	BIO SCI 2223	3
	15		15-16
Senior Year			
First Semester	Credits	Second Semester	Credits
GEOLOGY 4310 , or GEO ENG 2536 , or GEO ENG 5144	3	FREE ELECTIVES	3
FREE ELECTIVES	2	ENV SCI 4028	3
UPPER DIVISION ELECTIVES ¹	9	UPPER DIVISION ELECTIVES ¹	9
	14		15
Total Credits: 120-121			

1

See Upper Division Elective Course List

Upper Division Elective Course List

BIO SCI 2242	Cave Biology	2
BIO SCI 2252	Vegetation of the Ozarks	2
BIO SCI 2264	Field Ecology	2
BIO SCI 2353	Zoology	3
BIO SCI 2372	Issues in Public Health	3
BIO SCI 2383	Plant Biology	3
BIO SCI 2389	Plant Biology Laboratory	1
BIO SCI 3353	Comparative Vertebrate Anatomy	4
BIO SCI 4363	Freshwater Ecology	3
BIO SCI 4663	Animal Behavior	3
BIO SCI 4369	Freshwater Ecology Laboratory	1
BIO SCI 4316	Introduction to Geomicrobiology	3
BIO SCI 4099	Undergraduate Research	1-3
BIO SCI 3363	Ecophysiology	3
BIO SCI 2359	Zoology Laboratory	1
BIO SCI 5423	Advanced Biodiversity	3
BIO SCI 5443	Population and Conservation Genetics	3
BIO SCI 4383	Toxicology	3
BIO SCI 4423	Introduction to Astrobiology	3
BIO SCI 4563	Global Ecology	3
ECON 4643	Ethical Problems in a Global Environment	3
ECON 4642	Introduction to Global Eco- and Social-preneurship and Innovation	3
MIN ENG 5742	Environmental Aspects of Mining	3
ECON 5644	Creativity, Innovation, and Sustainability	3
CHEM 4710	Principles Of Environmental Monitoring	3
ENV ENG 3615	Water And Wastewater Engineering	3
ENV ENG 5605	Environmental Systems Modeling	3

ENV ENG 5630	Remediation of Contaminated Groundwater And Soil	3
ENV ENG 5635	Phytoremediation and Natural Treatment Systems: Science and Design	3
ENV ENG 5660	Introduction To Air Pollution	3
ENV ENG 5662	Air Pollution Control Methods	3
GEOLOGY 4310	Remote Sensing Technology	3
GEOLOGY 4411	Hydrogeology	3
GEOLOGY 4711	Paleoclimatology and Paleoecology	3
GEOLOGY 4721	Meteorology and Climatology	3
GEOLOGY 5681	Lidar Principles and Application	3
GEOLOGY 5741	Micropaleontology	3
GEO ENG 4115	Statistical Methods in Geology and Engineering	3
GEO ENG 4276	Environmental Aspects Of Mining	3
GEO ENG 5233	Risk Assessment In Environmental Studies	3
ENV ENG 5650	Public Health Engineering	3
ENV ENG 4609	Research in Environmental Engineering	1
ENV ENG 4099	Undergraduate Research	0-6
ENV ENG 4010	Senior Seminar: Engineering In A Global Society	1
CIV ENG 5605	Environmental Systems Modeling	3
CIV ENG 5630	Remediation of Contaminated Groundwater and Soil	3
CIV ENG 5635	Phytoremediation and Natural Treatment Systems: Science and Design	3
CIV ENG 5650	Public Health Engineering	3
CIV ENG 5660	Introduction To Air Pollution	3
CIV ENG 5665	Indoor Air Pollution	3
CIV ENG 5662	Air Pollution Control Methods	3
ENV ENG 5665	Indoor Air Pollution	3
GEO ENG 4099	Undergraduate Research	0-6
GEO ENG 5085	Internship	0-15
GEO ENG 5146	Applications Of Geographic Information Systems	3
GEO ENG 5174	Geological Engineering Field Methods	3
GEO ENG 5239	Groundwater Remediation	3
GEO ENG 5276	Advanced Environmental Aspects Of Mining	3
GEO ENG 5320	Groundwater Modeling	3
GEO ENG 5332	Fundamentals of Groundwater Hydrology	3
GEO ENG 5556	Renewable Energy Systems	3
GEOLOGY 2096	Field Geology	3
GEOLOGY 2731	Introduction to Planetary Science	3
GEOLOGY 4085	Internship	3
GEOLOGY 4099	Undergraduate Research	0-6
GEOLOGY 4411	Hydrogeology	3
GEOLOGY 4421	Radioactive Waste Management And Remediation	3
GEOLOGY 4431	Methods Of Karst Hydrogeology	3
GEOLOGY 4711	Paleoclimatology and Paleoecology	3
GEOLOGY 4721	Meteorology and Climatology	3

GEOLOGY 4841	Geological Field Studies	3
GEOLOGY 5681	Lidar Principles and Application	3
GEOLOGY 5741	Micropaleontology	3
POL SCI 4320	The Politics of Innovation	3
POL SCI 4085	Political Science Internship	0-6
POL SCI 3300	Principles Of Public Policy	3
ECON 4085	Internship	0-6
ECON 4641	Foundations of Sustainability	3

Secondary Education Emphasis Area

You may earn a BS degree in environmental sciences from Missouri S&T and certification to teach at the secondary level in the schools of Missouri with this emphasis area. This program can be completed in four academic years, and student teaching is arranged with public schools anywhere in the state. Students interested in this emphasis area should consult with the advisor for environmental science.

In order to successfully complete the emphasis area, students must attain at least a 3.0 GPA average for all environmental science courses and professional education courses required by the Missouri Department of Elementary and Secondary Education for teacher certification.

Students must also meet all requirements listed under the teacher education website including passing the state-required assessments.

A degree in the emphasis area requires a minimum of 128 credit hours. The required courses are provided below.

<u>Humanities: 15 semester hours</u>		
ENGLISH 1120	Exposition And Argumentation	<u>3</u>
ENGLISH 1160	Writing And Research	<u>3</u>
or ENGLISH 3560	Technical Writing	
ENGLISH 3170	Teaching And Supervising Reading and Writing	<u>3</u>
PHILOS 1130	How Should I Live? An Introduction to Ethics	<u>3</u>
PHILOS 4350	Environmental Ethics	<u>3</u>
<u>Social Sciences: 18 semester hours</u>		
HISTORY 1310	American History Since 1877	<u>3</u>
PSYCH 1101	General Psychology	<u>3</u>
PSYCH 3310	Developmental Psychology	<u>3</u>
ECON 1100	Principles Of Microeconomics	<u>3</u>
ECON 4440	Environmental And Natural Resource Economics	<u>3</u>
HISTORY 2510	History of Technology	<u>3</u>
or HISTORY 3510	Twentieth Century Technology And Society	
or HISTORY 3530	History of Science	
<u>Mathematics/Physical Science: 12 semester hours</u>		
MATH 1208	Calculus With Analytic Geometry I	<u>4-9</u>
or MATH 1214	Calculus I	
or MATH 1210 & MATH 1211	Calculus I-A and Calculus I-B	
PHYSICS 1505 & PHYSICS 1509	Introductory Astronomy and Astronomy Laboratory	<u>4</u>
PHYSICS 1145	College Physics I	<u>4</u>
or PHYSICS 1135	Engineering Physics I	
<u>Statistics: 3 semester hours</u>		

