



Campus Curricula Committee Meeting Agenda

September 28, 2021

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

(For Faculty Senate Meeting of October 21, 2021)

Review of submitted Course Change forms:

File: 2564.7 AERO ENG 2861 : Aerospace Vehicle Performance
File: 873.5 AERO ENG 3251 : Aerospace Structures I
File: 835.4 AERO ENG 3613 : Aerospace Mechanics I
File: 7.1 AERO ENG 4253 : Aerospace Structures II
File: 143.1 BIO SCI 5010 : Graduate Seminar
File: 1451.8 CIV ENG 2601 : Fundamentals Of Environmental Engineering And Science
File: 1250.8 GEO ENG 5331 : Subsurface Hydrology
File: 2569.5 GEOPHYS 4231 : Seismic Interpretation
File: 768.9 GEOPHYS 5202 : Exploration and Development Seismology
File: 459.4 HISTORY 4245 : Nazi Germany and the Holocaust
File: 4821 MECH ENG 1761 : Introduction to Computer Aided Design
File: 765.8 MECH ENG 2519 : Thermodynamics
File: 105.3 MECH ENG 2527 : Thermal Analysis
File: 1474.4 MECH ENG 2653 : Introduction To Manufacturing Processes
File: 2099.4 MECH ENG 2761 : Introduction To Mechanical Design
File: 517.5 MECH ENG 3313 : Machine Dynamics
File: 1286.6 MECH ENG 3411 : Modeling and Analysis of Dynamic Systems
File: 617.4 NUC ENG 5428 : Advanced Reactor Laboratory I
File: 1652.4 NUC ENG 5438 : Advanced Reactor Laboratory II

Review of submitted Certificate forms:

File: 352.4 SUB WAT-CT : Subsurface Water Resources Certificate

Review of submitted Program Change forms:

File: 141.33 AE ENG-BS : Aerospace Engineering BS
File: 150.88 CH ENG-BS : Chemical Engineering BS
File: 51.21 EV ENG-BS : Environmental Engineering BS
File: 156.60 GE ENG-BS : Geological Engineering BS



File: 64.59 GL&GPH-BS : Geology and Geophysics BS
File: 86.48 MC ENG-BS : Mechanical Engineering BS
File: 95.29 MI ENG-BS : Mining Engineering BS
File: 108.48 PE ENG-BS : Petroleum Engineering BS
File: 115.45 PHYSIC-BS : Physics BS

Review of submitted Experimental Course forms:

File: 4822 MIN ENG 6001.003 : Computational Rock Mechanics
File: 4807 MS&E 4001.001 : Medical Nanomaterials
File: 4808 MS&E 6001.006 : Advanced Medical Nanomaterials

Course Change Request

Date Submitted: 07/22/21 3:01 pm

Viewing: **AERO ENG 2861 : Aerospace Vehicle Performance**

File: 2564.7

Last approved: 10/12/17 3:29 am

Last edit: 07/23/21 12:25 pm

Changes proposed by: nisbett

Programs
referencing this
course

[AE ENG-MI: Aerospace Engineering Minor](#)

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

Other Courses
referencing this
course

In The Prerequisites:

[AERO ENG 2780 : Introduction to Aerospace Design](#)

[AERO ENG 2790 : Introduction to Spacecraft Design](#)

[AERO ENG 3131 : Aerodynamics I](#)

Requested
Effective Change
Date

Spring 2022 ~~01/08/2018~~

Department Mechanical & Aerospace Engineering

Discipline Aerospace Engineering (AERO ENG)

Course Number 2861

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. 07/22/21 3:48 pm
David Bayless
(djbkqf):

Approved for
RMECHENG Chair

2. 07/23/21 12:26
pm

Marita Tibbetts
(tibbettsmg):

Title

Aerospace Vehicle Performance

Abbreviated

Aero Vehicle Performance

Course Title

Catalog

Description

Approved for CCC
Secretary

3. 09/08/21 3:16 pm

Stephen Raper
(sraper):

Approved for
Engineering DSCC
Chair

History

1. Oct 12, 2017 by
nisbett (2564.1)

Nature and theory of lift, drag, performance, and stability and control of aerospace vehicles.

Prerequisites

A grade of "C" or better in each of the following: Math **1215**; ~~1215 or Math 1221~~;
Physics 1135 or Physics 1111.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Required for

Yes

Majors

Elective for

No

Majors

Justification for

change:

Removing Math 1221 from the prerequisite list, since it is no longer offered.