<u>STAT 3425</u>	<u>Introduction to Biostatistics</u>	<u>3-4</u>
or <u>STAT 3113</u>	<u>Applied Engineering Statistics</u>	
or <u>STAT 3115</u>	<u>Engineering Statistics</u>	
<u>Biological Sciences: 13 semester hours</u>		
<u>BIO SCI 1223</u> & <u>BIO SCI 1229</u>	<u>Biodiversity</u> & <u>and Biodiversity Lab</u>	<u>4</u>
<u>BIO SCI 1173</u>	<u>Introduction to Environmental Sciences</u>	<u>3</u>
<u>BIO SCI 2223</u>	<u>General Genetics</u>	<u>3</u>
<u>BIO SCI 2263</u>	<u>Ecology</u>	<u>3</u>
<u>Chemistry: 9 semester hours</u>		
<u>CHEM 1100</u>	<u>Introduction To Laboratory Safety & Hazardous Materials</u>	<u>1</u>
<u>CHEM 1310</u>	<u>General Chemistry I</u>	<u>4</u>
<u>CHEM 1319</u>	<u>General Chemistry Laboratory</u>	<u>1</u>
<u>CHEM 1320</u>	<u>General Chemistry II</u>	<u>3</u>
<u>Civil, Architectural and Environmental Engineering: 9 semester hours</u>		
<u>ENV ENG 2601</u>	<u>Fundamentals Of Environmental Engineering and Science</u>	<u>3</u>
<u>ENV ENG 2602</u>	<u>Biological Fundamentals Of Environmental Engineering</u>	<u>3</u>
<u>ENV ENG 5640</u>	<u>Environmental Law And Regulations</u>	<u>3</u>
or <u>ENV ENG 5642</u>	<u>Sustainability, Population, Energy, Water, and Materials</u>	
<u>Environmental Science: 1 semester hour</u>		
<u>ENV SCI 1110</u>	<u>Environmental Science Freshman Seminar</u>	<u>1</u>
<u>Geological Sciences/Geological and Petroleum Engineering: 12 semester hours</u>		
<u>GEO ENG 2536</u>	<u>Basic Weather</u>	<u>3</u>
<u>GEOLOGY 1110</u>	<u>Physical And Environmental Geology</u>	<u>3</u>
<u>GEOLOGY 2611</u>	<u>Physical Mineralogy And Petrology</u>	<u>3</u>
<u>GEO ENG 3148</u>	<u>Fundamentals Of Geographic Information Systems</u>	<u>3</u>
<u>Education: 36 semester hours</u>		
<u>EDUC 1040</u>	<u>Perspectives In Education</u>	<u>2</u>
<u>EDUC 1174</u>	<u>School Organization and Administration For Teachers</u>	<u>2</u>
<u>EDUC 3216</u>	<u>Instructional Literacy in the Content Area</u>	<u>3</u>
<u>EDUC 3280</u>	<u>Instructional Strategies in the Content Area</u>	<u>3</u>
<u>EDUC 4298</u>	<u>Student Teaching Seminar</u>	<u>1</u>
<u>PSYCH 2300</u>	<u>Educational Psychology</u>	<u>3</u>
or <u>EDUC 2102</u>	<u>Educational Psychology</u>	
<u>EDUC 3340</u>	<u>Assessment of Student Learning</u>	<u>3</u>
<u>PSYCH 4310</u>	<u>Psychology Of The Exceptional Child</u>	<u>3</u>
or <u>EDUC 2310</u>	<u>Education Of The Exceptional Child</u>	
<u>EDUC 1104</u>	<u>Teacher Field Experience I</u>	<u>1</u>
<u>EDUC 1164</u>	<u>Teacher Field Experience II</u>	<u>2</u>
<u>EDUC 3298</u>	<u>Teacher Field Experience III</u>	<u>1</u>
<u>EDUC 4299</u>	<u>Student Teaching</u>	<u>12</u>

Upper Division Elective Course List

Justification for request

Supporting Documents

[Environmental Science Emphasis Secondary Edu.pdf](#)

[BioSci-EnvSci-Curriculum Correction.pdf](#)

[MST PC October 2022.pdf](#)

[Approved New Matrix MoST Earth Science 3Mar21.pdf](#)

Course Reviewer Comments

jpdfd (02/21/23 1:41 pm): Rollback: formatting course list

jpdfd (02/21/23 3:16 pm): Updated/corrected course name abbreviations.

jpdfd (02/21/23 3:30 pm): Format Edit

jpdfd (02/21/23 3:32 pm): Edits

jpdfd (02/21/23 4:02 pm): Updated area header in Secondary Educ Emphasis area.

jpdfd (02/21/23 4:06 pm): Format update.

jpdfd (02/23/23 8:50 am): Updated Math credit range from 4-5 to 4-9.

jpdfd (03/01/23 2:32 pm): Attached the document showing the curriculum correction of the Humanities- 15 credit hours instead of the current statement of 12 hours and the following statement added, "A degree in this emphasis area requires a minimum of 128 credit hours." Both edits completed.

jpdfd (03/01/23 2:37 pm): Updated text formatting.

jpdfd (03/21/23 9:31 am): Attached MDHE approval.

jpdfd (03/23/23 8:51 am): Attached DESE approval

jpdfd (03/23/23 8:54 am): 3/22/23 Verified with Beth Kania-Gosche that the courses are good with DESE.

Program Change Request

Date Submitted: 04/17/23 3:40 pm

Viewing: **FR ENG-UN : Foundational Engineering and Computing**

File: 261.8

Last approved: 04/09/20 8:45 am

Last edit: 04/17/23 3:46 pm

Changes proposed by: ikuenobe

Catalog Pages Using this Program

[Foundational Engineering and Computing Program](#)

Start Term

Fall ~~2020~~ 2023

Program Code

FR ENG-UN

Department

Freshman Engineering

Title

Foundational Engineering and Computing

Program Requirements and Description

In Workflow

1. FR ENG Chair
2. RMATSENG Chair
3. CCC Secretary
4. Engineering DSCC Chair
5. Pending CCC Agenda post
6. CCC Meeting Agenda
7. Campus Curricula Committee Chair
8. FS Meeting Agenda
9. Faculty Senate Chair
10. Registrar

Approval Path

1. 03/09/22 3:38 pm
Douglas Ludlow (dludlow): Approved for FR ENG Chair
2. 03/09/22 3:41 pm
Marita Raper (tibbettsmg): Approved for CCC Secretary
3. 04/06/22 2:14 pm
Stephen Raper (sraper): Rollback to CCC Secretary for Engineering DSCC Chair
4. 04/12/22 11:40 am
Marita Raper (tibbettsmg): Rollback to Initiator
5. 04/03/23 1:52 pm
Evie Sherlock (esdk3): Rollback to Initiator
6. 04/03/23 3:40 pm
Stephen Raper (sraper): Approved for FR ENG Chair
7. 04/13/23 3:08 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
8. 04/13/23 3:12 pm
Mark Fitch (mfitch): Rollback to CCC Secretary for Engineering DSCC

- Chair
9. 04/17/23 3:18 pm
Evie Sherlock
(esdk3): Rollback to Initiator
 10. 04/17/23 3:46 pm
Stephen Raper
(sraper): Approved for FR ENG Chair
 11. 04/18/23 8:22 am
Michael Moats
(moatsm): Approved for RMATSENG Chair
 12. 04/18/23 8:34 am
Evie Sherlock
(esdk3): Approved for CCC Secretary
 13. 04/18/23 10:30 am
Mark Fitch (mfitch): Approved for Engineering DSCC Chair
 14. 04/18/23 10:40 am
Jennifer Pohlsander
(jpnfd): Approved for Pending CCC Agenda post

History

1. Jun 18, 2018 by Douglas Ludlow (dludlow)
2. Mar 3, 2020 by ershenb
3. Apr 9, 2020 by Crystal Wilson (wilsoncry)

~~Entering freshmen desiring to study engineering or computer science are admitted to the Foundational Engineering and Computing Program. They may state a preference for a major in a particular engineering or computer science field if they wish. In the event a preference is stated, it will be used in the consideration for freshmen scholarships, if available, in the preferred department.~~ The goals of the Foundational Engineering and Computing Program are:

~~1. to provide high quality advising in order to enhance the likelihood of student academic success, and~~ success through professional advisors in the S&T Advising Center

~~2. to provide information about the non-academic advising and resources, and~~ to provide information about the non-academic advising and resources, and

~~3. to provide information about careers in the various engineering fields or computer science so that students can make an informed decision regarding a major should they be admitted as undecided. major.~~ to provide information about careers in the various engineering fields or computer science so that students can make an informed decision regarding a major should they be admitted as undecided. major.

~~Students will complete a set of required courses common to all engineering fields and then may apply for admission as degree candidates to the program of their choice.~~ Typical Courses for Freshman Year

The following courses are typical freshman year academic requirements to all the engineering programs offered at Missouri S&T and are normally taken while the student is in the Foundational Engineering and Computing Program:

Course List

MATH 1214 & MATH 1215	Calculus I and Calculus II	8
CHEM 1310 & CHEM 1319 & CHEM 1100	General Chemistry I and General Chemistry Laboratory and Introduction To Laboratory Safety & Hazardous Materials	6
ENGLISH 1120	Exposition And Argumentation	3
Humanities/Social Sciences courses ¹		
FR ENG 1100	Study And Careers In Engineering and Computing	1
MECH ENG 1720	Introduction to Engineering Design	3
or a department specific course		
PHYSICS 1135	Engineering Physics I	4
COMP SCI 1200 & COMP SCI 1570 & COMP SCI 1580	Discrete Mathematics for Computer Science & Introduction To C++ Programming & Introduction To Programming Laboratory	<u>7</u>

Courses required in the remainder of each specific engineering program are listed under that program's description in the catalog.

1

Students must receive credit prior to graduation for a course that fulfills the Williams law requirement ([HISTORY 1200](#), [HISTORY 1300](#), [HISTORY 1310](#) or [POL SCI 1200](#)). Students planning to major in architectural engineering should take [HISTORY 1200](#).

2

=

[Applies only to students in Computer Science](#)

Students planning to major in ceramic engineering, chemical engineering, environmental engineering, geological engineering, metallurgical engineering or petroleum engineering will require additional chemistry or chemistry/geochemistry electives. It is recommended that, during the freshman year, these students should plan on taking [CHEM 1320](#), [GEOLOGY 3410](#), or other suggested courses as outlined in the curriculum of those specific majors.

Students planning to major in mining engineering should take [GEO ENG 1150](#), [MIN ENG 1912](#), and [MIN ENG 2126](#) during their freshman year. Students planning to major in nuclear engineering should take [NUC ENG 1105](#) during their freshman year.