Semesters

previously

offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

tibbettsmg (07/23/21 12:25 pm): updated term to Spring 22. mt

Key: 2564

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:59 pm

Viewing: **AERO ENG 3251 : Aerospace Structures**

I

File: 873.5

Last approved: 10/07/17 3:29 am

Last edit: 09/08/21 3:32 pm

Changes proposed by: nisbett

Programs
referencing this
course

[AE ENG-MI: Aerospace Engineering Minor](#)

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

Other Courses
referencing this
course

In The Prerequisites:

[AERO ENG 4253 : Aerospace Structures II](#)

[AERO ENG 4780 : Aerospace Systems Design I](#)

[AERO ENG 4790 : Spacecraft Design I](#)

[AERO ENG 4883 : Experimental Methods in Aerospace
Engineering II](#)

[AERO ENG 5353 : Aeroelasticity](#)

[AERO ENG 5758 : Integrated Product Development](#)

Requested **Fall 2022 01/08/2018**
Effective Change

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. 07/22/21 3:51 pm
David Bayless
(djbkqf):

Approved for
RMECHENG Chair

2. 07/27/21 10:41
am

Marita Tibbetts
(tibbettsmg):

Date

Department Mechanical & Aerospace Engineering

Discipline Aerospace Engineering (AERO ENG)

Course Number 3251

Title Aerospace Structures I

Abbreviated Aerospace Structures I

Course Title

Approved for CCC Secretary

3. 09/08/21 3:32 pm

Stephen Raper (sraper):

Approved for Engineering DSCC Chair

History

1. Oct 7, 2017 by nisbett (873.1)

Catalog Description

An introduction to various loads on aerospace vehicles. Basic theory and analysis of typical aerospace and related vehicle structures subjected to steady loading.

Bending, shear, and torsion of open and closed section beams. ~~An overview of various failure theories including yielding, buckling, fracture and fatigue.~~ Design of thin walled structures. ~~Introduction to advanced composite materials.~~

Prerequisites

A grade of "C" or better in each of the following: Math 1214 **(or 1211); or** Math **1215; 1208;** Math ~~1215 or Math 1221;~~ Math 2222; Physics 1135 or Physics 1111; Civ Eng 2210.

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:

Updating the course description to reflect current coverage.

Updating the prerequisite to include the new Math 1210 and 1211 as an option in place of Math 1214.

Also removing Math 1208 and 1221 which are no longer offered.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

tibbettsmg (07/27/21 10:40 am): updated term to FS 22. mt

sraper (09/08/21 3:32 pm): Removed Math 1210 from the prereq statement.

Key: 873

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:54 pm

Viewing: **AERO ENG 3613 : Aerospace Mechanics**

I

File: 835.4

Last approved: 10/07/17 3:29 am

Last edit: 09/08/21 3:33 pm

Changes proposed by: nisbett

Programs
referencing this
course

[AE ENG-MI: Aerospace Engineering Minor](#)

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

[AP MATH-BS: Applied Mathematics BS](#)

[SPACE R-CT: Space Resources Certificate](#)

Other Courses
referencing this
course

In The Prerequisites:

[AERO ENG 3361 : Flight Dynamics and Control](#)

[AERO ENG 5307 : Vibrations I](#)

[AERO ENG 5309 : Engineering Acoustics I](#)

[AERO ENG 5313 : Intermediate Dynamics of Mechanical and
Aerospace Systems](#)

[AERO ENG 5614 : Spaceflight Mechanics](#)

[MECH ENG 5307 : Vibrations I](#)

[MECH ENG 5309 : Engineering Acoustics I](#)

[MECH ENG 5313 : Intermediate Dynamics Of Mechanical And](#)

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. 07/22/21 3:51 pm
David Bayless
(djbkqf):

Approved for
RMECHENG Chair

2. 07/23/21 1:18 pm
Marita Tibbetts
(tibbettsmg):

Approved for CCC
Secretary

Aerospace Systems

Requested **Spring 2022** ~~01/08/2018~~
Effective Change
Date

Department Mechanical & Aerospace Engineering

Discipline Aerospace Engineering (AERO ENG)

Course Number 3613

Title
Aerospace Mechanics I

Abbreviated Aerospace Mechanics I
Course Title

3. 09/08/21 3:33 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

History

1. Oct 7, 2017 by
nisbett (835.1)

Catalog

Description

Introduction to celestial mechanics and an analytical study of space flight. Emphasis is placed on satellite orbits and general theory of gyroynamics.

Prerequisites

Math 3304; a grade of "C" or better in each of the following: Aero Eng 2360 or Mech Eng 2360; Math 1214 (**or 1211**); ~~or~~ Math **1215**; ~~1208~~; Math ~~1215 or Math 1221~~; ~~Math~~ 2222; Physics 1135 or Physics 1111.

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:

Updating the prerequisite to include the new Math 1210 and 1211 as an option in place of Math 1214.

Also removing Math 1208 and 1221 which are no longer offered.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

sraper (09/08/21 3:33 pm): Removed Math 1210 from prereq statement.