~~Students may transfer from the Foundational Engineering and Computing Program to their selected degree program after having satisfied all of the above requirements, provided the degree programs will accept them. Students are advised to check special program requirements as listed with the program curricula in the catalog.~~

Justification for request

With the change to "Direct Admit" for all incoming engineering and computer science students (FS 23 forward), the catalog is being revised to reflect this change. In addition, the Materials Science and Engineering Department will become the home department for FECP and FE1100.

proposing deactivation of program due to beginning direct admit Fall 2022. MR

Supporting Documents

[FR ENG Email Info.pdf](#)

Course Reviewer Comments

srafer (04/06/22 2:14 pm): Rollback: Talked to Deanne about suppressing this rather than delete it. You might chat with her about that. It seems like the safe thing to do at the moment.

tibbettsmg (04/12/22 11:40 am): Rollback: not needed.

esdk3 (04/03/23 1:52 pm): Rollback: Resubmit so workflow will route through Dr. Raper for the FR ENG program/Chair.

jpndf (04/04/23 3:58 pm): Changed Comp Sci 1500 to Comp Sci 1200 per email from Dr.Raper 4/4/23

jpndf (04/05/23 8:24 am): Attached email explanation from Dr. Raper 4/4/23

jpndf (04/05/23 8:44 am): Updated Comp Sci Course list.

jpndf (04/05/23 8:50 am): Updated Comp Sci courses to 7 credit hrs needed.

mfitch (04/13/23 3:12 pm): Rollback: Per CCC discussion, changes must originate from a department or special program.

esdk3 (04/17/23 3:18 pm): Rollback: Rolling back per Dr. Raper so that when you approve it will now go to Dr. Moat's workflow.

srapr (04/17/23 3:46 pm): Taking these actions to align program with current Bylaw requirements. Program will reside in MSE. My approval is for efficiency sake and to not require shredding and initiating from the start again.

Program Change Request

Date Submitted: 03/22/23 12:56 pm

Viewing: **MC ENG-BS : Mechanical Engineering BS**

File: 86.56

Last approved: 05/02/22 1:31 pm

Last edit: 03/22/23 12:56 pm

Changes proposed by: nisbett

Catalog Pages Using this Program

[Mechanical Engineering](#)

Start Term

Fall ~~2022~~ 2023

Program Code

MC ENG-BS

Department

Mechanical & Aerospace Engineering

Title

Mechanical Engineering BS

Program Requirements and Description

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 03/22/23 1:08 pm
David Bayless (djbkqf): Approved for RMECHENG Chair
2. 04/13/23 4:09 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/18/23 9:17 am
Mark Fitch (mfitch): Approved for Engineering DSCC Chair
4. 04/18/23 10:10 am
Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Feb 24, 2014 by J. Keith Nisbett (nisbett)
2. Aug 6, 2014 by J. Keith Nisbett (nisbett)
3. Jul 21, 2015 by pantaleoa
4. May 3, 2018 by J. Keith Nisbett (nisbett)
5. Jun 14, 2019 by J. Keith Nisbett (nisbett)
6. Mar 3, 2020 by

- ershenb
 7. Oct 8, 2020 by
 Crystal Wilson
 (wilsoncry)
 8. May 5, 2021 by J.
 Keith Nisbett
 (nisbett)
 9. Oct 28, 2021 by J.
 Keith Nisbett
 (nisbett)
 10. May 2, 2022 by J.
 Keith Nisbett
 (nisbett)

Bachelor of Science Mechanical Engineering

The mechanical engineering program at Missouri S&T is characterized by its focus on the scientific basics of engineering and its innovative application; indeed, the underlying theme of this educational program is the application of the scientific basics to engineering practice through attention to problems and needs of the public. The necessary interrelations among the various topics, the engineering disciplines, and the other professions as they naturally come together in the solution of real world problems are emphasized as research, analysis, synthesis, and design are presented and discussed through classroom and laboratory instruction.

For the bachelor of science degree in mechanical engineering a minimum of 128 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. An average of at least two grade points per credit hour must be attained. An average of at least two grade points per credit hour must also be attained in all courses taken in mechanical engineering.

Each student's program of study must contain a minimum of 21 credit hours of course work in general education as follows:

1. [ENGLISH 1120](#)
2. [HISTORY 1200](#) or [HISTORY 1300](#) or [HISTORY 1310](#) or [POL SCI 1200](#)
3. [ECON 1100](#) or [ECON 1200](#)
4. [ENGLISH 1160](#) or [ENGLISH 3560](#) or [SP&M S 1185](#)
5. A literature elective
6. A humanity or social science elective*
7. A humanity or social science elective* that has, as a prerequisite, a humanity or social science course already taken.

* Humanity and social science electives must be at least 3 credit hours of lecture designation, and also meet the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.

Freshman Year			
First Semester	Credits	Second Semester	Credits
FR ENG 1100	1	ECON 1100 or 1200	3
CHEM 1310^a	4	MECH ENG 1720	3
ENGLISH 1120	3	PHYSICS 1135^a	4
HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200	3	MATH 1215^a	4
CHEM 1319	1	Elective-Hum or Soc Sci ^e	3
MATH 1214 or 1211^a	4		
	16		17

Sophomore Year

First Semester	Credits	Second Semester	Credits
MATH 2222^a	4	MECH ENG 2761	2
CIV ENG 2200^a	3	MECH ENG 2519^a	3
PHYSICS 2135^a	4	MECH ENG 2360^a	3
MECH ENG 2653	3	MATH 3304^a	3
MECH ENG 1761	1	MET ENG 2110^a	3
		Programming Elective ^{a, b}	3
	15		17

Junior Year

First Semester	Credits	Second Semester	Credits
MECH ENG 3313	3	MECH ENG 3411^a	3
MECH ENG 3521	3	MECH ENG 3131	3
ELEC ENG 2800	3	MECH ENG 4840	2
CIV ENG 2210^a	3	Elective-Communications ^c	3
CIV ENG 2211	1	MECH ENG 3708	3
Elective-Advanced Math/Stat ^d	3	MECH ENG 3525	3
	16		17

Senior Year

First Semester	Credits	Second Semester	Credits
MECH ENG 4842	2	ENG MGT 1100	1
MECH ENG 4479	3	ENG MGT 1210	2
MECH ENG technical elective ^f	3	MECH ENG 4761	3
Literature elective ^e	3	MECH ENG 4480	1
Technical elective ^g	3	MECH ENG 5000-level technical elective ^f	3
Elective-Advanced Hum or Soc Sci ^e	3	Breadth elective ^h	3
	17		13
Total Credits: 128			

a

A grade of "C" or better is required in [CHEM 1310](#), [MATH 1214](#) (or [MATH 1211](#)), [MATH 1215](#), [MATH 2222](#), [MATH 3304](#), [PHYSICS 1135](#), [PHYSICS 2135](#), programming elective, [MET ENG 2110](#), [CIV ENG 2200](#), [CIV ENG 2210](#), [MECH ENG 2519](#), [MECH ENG 2360](#), and [MECH ENG 3411](#), both as prerequisite for follow-up courses in the curriculum and for graduation.

b

The programming elective consists of a lecture and lab combination, and may be selected from [COMP SCI 1970/COMP SCI 1980](#), [COMP SCI 1971/COMP SCI 1981](#), or [COMP SCI 1972/COMP SCI 1982](#), or [COMP SCI 1570/COMP SCI 1580](#). Note that [COMP SCI 1570/COMP SCI 1580](#) requires one more credit hour than the other options.

c

This course must be selected from the following: [ENGLISH 1160](#), [ENGLISH 3560](#) or [SP&M S 1185](#), or the complete four course sequence in Advanced ROTC ([MIL ARMY 3250](#), [MIL ARMY 3500](#), [MIL ARMY 4250](#), and [MIL ARMY 4500](#); or [MIL AIR 3110](#), [MIL AIR 3120](#), [MIL AIR 4110](#) and [MIL AIR 4120](#)).

d

This course must be selected from the following: [MATH 3108](#), [STAT 3113](#), [STAT 3115](#) or any 5000-level math or stat course approved by the student's advisor.

e

All electives must be approved by the student's advisor. Humanity and social science electives must be at least 3 credit hours of lecture designation, and also meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.

f

Six hours of technical electives, subject to approval by the student's advisor, must be in the department of mechanical and aerospace engineering. At least three of these technical elective hours must be at the 5000 level. This elective may not include co-op, special problems, or research credits, such as as 3002, 4000, or 4099. Honors students have special requirements for technical electives.

g

This elective must be a three credit hour course, subject to approval by the student's advisor, from any of the following areas: math, statistics, science, engineering, or computer science. The course must be at the 3000 or higher level, or have a prerequisite that is part of the required mechanical engineering curriculum. Exceptions to the course level may be approved by the student's advisor. The elective may not include co-op, special problems, or research credits, such as 3002, 4000, or 4099.

h

This elective consists of three credit hours, subject to approval by the student's advisor, and may be satisfied by any of the following: (1) A three credit hour course from any of the following areas: math, statistics, science, engineering, computer science, business, or IST. The course must be at the 3000 or higher level, or have a prerequisite that is part of the required mechanical engineering curriculum. Exceptions to the course level may be approved by the student's advisor; (2) Any three credit hour course in the list of approved courses for the global studies minor; or (3) Any combination of three credit hours from co-op (3002), special problems (3000, 4000, or 5000), or research (4099).

i

All mechanical engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade on this examination is not required to earn a B.S. degree. However, it is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process as described in assessment requirements found elsewhere in this catalog.

Energy Conversion Emphasis Area for Mechanical Engineering

Students desiring to obtain a bachelor of science degree in mechanical engineering with an emphasis area in energy conversion must satisfy all the requirements of the bachelor of science degree in mechanical engineering, with the additional stipulation that four courses must be taken as follows:

a. Two courses from the following list:		6
MECH ENG 5527	Combustion Processes	3
or AERO ENG 5527	Combustion Processes	
MECH ENG 5533	Internal Combustion Engines	3
MECH ENG 5566	Solar Energy Technology	3
MECH ENG 5567	Heat Pump And Refrigeration Systems	3
MECH ENG 5571	Environmental Controls	3
MECH ENG 5575	Mechanical Systems For Environmental Control	3
AERO ENG 5169	Introduction to Hypersonic Flow	3
AERO ENG 5535	Aerospace Propulsion Systems	3
b. One course from the following list:		3
MECH ENG 5519	Advanced Thermodynamics	3
or AERO ENG 5519	Advanced Thermodynamics	
MECH ENG 5525	Intermediate Heat Transfer	3
or AERO ENG 5525	Intermediate Heat Transfer	
MECH ENG 5131	Intermediate Thermofluid Mechanics	3
or AERO ENG 5131	Intermediate Thermofluid Mechanics	
MECH ENG 5139	Computational Fluid Dynamics	3
or AERO ENG 5139	Computational Fluid Dynamics	
c. One additional course from either list "a" or list "b", or from the following list:		3
ECON 4540	Energy Economics	3
ELEC ENG 5150	Photovoltaic Systems Engineering	3
ENV ENG 5660	Introduction To Air Pollution	3
NUC ENG 4257	Two-phase Flow in Energy Systems - I	3

Note: By using the breadth elective and technical electives to satisfy the above requirements, this emphasis area requires the same total number of credit hours as the BSME degree. A change of major form should be submitted to designate the energy conversion emphasis area.

Manufacturing Processes Emphasis Area for Mechanical Engineering

Students desiring to obtain a bachelor of science in mechanical engineering with an emphasis area in manufacturing processes must satisfy all requirements of the bachelor of science in mechanical engineering with the additional stipulation that four courses must be taken as follows:

a. The following course:	3
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MECH ENG 3653	Manufacturing	3
b. One course from the following Manufacturing/Automation courses:		3
MECH ENG 5653	Computer Numerical Control of Manufacturing Processes	3
MECH ENG 5655	Manufacturing Equipment Automation	3
MECH ENG 5449	Robotic Manipulators and Mechanisms	3
MECH ENG 5606	Material Processing By High-Pressure Water Jet	3
c. One course from the following Design courses:		3
MECH ENG 5763	Computer Aided Design: Theory and Practice	3
MECH ENG 5656	Design For Manufacture	3
MECH ENG 5702	Synthesis Of Mechanisms	3
d. One course from the following list:		3
MECH ENG 5708	Rapid Product Design And Optimization	3
MECH ENG 5758	Integrated Product Development	3
e. The Math/Stat elective must be one of the following:		3
STAT 3113	Applied Engineering Statistics	3
STAT 3115	Engineering Statistics	3

A suggested sequence for the junior and senior years is given below. Note that by using the breadth elective and technical electives to satisfy the above requirements, this emphasis area requires the same total number of credit hours as the BSME degree. A change of major form should be submitted to designate the manufacturing processes emphasis area.

Junior Year			
First Semester	Credits	Second Semester	Credits
MECH ENG 3313	3	MECH ENG 3411 ^a	3
ELEC ENG 2800	3	MECH ENG 3131	3
MECH ENG 3521	3	MECH ENG 3525	3
CIV ENG 2210 ^a	3	MECH ENG 4840	2
CIV ENG 2211	1	MECH ENG 3653	3
STAT 3113 or 3115	3	Elective-Communications ^c	3
	16		17
Senior Year			
First Semester	Credits	Second Semester	Credits
MECH ENG 4842	2	ENG MGT 1100	1
MECH ENG 4479	3	ENG MGT 1210	2
MECH ENG 3708	3	MECH ENG 4761	3
Manufacturing Technical Elective ^e	3	MECH ENG 4480	1
Manufacturing Technical Elective ^e	3	Manufacturing Technical Elective ^e	3
Elective Literature ^d	3	Electives-Hum or Soc Sci ^d	3
	17		13
Total Credits: 63			

a

A grade of "C" or better is required in [CHEM 1310](#), [MATH 1214](#) (or [MATH 1211](#)), [MATH 1215](#), [MATH 2222](#), [MATH 3304](#), [PHYSICS 1135](#), [PHYSICS 2135](#), programming elective, [MET ENG 2110](#), [CIV ENG 2200](#), [CIV ENG 2210](#), [MECH ENG 2519](#), [MECH ENG 2360](#) and [MECH ENG 3411](#), both as prerequisite for follow-up courses in the curriculum and for graduation.

b

The programming elective consists of a lecture and lab combination, and may be selected from [COMP SCI 1970/COMP SCI 1980](#), [COMP SCI 1971/COMP SCI 1981](#), [COMP SCI 1972/COMP SCI 1982](#), or [COMP SCI 1570/COMP SCI 1580](#). Note that [COMP SCI 1570/COMP SCI 1580](#) requires one more credit hour than the other options.

c

This course must be selected from the following: [ENGLISH 1160](#), [ENGLISH 3560](#) or [SP&M S 1185](#), or the complete four course sequence in Advanced ROTC ([MIL ARMY 3250](#), [MIL ARMY 3500](#), [MIL ARMY 4250](#), and [MIL ARMY 4500](#); or [MIL AIR 3110](#), [MIL AIR 3120](#), [MIL AIR 4110](#) and [MIL AIR 4120](#)).

d

All electives must be approved by the student's advisor. Humanity and social science electives must be at least 3 credit hours of lecture designation, and also meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.

e

The nine hours of manufacturing technical elective must be selected as follows:

One course from the following manufacturing/automation courses: [MECH ENG 5653](#), [MECH ENG 5655](#), [MECH ENG 5449](#), [MECH ENG 5606](#).

One of the following design courses: [MECH ENG 5763](#), [MECH ENG 5656](#), [MECH ENG 5702](#).

One course from the following list: [MECH ENG 5708](#), [MECH ENG 5758](#).

f

All mechanical engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade on this examination is not required to earn a B.S. degree, however, it is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process as described in Assessment Requirements found elsewhere in this catalog.

Mechanical Design and Analysis Emphasis Area

Students desiring to obtain a bachelor of science in mechanical engineering with an emphasis area in mechanical design and analysis must satisfy all requirements of the bachelor of science in mechanical engineering, with the additional stipulation that four courses must be taken as follows:

a. One design course from the following list:		3
MECH ENG 5709	Machine Design II	3
MECH ENG 5702	Synthesis Of Mechanisms	3
MECH ENG 5704	Compliant Mechanism Design	3
MECH ENG 5708	Rapid Product Design And Optimization	3
MECH ENG 5715	Concurrent Engineering	3
MECH ENG 5656	Design For Manufacture	3
MECH ENG 5757	Integrated Product And Process Design	3
MECH ENG 5760	Probabilistic Engineering Design	3
MECH ENG 5763	Computer Aided Design: Theory and Practice	3
MECH ENG 5761	Engineering Design Methodology	3
b. One analysis course from the following list:		3
MECH ENG 5307	Vibrations I	3
MECH ENG 5211	Introduction To Continuum Mechanics	3
MECH ENG 5212	Introduction to Finite Element Analysis	3
MECH ENG 5234	Stability of Engineering Structures	3
MECH ENG 5236	Fracture Mechanics	3
MECH ENG 5313	Intermediate Dynamics Of Mechanical And Aerospace Systems	3
MECH ENG 5222	Introduction To Solid Mechanics	3
MECH ENG 5238	Fatigue Analysis	3
MECH ENG 5449	Robotic Manipulators and Mechanisms	3
MECH ENG 5478	Mechatronics	3
c. Two additional courses from either of the previous lists.		6

Note that by using the breadth elective and technical electives to satisfy the above requirements, this emphasis area requires the same total number of credit hours as the BSME degree. A change of major form should be submitted to designate the mechanical design and analysis emphasis area.

Systems Integration Emphasis Area

The Systems Integration emphasis area is required and available only for students pursuing a bachelor of science in mechanical engineering in the cooperative

program delivered at Missouri State University. This emphasis area includes all requirements of the bachelor of science in mechanical engineering, except for the substitutions stipulated below.