Key: 835

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 3:03 pm

Viewing: **AERO ENG 4253 : Aerospace Structures**

II

File: 7.1

Last edit: 07/27/21 10:44 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 4885 : Assessment](#)

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

Requested **Fall 2022 08/14/2018**

Effective Change
Date

Department Mechanical & Aerospace Engineering

Discipline Aerospace Engineering (AERO ENG)

Course Number 4253

Title
Aerospace Structures II

Abbreviated Aerospace Structures II
Course Title

Approval Path

1. 07/22/21 3:52 pm
David Bayless (djbkqf):
Approved for
RMECHENG Chair
2. 07/27/21 10:44
am
Marita Tibbetts (tibbettsmg):

Catalog
Description

Approved for CCC
Secretary
3. 09/08/21 3:21 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

~~Introduction to the finite element method for static and dynamic analysis of aerospace structures. Aircraft Analysis of beams, trusses and spacecraft structure loads and regulations. frames.~~ **Advanced methods in structural analysis using virtual work, energy methods, matrix methods, and finite element analysis. Thin plate theory and structural instability. Dynamic analysis of structures Plane stress and fatigue plane strain analysis. Introduction to aeroelasticity. Isoparametric elements and numerical integration.** ~~Free vibration and time dependent problems.~~

Prerequisites

Aero Eng 3251.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Required for

Yes ~~No~~

Majors

Elective for

No

Majors

Justification for

change:

Updating the course description to reflect current coverage, and to better sequence the topics with Aero Eng 3251.

Semesters

previously

offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

tibbettsmg (07/27/21 10:43 am): updated term to fs22. mt

Key: 7

[Preview Bridge](#)

Course Change Request

Date Submitted: 08/19/21 10:22 am

Viewing: **BIO SCI 5010 : Graduate Seminar**

File: 143.1

Last edit: 08/19/21 1:47 pm

Changes proposed by: shannonk

Programs
referencing this
course

[A&E BIO-MS: Applied and Environ Biology MS](#)

Requested **Fall 2022** ~~08/01/2014~~

Effective Change
Date

Department Biological Sciences

Discipline Biological Sciences (BIO SCI)

Course Number 5010

Title
Graduate Seminar

Abbreviated Graduate Seminar
Course Title

Catalog
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

10. CAT entry

11. Peoplesoft

Approval Path

1. 08/19/21 12:22
pm

David Duvernell
(duvernellid):
Approved for
RBIOLSCI Chair

2. 08/19/21 1:47 pm
Marita Tibbetts
(tibbettsmg):

Approved for CCC
Secretary

3. 09/09/21 4:02 pm

Katie Shannon
(shannonk):

Approved for
Sciences DSCC
Chair

Presentation and discussion of current topics in ~~Applied and Environmental~~ Biology.

Prerequisites

Field Trip
Statement

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

Total: ~~1~~ 0-6

Required for
Majors No

Elective for
Majors ~~Yes~~ No

Justification for
change:

Our Masters program has changed from Applied and Environmental Biology to Biological Sciences. This course is being taken by both graduate and undergraduate students. It should be one hour credit only, not 0-6. It should be repeatable.

Semesters
previously
offered as an
experimental
course

Co-Listed

Courses:

Course Reviewer

Comments

tibbettsmg (08/19/21 1:47 pm): missed deadline to be effective for Sp22. updated term to FS22. mt

Key: 143

[Preview Bridge](#)

Course Change Request

Date Submitted: 08/17/21 12:53 pm

Viewing: **CIV ENG 2601 : Fundamentals Of Environmental Engineering And Science**

File: 1451.8

Last approved: 04/03/17 3:15 am

Last edit: 08/17/21 12:53 pm

Changes proposed by: mfitc

Programs
referencing this
course

[CV ENG-BS: Civil Engineering BS](#)

Other Courses
referencing this
course

In The Catalog Description:

[ENV ENG 2601 : Fundamentals Of Environmental Engineering and Science](#)

In The Prerequisites:

[ARCH ENG 5665 : Indoor Air Pollution](#)

[BIO SCI 5313 : Pathogenic Microbiology](#)

[CIV ENG 3615 : Water And Wastewater Engineering](#)

[CIV ENG 5605 : Environmental Systems Modeling](#)

[CIV ENG 5650 : Public Health Engineering](#)

[CIV ENG 5665 : Indoor Air Pollution](#)

[CIV ENG 5670 : Solid Waste Management](#)

[CIV ENG 6608 : Environmental Engineering Analysis Laboratory](#)

[ENV ENG 3615 : Water And Wastewater Engineering](#)

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. 08/18/21 3:43 pm
Joel Burken
(burken):
Approved for
RCIVILEN Chair
2. 08/18/21 3:49 pm
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary

[ENV ENG 5605 : Environmental Systems Modeling](#)
[ENV ENG 5650 : Public Health Engineering](#)
[ENV ENG 5665 : Indoor Air Pollution](#)
[ENV ENG 5670 : Solid Waste Management](#)
[ENV ENG 6608 : Environmental Engineering Analysis](#)
[Laboratory](#)

3. 09/08/21 3:24 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

Requested **Fall 2022** ~~08/14/2017~~
Effective Change
Date
Department Civil, Architectural, and Environmental Engineering
Discipline Civil Engineering (CIV ENG)
Course Number 2601
Title Fundamentals Of Environmental Engineering And Science
Abbreviated Fund Of Env Engr & Sci
Course Title

History

1. Feb 9, 2015 by
mfitch (1451.1)
2. Apr 3, 2017 by
mfitch (1451.4)

Catalog

Description

Course discusses fundamental chemical, physical, and biological principles in environmental engineering and science. Topics include environmental phenomena, aquatic pollution and control, solid waste management, air pollution and control, water and wastewater treatment systems, sustainability and life cycle analyses.