The following requirements in the mechanical engineering curriculum are removed (16 credit hours):		
ELEC ENG 2800	Electrical Circuits	3
ENG MGT 1100	Practical Concepts for Technical Managers	1
Elective-Advanced Math/Stat		3
MECH ENG 5000-level technical elective		3
Technical elective		3
Breadth elective		3
The following requirements are added (16 credit hours):		
ELEC ENG 2100	Circuits I	3
ELEC ENG 2101	Circuit Analysis Laboratory I	1
ELEC ENG 2120	Circuits II	3
<u>Systems Management elective. One of the following:</u>		
MECH ENG 5715	Concurrent Engineering	3
MECH ENG 5757	Integrated Product And Process Design	3
MECH ENG 5758	<u>Integrated Product Development</u>	<u>3</u>
ENG MGT 3320	Introduction to Project Management	3
ENG MGT 4710	<u>Quality</u>	<u>3</u>
Systems Integration technical elective. One of the following:		3
MECH ENG 5307	Vibrations I	3
MECH ENG 5478	Mechatronics	3
MECH ENG 5481	Mechanical And Aerospace Control Systems	3
MECH ENG 5533	Internal Combustion Engines	3
MECH ENG 5571	Environmental Controls	3
MECH ENG 5575	Mechanical Systems For Environmental Control	3
MECH ENG 5656	Design For Manufacture	3
MECH ENG 5704	Compliant Mechanism Design	3
MECH ENG 5708	Rapid Product Design And Optimization	3
MECH ENG 5709	Machine Design II	3
MECH ENG 5715	<u>Concurrent Engineering</u>	<u>3</u>
MECH ENG 5757	<u>Integrated Product And Process Design</u>	<u>3</u>
MECH ENG 5760	<u>Probabilistic Engineering Design</u>	<u>3</u>
MECH ENG 5763	Computer Aided Design: Theory and Practice	3
One of the following:		
STAT 3113	Applied Engineering Statistics	3
STAT 3115	Engineering Statistics	3
STAT 3117	Introduction To Probability And Statistics	3

All of the substitutions for this emphasis area appear in the junior and senior years. A suggested sequence for the junior and senior years is given below.

Junior Year			
First Semester	Credits	Second Semester	Credits
MECH ENG 3313	3	MECH ENG 3411^a	3

MECH ENG 3521	3	MECH ENG 3131	3
ELEC ENG 2100	3	MECH ENG 3525	3
ELEC ENG 2101	1	MECH ENG 3708	3
CIV ENG 2210^a	3	MECH ENG 4840	2
CIV ENG 2211	1	ELEC ENG 2120	3
STAT 3113 , or 3115 , or 3117	3		
	17		17
Senior Year			
First Semester	Credits	Second Semester	Credits
MECH ENG 4842	2	MECH ENG 4761	3
MECH ENG 4479	3	Systems Integration technical elective ^f	3
MECH ENG 4480	1	Systems Management elective^g	<u>3</u>
MECH ENG technical elective ^e	3	Literature elective ^d	3
Elective - Communications ^c	3	Elective - Advanced Hum or Soc Sci ^d	3
ENG MGT 1210	2	ENG MGT 3320	3
	14		15
Total Credits: 63			

a

A grade of "C" or better is required in [CHEM 1310](#), [MATH 1214](#) (or [MATH 1211](#)), [MATH 1215](#), [MATH 2222](#), [MATH 3304](#), [PHYSICS 1135](#), [PHYSICS 2135](#), programming elective, [MET ENG 2110](#), [CIV ENG 2200](#), [CIV ENG 2210](#), [MECH ENG 2519](#), [MECH ENG 2360](#) and [MECH ENG 3411](#), both as prerequisite for follow-up courses in the curriculum and for graduation.

b

The programming elective consists of a lecture and lab combination, and may be selected from [COMP SCI 1970/COMP SCI 1980](#), [COMP SCI 1971/COMP SCI 1981](#), or [COMP SCI 1972/COMP SCI 1982](#), or [COMP SCI 1570/COMP SCI 1580](#). Note that [COMP SCI 1570/COMP SCI 1580](#) requires one more credit hour than the other options.

c

This course must be selected from the following: [ENGLISH 1160](#), [ENGLISH 3560](#) or [SP&M S 1185](#), or the complete four course sequence in Advanced ROTC ([MIL ARMY 3250](#), [MIL ARMY 3500](#), [MIL ARMY 4250](#), and [MIL ARMY 4500](#); or [MIL AIR 3110](#), [MIL AIR 3120](#), [MIL AIR 4110](#) and [MIL AIR 4120](#)).

d

All electives must be approved by the student's advisor.

Humanity and Social Science electives must be at least 3 credit hours of lecture designation, and also meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.

e

The mechanical engineering technical elective is subject to approval by the student's advisor, and must be in the department of mechanical and aerospace engineering. This elective may not include co-op, special problems, or research credits, such as 3002, 4000, or 4099. Honors students have special requirements for technical electives.

f

The systems integration technical elective must be selected from the following list: [MECH ENG 5307](#), [MECH ENG 5478](#), [MECH ENG 5481](#), [MECH ENG 5533](#), [MECH ENG 5571](#), [MECH ENG 5575](#), [MECH ENG 5656](#), [MECH ENG 5704](#), [MECH ENG 5708](#), [MECH ENG 5709](#), [MECH ENG 5715](#), [MECH ENG 5757](#), MECH ENG 5760, [MECH ENG 5763](#).

g

The systems management elective must be selected from the following list: MECH ENG 5715, MECH ENG 5757, MECH ENG 5758, ENG MGT 3320, ENG MGT 4710.

h

All mechanical engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade on this examination is not required to earn a B.S. degree. However, it is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process as described in assessment requirements found elsewhere in this catalog.

Justification for request

1. In the Systems Integration emphasis area, replacing Eng MGT 3320 with a Systems Management elective to allow a list of options. This will help with course availability for the distance offerings associated with the Missouri State University cooperative program.
2. In the Systems Integration emphasis area, adding MECH ENG 5760 to the list of options for the Systems Integration technical elective.

3. Remove Eng Mgt design team credits from the options for the breadth elective. These courses have not been offered in many years and create confusion.

Supporting Documents

Course Reviewer Comments

Program Change Request

Date Submitted: 04/07/23 3:27 pm

Viewing: **MF SYS-CT : Manufacturing Systems CT**

File: 309.2

Last approved: 06/12/19 4:02 pm

Last edit: 04/07/23 3:27 pm

Changes proposed by: nisbett

Catalog Pages Using this Program

[Manufacturing Engineering](#)

Start Term

Fall 2023 ~~2019~~

Program Code

MF SYS-CT

Department

Mechanical & Aerospace Engineering

Title

Manufacturing Systems CT

Program Requirements and Description

In Workflow

1. RMECHENG Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar

Approval Path

1. 04/07/23 4:25 pm
David Bayless (djbkqf): Approved for RMECHENG Chair
2. 04/14/23 11:15 am
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/18/23 9:16 am
Mark Fitch (mfitch): Approved for Engineering DSCC Chair
4. 04/18/23 10:10 am
Jennifer Pohlsander (jpnfd): Approved for Pending CCC Agenda post

History

1. Jun 12, 2019 by ershenb

Manufacturing Systems Certificate

For the Manufacturing Systems Graduate Certificate Program the students will need to take four course sequences, one each from the four course areas in the Manufacturing Engineering program as outlined below:

Course I-Materials and Manufacturing Processes

Select one of the following:

Manufacturing Systems Certificate

MECH ENG 5220	Advanced Mechanics of Materials
MECH ENG 5236	Fracture Mechanics
MECH ENG 5238	Fatigue Analysis
MECH ENG 5282	Introduction to Composite Materials & Structures
MET ENG 5150	Introduction to Metal Additive Manufacturing
Course II-Process, Assembly and Product Engineering	
Select one of the following:	
ENG MGT 5515/MECH ENG 5757	Integrated Product And Process Design
MECH ENG 5708	Rapid Product Design And Optimization
MECH ENG 5757/ENG MGT 5515	Integrated Product And Process Design
MECH ENG 5763	Computer Aided Design: Theory and Practice
MECH ENG 6663	Advanced Digital Design and Manufacturing
Course III-Manufacturing Competitiveness	
Select one of the following:	
ENG MGT 5710	Six Sigma
ENG MGT 5613	Value Analysis
ENG MGT 5615	Production Planning And Scheduling
ENG MGT 5714	Statistical Process Control
ENG MGT 6611	Lean Systems
AERO-ENG-5760	Probabilistic Engineering Design
ERP 5110	Enterprise Resource Planning Systems Design and Implementation
MECH ENG 5760/AERO ENG 5760	Probabilistic Engineering Design
MECH ENG 5653	Computer Numerical Control of Manufacturing Processes
Course IV-Manufacturing Systems Design	
Select one of the following:	
ENG MGT 5314	Course ENG MGT 5314 Not Found
MECH ENG 5449	Robotic Manipulators and Mechanisms
MECH ENG 5478	Mechatronics
MECH ENG 5655	Manufacturing Equipment Automation
MECH ENG 5656	Design For Manufacture
MECH ENG 6653	Advanced Cnc Of Manufacturing Processes & Engineering Metrology
MECH ENG 6659	Advanced Topics in Design and Manufacturing

Justification for request

Updating elective options to correlate with currently available courses.