Prerequisites

Chem 1310, Chem 1301, or Chem 1351; Math 1214, Math 1212, ~~or~~ Math **1211**, or **Math** 1208.

Field Trip

Statement

Credit Hours LEC: 2 LAB: 1 IND: 0 RSD: 0
Total: 3

| | |
|------------------------|-----|
| Required for Majors | Yes |
|------------------------|-----|

| | |
|------------------------|----|
| Elective for Majors | No |
|------------------------|----|

Justification for
change:

New Math 1211

Semesters
previously
offered as an
experimental
course

Co-Listed

Courses:

ENV ENG 2601 - Fundamentals Of Environmental Engineering and Science

Course Reviewer
Comments

Key: 1451

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:15 pm

Viewing: **GEO ENG 5331 : Subsurface Hydrology**

File: 1250.8

Last approved: 04/30/20 6:00 am

Last edit: 07/23/21 12:30 pm

Changes proposed by: borrokd

Programs

referencing this
course

[GE ENG-BS: Geological Engineering BS](#)

[GEO ENG-MS: GEOLOGICAL ENGINEERING MS](#)

[WATERSC-MS: Water Science and Engineering MS](#)

[GEO SCI-CT: Geoenvironmental Science and Engineering CT](#)

[SUB WAT-CT: Subsurface Water Resources Certificate](#)

[MINEREC-CT: Mine Reclamation CT](#)

[PROPOSED: Environmental Sciences, BS](#)

[EV ENG-BS: Environmental Engineering BS](#)

[GE ENG-MI: Geological Engineering Minor](#)

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

Other Courses

referencing this
course

In The Prerequisites:

[GEO ENG 5239 : Groundwater Remediation](#)

[GEO ENG 5320 : Groundwater Modeling](#)

[GEO ENG 5381 : Intermediate Subsurface Hydrology And
Contaminant Transport Mechs](#)

[GEO ENG 6331 : Advanced Subsurface Hydrology](#)

[GEO ENG 6332 : Numerical Methods In Subsurface Flow](#)

In Workflow

1. **RGEOENG 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. 07/22/21 2:16 pm
David Borrok
(borrokd):
Approved for
RGEOENG Chair
2. 07/23/21 12:30
pm
Marita Tibbetts
(tibbettsmg):

Requested **Spring 2022** ~~Fall 2020~~

Effective Change
Date

Department Geosciences and Geological and Petroleum
Engineering

Discipline Geological Engineering (GEO ENG)

Course Number 5331

Title
Subsurface Hydrology

Abbreviated Subsurface Hydrology
Course Title

Approved for CCC
Secretary

3. 09/08/21 3:25 pm

Stephen Raper
(sraper):

Approved for
Engineering DSCC
Chair

History

1. Jun 20, 2018 by
grotekr (1250.1)
2. Apr 30, 2020 by
grotekr (1250.3)

Catalog

Description

Introduction to the theory and engineering concepts of the movement of subsurface fluids. Hydraulic characteristics of earth materials, aquifer characterization, and flow prediction. Engineering problems related to subsurface fluids.

Prerequisites

Geo Eng **1150**; ~~1150 or equivalent~~; Math **1221 or Math** 1215.

Field Trip

Statement

Credit Hours LEC: 2 LAB: 1 IND: 0 RSD: 0

Total: 3

Required for
Majors Yes

Elective for
Majors No

Justification for
change:

Updating prerequisites to reflect changes in match requirements.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

tibbettsmg (07/23/21 12:30 pm): updated term to Sp22. removed "or equivalent" from prereq since that is already built in. mt

Key: 1250

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:13 pm

Viewing: **GEOPHYS 4231 : Seismic Interpretation**

File: 2569.5

Last approved: 05/24/16 4:57 am

Last edit: 07/27/21 10:49 am

Changes proposed by: borrokd

Programs
referencing this
course

[PE ENG-BS: Petroleum Engineering BS](#)

[GEOPHY-CT: Geophysics Graduate CT](#)

[PET SYS-CT: Petroleum Systems CT](#)

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

Requested **Fall 2022** ~~08/14/2018~~

Effective Change
Date

Department Geosciences and Geological and Petroleum
Engineering

Discipline Geophysics (GEOPHYS)

Course Number 4231

Title
Seismic Interpretation

Abbreviated Seismic Interpretation
Course Title

In Workflow

1. **RGEOSENG 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. 07/22/21 2:16 pm
David Borrok
(borrokd):

Approved for
RGEOSENG Chair

2. 07/27/21 10:50
am

Marita Tibbetts
(tibbettsmg):

Catalog
Description

Approved for CCC
Secretary
3. 09/09/21 4:03 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair

History

1. May 24, 2016 by
liukh (2569.1)

An introduction to 2-D/3-D seismic structural interpretation, stratigraphic interpretation, reservoir identification and evaluation, and horizon and formation attributes. The students are expected to master interactive 2-D/3-D seismic interpretation software packages that are routinely used in the petroleum industry.