Supporting Documents

Course Reviewer Comments

Program Change Request

New Program Proposal

Date Submitted: 03/24/23 3:48 pm

Viewing: **PROPOSED : Quantitative Economics Minor**

File: 399

Last edit: 03/24/23 3:48 pm

Changes proposed by: mlc2d

Start Term

Fall 2023

Program Code

PROPOSED

Department

Economics

Title

Quantitative Economics Minor

Program Requirements and Description

In Workflow

1. **RECONOMI Chair**
2. **CCC Secretary**
3. **Social Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. **Campus Curricula Committee Chair**
7. **FS Meeting Agenda**
8. **Faculty Senate Chair**
9. **Registrar**

Approval Path

1. 04/03/23 11:32 am
Melody Lo (mlc2d):
Approved for
RECONOMI Chair
2. 04/14/23 8:56 am
Jennifer Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/14/23 8:58 am
Cecil Eng Huang
Chua (cchua):
Approved for Social
Sciences DSCC
Chair
4. 04/18/23 10:10 am
Jennifer Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

The Quantitative Economics minor aims to increase job prospects for students across the campus. This minor is designed to prepare business, engineering, or science students to become future business and industry professionals who can apply the core economics principles and quantitative methods to articulate and make policy recommendations aligned with the current and projected economic environment. The minor provides foundational knowledge of market structure, the global business environment, data analytics, and public policies necessary for strategic corporate and government decision-making.

The Quantitative Economics minor requires completing of a minimum of 17 to 18 hours of coursework with a grade of "C" or better. Required courses in the minor program include both Principles of Microeconomics (ECON 1100) and Macroeconomics (ECON 1200), Introduction to Econometrics (ECON 3300), one course between Data Intelligence using Case Studies (ECON 5350) and Data-Driven Strategic Insights (ECON 5360), and two courses among Economic Analysis of Engineering Projects (ENG MGT 1210), ECON 2100, 2200, or any 3000 and above economic electives of the student's choices in consultation with the department's minor advisor.

ECON 1100	Principles Of Microeconomics	3
ECON 1200	Principles Of Macroeconomics	3

ECON 3300	Course ECON 3300 Not Found	3
Choose One of the Following Courses: ¹		
ECON 5350	Course ECON 5350 Not Found	3
ECON 5360	Course ECON 5360 Not Found	3
Choose Two of the Following Courses:		
ENG MGT 1210	Economic Analysis of Engineering Projects	2
ECON 2100	Intermediate Microeconomic Theory	3
ECON 2200	Intermediate Macroeconomic Theory	3
ECON 3333	Course ECON 3333 Not Found	
ECON 3512	Mining Industry Economics	3
ECON 3880	Introduction to Sports Economics	3
ECON 4230	Money And Banking	3
ECON 4383	Course ECON 4383 Not Found	3
ECON 4430	Cost-Benefit Analysis	3
ECON 4440	Environmental And Natural Resource Economics	3
ECON 4538	Course ECON 4538 Not Found	
ECON 4540	Energy Economics	3
ECON 4720	International Finance	3
ECON 5532	Advanced Mining Economics	3
ECON 5337	Financial Mathematics	3
Total Credits: 17 - 18		

1

Both data analytics courses can be counted as a total of six credit hours for this minor. When students choose to take both ECON 5350 and 5360, they must only choose one course from ENG MGT 1210, ECON 2100, 2200, or any other 3000-level and above economic electives to complete the minor.

Justification for request

Our intent in offering a quantitative economics minor is to provide an effective way for students across the S&T campus to increase their competitiveness in the job market. In particular, this intent is aimed better at serving many engineering and science students on our campus.

Supporting Documents

Course Reviewer Comments

Program Change Request

Date Submitted: 03/16/23 10:06 am

Viewing: **WATERSC-MS : Water Science and Engineering MS**

File: 345.10

Last approved: 06/14/22 4:26 pm

Last edit: 04/13/23 3:32 pm

Changes proposed by: jdc

Catalog Pages Using this Program

[Water Science and Engineering](#)

Start Term

Fall ~~2022~~ **2023**

Program Code

WATERSC-MS

Department

Geosciences and Geological and Petroleum Engineering

Title

Water Science and Engineering MS

Program Requirements and Description

In Workflow

1. **RGEOSENG Chair**
2. **CCC Secretary**
3. **Engineering DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. **Campus Curricula Committee Chair**
7. **FS Meeting Agenda**
8. **Faculty Senate Chair**
9. **Registrar**

Approval Path

1. 03/16/23 10:23 am
Jeff Cawfield (jdc):
Approved for
RGEOSENG Chair
2. 04/13/23 3:32 pm
Jennifer Pohlsander (jpnfd): Approved
for CCC Secretary
3. 04/18/23 9:17 am
Mark Fitch (mfitch):
Approved for
Engineering DSCC
Chair
4. 04/18/23 10:10 am
Jennifer Pohlsander (jpnfd): Approved
for Pending CCC
Agenda post

History

1. Jun 10, 2021 by
Sharon Lauck
(laucks)
2. Jun 14, 2022 by
Katherine Grote
(grotekr)

Master of Science

Water Science and Engineering

The Water Science and Engineering (WSE) Master of Science (MS) degree requires a total of 30 graduate credit hours beyond the B.S. [degree](#). [The program is](#)

~~non-thesis only, degree for both thesis and non-thesis MS options.~~ We encourage applications from students with undergraduate degrees from one of the seven participating programs (Biology, Chemistry, Chemical Engineering, Civil Engineering, Environmental Engineering, Geology and Geophysics, and Geological Engineering) or closely related degree programs. Graduate certificates in *Subsurface Water Resources* and/or *Surface Water Resources* can serve as an entry point into the WSE program.

The ~~program~~ thesis option is comprised of the following:

- **Program Courses:** Students will select six courses (18hrs) from the Program Course List. Students must take at least one course from three different course categories and also take at least one course from three separate departments. Course categories include *Engineering Hydrology*, *Water Infrastructure and Remediation*, *Water Resources and the Environment*, and *Water Policy*.
- **Additional Courses:** Students will select ~~four~~ two courses (~~12~~ 6 hrs) from a combination of existing and newly developed graduate courses that are relevant to their degree plans. These courses must be approved by their advisor ~~in consultation with their thesis committee~~ and will be chosen based on the student's ~~their~~ specific career goals and interests.

~~Thesis Research: Students will complete six hours of research credit. The non-thesis option is identical to the thesis option except that the research hours are replaced with six hours of additional coursework.~~ The non-thesis WSE MS-degree is offered both on campus and online.

Engineering Hydrology		
CIV ENG 6331	Advanced Hydraulics And Hydraulic Engineering	3
CIV ENG 5338	Hydrologic Engineering	3
CIV ENG 5330	Unsteady Flow Hydraulics	3
CIV ENG 5331	Hydraulics Of Open Channels	3
CIV ENG 5333	Intermediate Hydraulic Engineering	3
CIV ENG 5337	River Mechanics And Sediment Transport	3
CIV ENG 6338	Advanced Hydrology	3
GEO ENG 5320	Groundwater Modeling	3
GEO ENG 5331	Subsurface Hydrology	3
GEO ENG 5332	Fundamentals of Groundwater Hydrology	3
GEO ENG 6331	Advanced Subsurface Hydrology	3
Water Infrastructure and Remediation		
CIV ENG 5335	Water Infrastructure Engineering	3
CIV ENG 6340	Urban Hydrology	3
CIV ENG 6335	Hydraulic Structures	3
BIO SCI 6463	Bioremediation	3
CHEM ENG 4210	Biochemical Reactors	3
CHEM ENG 5110	Intermediate Chemical Reactor Design	3
CIV ENG 5332	Transport Processes in Environmental Flows	3
CIV ENG 5360	Water Resources And Wastewater Engineering	3
ENV ENG 5630	Remediation of Contaminated Groundwater And Soil	3
ENV ENG 5635	Phytoremediation and Natural Treatment Systems: Science and Design	3
ENV ENG 5619	Environmental Engineering Design	3
ENV ENG 6612	Biological Operations In Environmental Engineering Systems	3
ENV ENG 6611	Physicochemical Operations In Environmental Engineering Systems	3
GEO ENG 6237	Advanced Geological & Geotechnical Design For Hazardous Waste Mgt	3
GEO ENG 5239	Groundwater Remediation	3
GEO ENG 5381	Intermediate Subsurface Hydrology And Contaminant Transport Mechs	3
Water Resources and the Environment		