Prerequisites

Math 1208 or Math **1214 (or Math 1210 and Math 1211); ~~1214~~**; Geology 1110 or Geo Eng 1150.

Field Trip
Statement

| | | | | |
|------------------------|--------|--------|--------|--------|
| Credit Hours | LEC: 2 | LAB: 1 | IND: 0 | RSD: 0 |
| Total: 3 | | | | |
| Required for Majors | No | | | |
| Elective for Majors | Yes | | | |

Justification for
change:

Updating prerequisites based on changes in math requirements.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

tibbettsmg (07/27/21 10:49 am): updated term to fs 22 and formatted prereq statement. mt

Key: 2569

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:14 pm

Viewing: **GEOPHYS 5202 : Exploration and Development Seismology**

File: 768.9

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

Last edit: 07/27/21 10:51 am

Changes proposed by: borrokd

Programs
referencing this
course

[GEOPHY-CT: Geophysics Graduate CT](#)

[PET SYS-CT: Petroleum Systems CT](#)

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

Other Courses
referencing this
course

In The Prerequisites:

[GEOPHYS 5231 : Seismic Data Processing](#)

[GEOPHYS 6211 : Advanced Seismic Interpretation](#)

[GEOPHYS 6231 : Advanced Seismic Data Processing](#)

Requested
Effective Change
Date

Fall 2022 ~~01/12/2016~~

Department
Geosciences and Geological and Petroleum
Engineering

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. FS Meeting
Agenda

8. Faculty Senate
Chair

9. Registrar

10. CAT entry

11. Peoplesoft

Approval Path

1. 07/22/21 2:16 pm
David Borrok
(borrokd):

Approved for
RGEOENG Chair

2. 07/27/21 10:51
am

Marita Tibbetts
(tibbettsmg):

Discipline Geophysics (GEOPHYS)
Course Number 5202
Title
 Exploration and Development Seismology
Abbreviated Expl & Devlp Seismology
Course Title

Approved for CCC
Secretary
3. 09/09/21 4:03 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair

Catalog Description

History

1. Feb 9, 2015 by
liukh (768.1)
2. Feb 23, 2015 by
kleb6b (768.5)
3. Oct 19, 2015 by
liukh (768.6)

Principles of reflection seismology as applied to the delineation of geologic structures and the determination of stratigraphy and lithology. Emphasis on both the capabilities and limitations of the seismic method. The laboratory utilizes both modeled and actual seismic data.

Prerequisites

Math 1208 or Math **1214 (or Math 1210 and Math 1211); 1214;** Geology 1110 or Geo Eng 1150.

Field Trip Statement

Credit Hours LEC: 2 LAB: 1 IND: 0 RSD: 0

Total: 3

Required for
Majors No

Elective for
Majors Yes

Justification for

change:

Updating prerequisites based on changes in match requirements.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

tibbettsmg (07/27/21 10:51 am): updated term to FS22 and formatted prereq statement. mt

Key: 768

[Preview Bridge](#)

Course Change Request

Date Submitted: 08/25/21 8:29 am

Viewing: **HISTORY 4245 : Nazi Germany and the Holocaust**

File: 459.4

Last approved: 05/24/16 4:57 am

Last edit: 08/25/21 8:47 am

Changes proposed by: dewittp

Programs
referencing this
course

[HIST-BA: History BA](#)

[HISTORY-BS: Bachelor of Science in History](#)

[PROPOSED: UCT - War and Society](#)

Requested **Fall 2022** ~~08/14/2018~~
Effective Change
Date

Department History and Political Science

Discipline History (HISTORY)

Course Number 4245

Title
Nazi Germany and the Holocaust

Abbreviated Nazi Germany / Holocaust
Course Title

Catalog
Description

In Workflow

1. **RHISTORY 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. 08/25/21 8:41 am
Michael Bruening
(bruening):
Approved for
RHISTORY Chair
2. 08/25/21 8:47 am
Marita Tibbetts
(tibbettsmg):

Approved for CCC
Secretary

3. 08/25/21 8:50 am

Petra Dewitt

(dewittp):

Approved for Arts
& Humanities

DSCC Chair

History

1. May 24, 2016 by
dewittp (459.1)

This course focuses on the rise of Nazism and its consequences for politics, society, and culture in Europe. The period's history will be examined from the perspective or perpetrators, victims, and bystanders with emphasis on the Holocaust and its legacy.