BIO SCI 4313	Introduction to Environmental Microbiology	3
BIO SCI 6313	Environmental Microbiology	3
BIO SCI 4383	Toxicology	3
BIO SCI 4363	Freshwater Ecology	3
BIO SCI 6363	Advanced Freshwater Ecology	3
BIO SCI 6383	Advanced Toxicology	3
CHEM ENG 5340	Principles of Environmental Monitoring	3
CHEM 4710	Principles Of Environmental Monitoring	3
CHEM 5710	Environmental Monitoring	3
ENV ENG 5605	Environmental Systems Modeling	3
ENV ENG 5642	Sustainability, Population, Energy, Water, and Materials	3
GEOLOGY 4431	Methods Of Karst Hydrogeology	3
GEOLOGY 4411	Hydrogeology	3
GEOLOGY 4451	Aqueous Geochemistry	3
GEO ENG 5153	Regional Geological Engineering Problems In North America	3
GEO ENG 5233	Risk Assessment In Environmental Studies	3
GEO ENG 5782	Environmental and Engineering Geophysics	3
GEO ENG 6736	Advanced Geophysical Methods	3
Water Policy		
CIV ENG 5640	Environmental Law And Regulations	3
CIV ENG 5650	Public Health Engineering	3
POL SCI 4500	Geopolitics and International Security	3
POL SCI 4320	The Politics of Innovation	3
ECON 4440	Environmental And Natural Resource Economics	3

~~A written thesis and formal thesis defense are required for thesis-based MS-degree students.~~ Entrance requirements are equivalent to the baseline university graduate student admission standards. The GRE exam is not required for internal degree applicants.

Justification for request

At the suggestion of the Dean of the College of Engineering and Computing, and in consultation with the departments and programs involved in offering the Water Science and Engineering MS degree, it has been decided to offer a non-thesis MS degree only in Water Science and Engineering. I have removed the catalog information that referred to a thesis option and I have changed the course selection information to reflect a non-thesis option only.

Supporting Documents

Course Reviewer Comments

jpndf (04/13/23 3:32 pm): Edited spacing in description.

Course Change Request

New Experimental Course Proposal

Date Submitted: 03/15/23 3:22 pm

Viewing: **CHEM ENG 5001.019 : Materials as
Hard Tissue Devices**

File: 4949

Last edit: 03/31/23 8:52 am

Changes proposed by: luksc

Requested Spring 2024

Effective Change

Date

Department Chemical and Biochemical Engineering

Discipline Chemical Engineering (CHEM ENG)

Course Number 5001

Topic ID 019

Experimental

Title

In Workflow

1. **RCHEMENG Chair**
2. **CCC Secretary**
3. **Engineering DSCC
Chair**
4. **Pending CCC
Agenda post**
5. **CCC Meeting
Agenda**
6. Campus Curricula
Committee Chair
7. CAT entry
8. Registrar

Approval Path

1. 03/15/23 3:47 pm
Hu Yang (huyang):
Approved for
RCHEMENG Chair
2. 04/03/23 11:05
am
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/12/23 8:51 am
Mark Fitch
(mfitch):
Approved for

Engineering DSCC
Chair

4. 04/18/23 10:09
am

Jennifer

Pohlsander

(jpnfd): Approved

for Pending CCC

Agenda post

Materials as Hard Tissue Devices

Experimental Hard Tissue Devices

Abbreviated

Course Title

Instructors Mark Towler

Experimental

Catalog

Description

The structure-property relationships of materials employed as medical devices, as well as the bone, cartilage and ligament that they are designed to replace. The behavior of materials in the physiological environment, the tailoring of that behavior as a response to both bulk and surface properties, and the future of hard tissue medical devices.

Prerequisites

Chem Eng 4301 or instructor's permission.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Justification for

new course:

Course in area of specialization of new faculty member

Semester(s)

previously taught

Co-Listed

Courses:

Course Reviewer

Comments

jpnfd (03/24/23 2:33 pm): Added punctuation to prerequisite.

Key: 4949

[Preview Bridge](#)

Course Change Request

New Experimental Course Proposal

Date Submitted: 03/22/23 3:51 pm

Viewing: **CHEM ENG 5001.021 : Fermentation
Technology**

File: 4973

Last edit: 04/03/23 9:23 am

Changes proposed by: luksc

Requested Spring 2024

Effective Change

Date

Department Chemical and Biochemical Engineering

Discipline Chemical Engineering (CHEM ENG)

Course Number 5001

Topic ID 021

Experimental

Title

In Workflow

1. **RCHEMENG Chair**
2. **CCC Secretary**
3. **Engineering DSCC
Chair**
4. **Pending CCC
Agenda post**
5. **CCC Meeting
Agenda**
6. Campus Curricula
Committee Chair
7. CAT entry
8. Registrar

Approval Path

1. 03/23/23 1:22 pm
Hu Yang (huyang):
Approved for
RCHEMENG Chair
2. 04/03/23 11:05
am
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/12/23 8:51 am
Mark Fitch
(mfitch):
Approved for

Engineering DSCC
Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Fermentation Technology

Experimental Fermentation Technology

Abbreviated

Course Title

Instructors Christi Luks

Experimental

Catalog

Description

Application of transport, thermodynamics, and microbial growth to produce new chemical products. Development and scaling up of fermentation processes to successful production for industry. Biofuel, pharmaceutical, food, and beverage applications will be addressed.

Prerequisites

Chem Eng 3101 and Chem Eng 3120 and preceded or accompanied by Chem Eng 3150 or graduate standing.

Field Trip

Statement

There will be optional industrial field trips scheduled. Students under 21 years of age will not be allowed to sample alcoholic beverages.

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Justification for

new course:

There is a strong interest from students and industry for a technical course in fermentation. This is intended for our chemical engineering students, but also ties in with our proposed program in biomedical engineering.

Semester(s)

previously taught

n/a

Co-Listed

Courses:

Course Reviewer

Comments

jpnfd (03/30/23 11:28 am): Updated prerequisite format.

jpnfd (04/03/23 9:23 am): Updated prerequisite format.

Key: 4973

[Preview Bridge](#)

Course Change Request

New Experimental Course Proposal

Date Submitted: 04/05/23 2:07 pm

Viewing: **CHEM ENG 5001.022 : Energy**

Engineering

File: 4977

Last edit: 04/12/23 8:56 am

Changes proposed by: luksc

Requested Spring 2024

Effective Change

Date

Department Chemical and Biochemical Engineering

Discipline Chemical Engineering (CHEM ENG)

Course Number 5001

Topic ID 022

Experimental

Title

In Workflow

1. **RCHEMENG Chair**
2. **CCC Secretary**
3. **Engineering DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. CAT entry
8. Registrar

Approval Path

1. 04/05/23 2:09 pm
Hu Yang (huyang):
Approved for
RCHEMENG Chair
2. 04/12/23 8:57 am
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/18/23 9:16 am
Mark Fitch
(mfitch):
Approved for
Engineering DSCC

Chair
4. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Energy Engineering

Experimental Energy Engineering

Abbreviated

Course Title

Instructors Joseph Smith

Experimental

Catalog

Description

An assessment of issues related to worldwide energy demand and the key engineering, environmental, industrial, governmental, and market concepts that drive decision making. Discussions of the life-cycle analysis of traditional and renewable energy sources such as fossil fuels, nuclear power, biomass, wind, solar, and geothermal.

Prerequisites

Senior standing.

Field Trip

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0

Total: 3

Justification for
new course:

In an agreement with Dr. Lo in economics, we will no longer be offering ChemEng

4540. This course is a variation of that one which has been very popular with our students. We will be emphasizing the engineering aspects of that course,

Semester(s)
previously taught

Co-Listed

Courses:

Course Reviewer

Comments

Key: 4977

[Preview Bridge](#)

Course Change Request

New Experimental Course Proposal

Date Submitted: 03/20/23 3:33 pm

Viewing: **COMP ENG 5001.005 : Fundamentals
of Data Engineering**

File: 4971

Last edit: 04/03/23 9:24 am

Changes proposed by: stanleyj

Requested Fall 2023

Effective Change

Date

Department Electrical and Computer Engineering

Discipline Computer Engineering (COMP ENG)

Course Number 5001

Topic ID 005

Experimental

Title

In Workflow

1. RELECENG Chair
2. CCC Secretary
3. Engineering DSCC
Chair
4. Pending CCC
Agenda post
5. CCC Meeting
Agenda
6. Campus Curricula
Committee Chair
7. CAT entry
8. Registrar

Approval Path

1. 03/20/23 3:34 pm
Jonathan Kimball
(kimballjw):
Approved for
RELECENG Chair
2. 04/03/23 11:06
am
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary
3. 04/12/23 8:51 am
Mark Fitch
(mfitch):

Approved for
Engineering DSCC
Chair

4. 04/18/23 10:09
am

Jennifer

Pohlsander

(jpnfd): Approved
for Pending CCC

Agenda post

Fundamentals of Data Engineering

Experimental Fund Data Eng

Abbreviated

Course Title

Instructors Minsu Choi

Experimental

Catalog

Description

This course introduces data engineering, covering the essential skills and knowledge required to design and manage data pipelines, integrate and process data from various sources, ensure data quality and security, and deploy machine learning/AI models. Through hands-on experience and real-world examples, you will learn the fundamentals of data engineering.