Prerequisites

History **1200 or History 1310.** ~~1200-~~

Field Trip

Statement

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

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

| | |
|------------------------|----|
| Elective for Majors | No |
|------------------------|----|

Justification for
change:

Added History 1310 as prerequisite as per instructor's request.

Semesters
previously

offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

tibbettsmg (08/25/21 8:47 am): missed deadline for Sp22. Updated effective term to
FS22. mt

Key: 459

[Preview Bridge](#)

Course Change Request

New Course Proposal

Date Submitted: 07/22/21 3:10 pm

Viewing: **MECH ENG 1761 : Introduction to Computer Aided Design**

File: 4821

Last edit: 07/23/21 1:46 pm

Changes proposed by: nisbett

Programs
referencing this
course

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

| | |
|------------------|---------------------------------------|
| Requested | Spring 2022 |
| Effective Change | |
| Date | |
| Department | Mechanical & Aerospace Engineering |
| Discipline | Mechanical Engineering (MECH ENG) |
| Course Number | 1761 |
| Title | Introduction to Computer Aided Design |
| Abbreviated | Intro to CAD |
| Course Title | |

Catalog
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
10. CAT entry
11. Peoplesoft

Approval Path

1. 07/22/21 3:52 pm
David Bayless (djbkqf):
Approved for RMECHENG Chair
2. 07/23/21 1:46 pm
Marita Tibbetts (tibbettsmg):
Approved for CCC Secretary

3. 09/08/21 3:25 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

Introduces principles and application of computer aided design. Topics include parametric sketching, solid modelling, assemblies, mass properties, engineering drawings and file exchange.

Prerequisites

Mech Eng 1720.

Field Trip

Statement

Credit Hours

LEC: 0

LAB: 1

IND: 0

RSD: 0

Total: 1

Required for

Yes

Majors

Elective for

No

Majors

Justification for

new course:

This content is being split out from Mech Eng 2761 to allow greater flexibility in scheduling it as a prerequisite for other courses.

An accompanying DC form reflects this course as a required course in the Mech Eng curriculum starting in the Fall 2022 catalog year. To ease the transition, this course will be offered for the first time in Spring 2022.

Semesters

previously

offered as an

experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

Key: 4821

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 1:49 pm

Viewing: **MECH ENG 2519 : Thermodynamics**

File: 765.8

Last approved: 05/03/21 6:01 am

Last edit: 09/08/21 3:33 pm

Changes proposed by: nisbett

Programs

referencing this
course

[NU ENG-BS: Nuclear Engineering BS](#)
[AE ENG-BS: Aerospace Engineering BS](#)
[AP MATH-BS: Applied Mathematics BS](#)
[CP ENG-BS: Computer Engineering BS](#)
[EL ENG-BS: Electrical Engineering BS](#)
[MC ENG-BS: Mechanical Engineering BS](#)

Other Courses

referencing this
course

In The Prerequisites:

[AERO ENG 3171 : Aerodynamics II](#)
[AERO ENG 5519 : Advanced Thermodynamics](#)
[AERO ENG 5539 : Modeling Across Scales in Computational Mechanics](#)
[MECH ENG 3131 : Thermofluid Mechanics I](#)
[MECH ENG 3521 : Applied Thermodynamics](#)
[MECH ENG 3525 : Heat Transfer](#)
[MECH ENG 4840 : Mechanical Instrumentation](#)
[MECH ENG 5519 : Advanced Thermodynamics](#)
[MECH ENG 5539 : Modeling Across Scales in Computational](#)

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. 07/22/21 3:52 pm
David Bayless
(djbkqf):
Approved for
RMECHENG Chair
2. 07/23/21 1:12 pm
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary

Mechanics

NUC ENG 3221 : Reactor Fluid Mechanics

3. 09/08/21 3:33 pm

Stephen Raper

(sraper):

Approved for

Engineering DSCC

Chair

Requested

Spring 2022 ~~Fall 2021~~

Effective Change

Date

Department

Mechanical & Aerospace Engineering

Discipline

Mechanical Engineering (MECH ENG)

Course Number

2519

Title

Thermodynamics

Abbreviated

Thermodynamics

Course Title

History

1. Oct 19, 2015 by

nisbett (765.1)

2. Oct 7, 2017 by

nisbett (765.3)

3. May 3, 2021 by

nisbett (765.5)

Catalog

Description

Energy transformations and the relation of energy to the status of matter.

Fundamental laws, concepts, and modes of analysis which underlie all applications of energy conversion in engineering.

Prerequisites

A grade of "C" or better in each of the following: Math 1214 (**or 1211**); ~~or~~ Math **1215**; ~~1208~~; Math ~~1215 or Math 1221~~; ~~Math~~ 2222; Physics 1135 or Physics 1111.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Required for

Yes

Majors

Elective for

No

Majors

Justification for

change:

Adding the prerequisite option of the new Math 1210 and 1211 to substitute for Math 1214.

Also removing the old courses Math 1208 and 1221 since they are no longer offered.

Semesters

previously

offered as an

experimental

course

Removed Math 1210 from prereq statement.

Co-Listed

Courses:

Course Reviewer

Comments

Key: 765

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 1:51 pm

Viewing: **MECH ENG 2527 : Thermal Analysis**

File: 105.3

Last approved: 10/16/17 3:27 am

Last edit: 07/23/21 1:13 pm

Changes proposed by: nisbett

Programs

referencing this
course

[PE ENG-BS: Petroleum Engineering BS](#)

[AP MATH-BS: Applied Mathematics BS](#)

[ARC ENG-BS: Architectural Engineering BS](#)

[CP ENG-BS: Computer Engineering BS](#)

[EL ENG-BS: Electrical Engineering BS](#)

[ENG MG-BS: Engineering Management BS](#)

[MI ENG-BS: Mining Engineering BS](#)

Other Courses

referencing this
course

In The Prerequisites:

[ARCH ENG 4800 : Principles of HVAC I](#)

[ARCH ENG 5850 : Residential Renewable Energy Systems](#)

[MECH ENG 5571 : Environmental Controls](#)

[MECH ENG 5575 : Mechanical Systems For Environmental Control](#)

[MIN ENG 5113 : Mine Atmosphere Control](#)

[MIN ENG 5912 : Mine Power and Drainage](#)

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. 07/22/21 3:53 pm
David Bayless
(djbkqf):

Approved for
RMECHENG Chair

2. 07/23/21 1:13 pm
Marita Tibbetts
(tibbettsmg):

Approved for CCC
Secretary

Requested **Spring 2022** ~~01/08/2018~~
 Effective Change
 Date
 Department Mechanical & Aerospace Engineering
 Discipline Mechanical Engineering (MECH ENG)
 Course Number 2527
 Title
 Thermal Analysis
 Abbreviated Thermal Analysis
 Course Title

3. 09/08/21 3:25 pm
 Stephen Raper
 (srapr):
 Approved for
 Engineering DSCC
 Chair

History

1. Oct 16, 2017 by
 nisbett (105.1)

Catalog

Description

Basic principles of thermodynamics and heat transfer. First and second laws of thermodynamics and applications to engineering systems. Fundamentals of heat transfer by conduction, convection, and radiation with applications. Not for mechanical engineering majors.

Prerequisites

Math **1215**; ~~1215 or Math 1221~~; Physics 1135 or Phys 1111.

Field Trip

Statement

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

Total: 3

Required for
 Majors No

Elective for
 Majors **Yes** ~~No~~

Justification for
 change:

Removing Math 1221 from the prerequisite list since it is no longer offered.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

Key: 105

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/23/21 3:24 pm

Viewing: **MECH ENG 2653 : Introduction To Manufacturing Processes**

File: 1474.4

Last approved: 10/07/17 3:29 am

Last edit: 07/27/21 10:52 am

Changes proposed by: nisbett

Programs
referencing this
course

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

Other Courses
referencing this
course

In The Prerequisites:

[MECH ENG 2761 : Introduction To Design](#)

[MECH ENG 3653 : Manufacturing](#)

[MECH ENG 3708 : Machine Design I](#)

[MET ENG 4420 : Metals Casting](#)

[MET ENG 5420 : Advanced Metals Casting](#)

Requested **Fall 2022** ~~01/08/2018~~

Effective Change

Date

Department Mechanical & Aerospace Engineering

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. 07/23/21 4:03 pm
David Bayless
(djbkqf):

Approved for
RMECHENG Chair

2. 07/27/21 10:52
am

Marita Tibbetts
(tibbettsmg):

Discipline Mechanical Engineering (MECH ENG)

Course Number 2653

Title

Introduction To Manufacturing Processes

Abbreviated Intro To Mfg Processes

Course Title

Approved for CCC
Secretary

3. 09/08/21 3:26 pm

Stephen Raper
(sraper):

Approved for
Engineering DSCC
Chair

Catalog

Description

History

1. Oct 7, 2017 by
nisbett (1474.1)

Introduction into the fundamentals of manufacturing processes. Welding, joining, casting, forming, powder metallurgy and material removal are covered. The material is presented in a descriptive fashion with emphasis on the fundamental working of the processes, their capabilities, applications, advantages and limitations.

Prerequisites

Mech Eng 1720; a grade of "C" or better in Phys 1135 or Phys **1111; preceded or accompanied by Mech Eng 1761. 1111**

Field Trip

Statement

Credit Hours

LEC: 2

LAB: 1

IND: 0

RSD: 0

Total: 3

Required for

Yes

Majors

Elective for

No

Majors

Justification for

change:

Mech Eng 1761 is being added as a pre/co-requisite to provide background in CAD for the expanded coverage of computer aided manufacturing topics.