Prerequisites

Comp Eng 2210, programming experience and junior standing.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Justification for

new course:

This course introduces data engineering, covering the essential skills and knowledge required to design and manage data pipelines, integrate and process data from various sources, ensure data quality and security, and deploy machine learning/AI models. Through hands-on experience and real-world examples, you will learn the fundamentals of data engineering, including data modeling, databases, data integration, processing, and pipeline design.

This course addresses an important area in computer engineering that spans multiple disciplines, including hardware-software co-design, security, data science, and computational intelligence. The course would be offered at the junior+ level to provide students with breadth and/or depth of knowledge to address the the senior electives in the computer engineering program .

Semester(s)

previously taught

Co-Listed

Courses:

Course Reviewer

Comments

jpnfd (03/24/23 2:34 pm): Updated prerequisite format.

jpnfd (03/30/23 11:24 am): Added punctuation to course description.

jpnfd (04/03/23 9:24 am): Updated prerequisite format.

Key: 4971

[Preview Bridge](#)

Course Change Request

New Experimental Course Proposal

Date Submitted: 03/20/23 9:46 am

Viewing: **COMP SCI 6001.012 : Topics in Quantum Computing and Information**

File: 4961

Last edit: 03/24/23 3:54 pm

Changes proposed by: taylorpat

Requested	Fall 2023
Effective Change Date	
Department	Computer Science
Discipline	Computer Science (COMP SCI)
Course Number	6001
Topic ID	012
Experimental Title	

In Workflow

1. RCOMPSCI Chair
2. CCC Secretary
3. Engineering DSCC Chair
4. Pending CCC Agenda post
5. CCC Meeting Agenda
6. Campus Curricula Committee Chair
7. CAT entry
8. Registrar

Approval Path

1. 03/20/23 7:34 am
Evie Sherlock (esdk3): Rollback to Initiator
2. 03/20/23 11:24 am
Stephen Gao (sgao): Approved for RCOMPSCI Chair
3. 04/03/23 11:06 am
Jennifer Pohlsander

(jpnfd): Approved
for CCC Secretary
4. 04/12/23 8:51 am
Mark Fitch
(mfitch):
Approved for
Engineering DSCC
Chair
5. 04/18/23 10:09
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Topics in Quantum Computing and Information

Experimental Topics in Quantum
Abbreviated
Course Title
Instructors Dr. Avah Banerjee

Experimental

Catalog

Description

This course will cover advanced quantum computing. Topics include quantum walks, quantum complexity theory, advanced quantum algorithms, Solovay-Kitaev theorem, quantum simulation, noisy systems, error correction, contextuality, etc.

Prerequisites

B or better in Comp Sci 5200.

Field Trip

Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0

Total: 3

Justification for
new course:

Quantum information sciences (QIS) is a promising emerging area. It is vitally important to build a workforce in QIS to keep pace with its growing demand. At the graduate level we need at least two courses to cover the necessary material to prepare interested students to go into QIS. This course will complement our experimental course (CS 5001 - Intro. To Quantum Computing) and cover most of the necessary topics that cannot be covered at the introductory level due to their complexity and time constraints. Further, depending on the instructor, students will be introduced to some advance concepts in QIS to help them get started in their research. Further, this course along with its sister course (CS 5001 - Intro. To Quantum Computing) will be used to create a QIS certification program at the graduate level in CS.

Semester(s)
previously taught

This is a new proposed experimental course.

Co-Listed
Courses:

Course Reviewer

Comments

esdk3 (03/20/23 7:34 am): Rollback: resubmit; Chair update

jpnfd (03/24/23 2:39 pm): Updated prerequisite format.

Key: 4961

[Preview Bridge](#)

Course Change Request

New Experimental Course Proposal

Date Submitted: 10/03/22 2:52 pm

Viewing: **GEOLOGY 2001.001 : Climate Change and Society**

File: 4902

Last edit: 03/07/23 10:02 am

Changes proposed by: johfb

Requested	Fall 2023
Effective Change Date	
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Geology (GEOLOGY)
Course Number	2001
Topic ID	001
Experimental Title	Climate Change and Society
Experimental Abbreviated Course Title	Climate Change
Instructors	Jonathan Obrist-Farner

Experimental

Catalog

Description

Introduction to fundamentals of natural and anthropogenic climate change, covering the basics of the climate system, weather and climate phenomena, the greenhouse effect, and climate feedbacks. We will look at past and present climate change, how climate variations have affected human evolution and modern society, and future mitigation strategies.

Prerequisites

In Workflow

1. **RGEOENG Chair**
2. **CCC Secretary**
3. **Sciences DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. **Campus Curricula Committee Chair**
7. **CAT entry**
8. **Registrar**

Approval Path

1. 10/04/22 12:10 pm
Jeff Cawlfeld (jdc): Approved for RGEOENG Chair
2. 10/06/22 2:41 pm
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 12/14/22 4:32 pm
Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 01/11/23 2:50 pm
Jennifer Pohlsander (jpnfd): Approved

Field Trip
Statement

Credit Hours LEC: 3 LAB: 0 IND: 0 RSD: 0
Total: 3

Justification for
new course:

Scientists attribute the global warming trend to the human expansion of greenhouse gases and climate change will be one of the greatest challenges for society in the coming future. This class will cover fundamentals of climate change so that our students can be educated on the topic.

Semester(s)
previously taught
N/A

Co-Listed

Courses:

ENV ENG 2001 - Special Topics
GEO ENG 2001 - Special Topics

Course Reviewer

Comments

jpnfd (10/06/22 8:09 am): Assigned topic ID number. Added capitalization to course title and abbreviated course title.

esdk3 (01/30/23 1:37 pm): Rollback: This EC (Geology 2001 - Climate Change and Society) is being rolled back to you because Engineering DSCC/Chair and Bio Sci Chair had not reviewed prior to the last CCC meeting. Please select 'Approve' on this item to push it back through the workflow.

esdk3 (01/30/23 1:56 pm): **Engineering DSCC/Chair and Bio Sci Chair had not received the workflow email in order to review prior to CCC meeting.

shannonk (02/13/23 4:16 pm): Biology feels like this course would be a good co-list for the new Environmental Science BS, so we prefer a colist of ENV SCI 2001

jpnfd (03/07/23 10:02 am): Approved by Civil, Arch, & Environmental Eng (CARE) chair, Joel Burken, via email 2/27/23

- for Pending CCC
Agenda post
5. 01/30/23 1:37 pm
Evie Sherlock
(esdk3): Rollback
to RGEOENG
Chair for CCC
Meeting Agenda
 6. 02/01/23 2:11 pm
Jeff Cawlfeld
(jdc): Approved
for RGEOENG
Chair
 7. 02/01/23 3:10 pm
Jennifer
Pohlsander
(jpnfd): Approved
for CCC Secretary
 8. 02/13/23 4:16 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair
 9. 04/18/23 10:10
am
Jennifer
Pohlsander
(jpnfd): Approved
for Pending CCC
Agenda post

Course Change Request

New Experimental Course Proposal

Date Submitted: 04/10/23 1:10 pm

Viewing: **TCH COM 6001.001 : Advanced Writing for Business**

File: 4981

Last edit: 04/12/23 8:36 am

Changes proposed by: kswenson

Requested	Fall 2023
Effective Change Date	
Department	English and Technical Communication
Discipline	Technical Communication (TCH COM)
Course Number	6001
Topic ID	001
Experimental Title	Advanced Writing for Business
Experimental Abbreviated Course Title	Adv Writing for Business
Instructors	Carleigh Davis

Experimental Catalog Description

This course helps advanced graduate students develop effective, agile writing skills for industry contexts. Students will learn to navigate “wicked problems” and present viable solutions to stakeholders by crafting compelling, practical communications for a variety of industry situations.

Prerequisites

Graduate standing.

Field Trip

In Workflow

1. **REGLISH Chair**
2. **CCC Secretary**
3. **Arts & Humanities DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
6. Campus Curricula Committee Chair
7. CAT entry
8. Registrar

Approval Path

1. 04/10/23 1:10 pm
Kristine Swenson (kswenson):
Approved for REGLISH Chair
2. 04/12/23 8:37 am
Jennifer Pohlsander (jpnfd): Approved for CCC Secretary
3. 04/12/23 8:48 am
Petra Dewitt (dewitt):
Approved for Arts & Humanities DSCC Chair
4. 04/18/23 10:10 am
Jennifer Pohlsander

Statement

(jpnfd): Approved
for Pending CCC
Agenda post

Credit Hours
Total: 3

LEC: 3

LAB: 0

IND: 0

RSD: 0

Justification for
new course:

This course will provide a graduate-level business writing course that should have broad appeal to students across the university as well as within our graduate certificate and MS degree.

Semester(s)
previously taught

n/a

Co-Listed
Courses:

Course Reviewer
Comments

jpnfd (04/12/23 8:36 am): Added punctuation to prerequisite.

Key: 4981

[Preview Bridge](#)