Note that Mech Eng 1761 is a new course that has its own CC form.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

tibbettsmg (07/27/21 10:52 am): updated term to FS 22. mt

Key: 1474

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 3:15 pm

Viewing: **MECH ENG 2761 : Introduction To Mechanical Design**

File: 2099.4

Last approved: 10/07/17 3:30 am

Last edit: 09/08/21 3:34 pm

Changes proposed by: nisbett

Programs
referencing this
course

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

Other Courses
referencing this
course

In The Prerequisites:

[MECH ENG 3708 : Machine Design I](#)

[MECH ENG 5763 : Computer Aided Design: Theory and Practice](#)

Requested **Fall 2022** ~~01/08/2018~~
Effective Change
Date

Department Mechanical & Aerospace Engineering

Discipline Mechanical Engineering (MECH ENG)

Course Number 2761

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. 07/22/21 3:53 pm
David Bayless (djbkqf):
Approved for RMECHENG Chair
2. 07/23/21 1:45 pm
Marita Tibbetts (tibbettsmg):
Approved for CCC Secretary

Introduction To **Mechanical** Design

Abbreviated **Intro Mechanical**
Course Title ~~Introduction To~~ Design

3. 09/08/21 3:35 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

Catalog
Description

History

1. Oct 7, 2017 by
nisbett (2099.1)

Introduction to ~~Introduces~~ the **mechanical** ~~process of~~ design **process** with emphasis on creativity and design visualization. **A systemic approach to design is introduced, emphasizing quality design, concept identification and selection, design life cycle, project management, failure analysis, and engineering ethics. Solid modeling is presented as a design tool. The solid modeling environment will also be used to reinforce the concepts of tolerancing, dimensioning, and multiview representation.** Concurrent engineering will be **presented introduced** in a group design project.

Prerequisites

Mech Eng 1720, Mech Eng **1761**, **Mech Eng** 2653, preceded or accompanied by Civ **Eng Eng** 2200; a grade of "C" or better in each of the following: Math 1214 (**or 1211**); ~~or Math 1208~~; Physics 1135 or Physics 1111.

Field Trip
Statement

Credit Hours LEC: **1 2** LAB: 1 IND: 0 RSD: 0
Total: **2 3**

Required for
Majors Yes

Elective for
Majors No

Justification for
change:

Splitting out the former CAD content to the new course Mech Eng 1761. Updating the coverage for this course. The change of credit hours and the new course are reflected in the mechanical engineering curriculum in an accompanying DC form.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

sraper (09/08/21 3:34 pm): Removed Math 1210 from prereq statement.

Key: 2099

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:53 pm

Viewing: **MECH ENG 3313 : Machine Dynamics**

File: 517.5

Last approved: 10/07/17 3:29 am

Last edit: 09/08/21 3:34 pm

Changes proposed by: nisbett

Programs
referencing this
course

[AP MATH-BS: Applied Mathematics BS](#)
[MC ENG-BS: Mechanical Engineering BS](#)

Other Courses
referencing this
course

In The Prerequisites:

[AERO ENG 5313 : Intermediate Dynamics of Mechanical and Aerospace Systems](#)
[AERO ENG 5449 : Robotic Manipulators and Mechanisms](#)
[AERO ENG 5715 : Concurrent Engineering](#)
[AERO ENG 5758 : Integrated Product Development](#)
[MECH ENG 5313 : Intermediate Dynamics Of Mechanical And Aerospace Systems](#)
[MECH ENG 5449 : Robotic Manipulators and Mechanisms](#)
[MECH ENG 5702 : Synthesis Of Mechanisms](#)
[MECH ENG 5704 : Compliant Mechanism Design](#)
[MECH ENG 5715 : Concurrent Engineering](#)

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. 07/22/21 3:54 pm
David Bayless (djbkqf):
Approved for RMECHENG Chair
2. 07/23/21 1:15 pm
Marita Tibbetts (tibbettsmg):
Approved for CCC Secretary

Requested **Spring 2022** ~~01/08/2018~~

Effective Change
Date

Department Mechanical & Aerospace Engineering

Discipline Mechanical Engineering (MECH ENG)

Course Number 3313

Title
Machine Dynamics

Abbreviated Machine Dynamics
Course Title

3. 09/08/21 3:34 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

History

1. Oct 19, 2015 by
nisbett (517.1)
2. Oct 7, 2017 by
nisbett (517.3)

Catalog

Description

Motion analysis using vector methods is considered for machine elements including linkages, cams, and gears. Dynamic force analysis methods are applied to balancing, flywheels, and single and multicylinder engines.

Prerequisites

A grade of "C" or better in each of the following: Comp Sci 1570 or Comp Sci 1970 or Comp Sci 1971 or Comp Sci 1972; Mech Eng 2360 or Aero Eng 2360; Math 1214 (**or 1211**); ~~or Math 1215; 1208~~; Math ~~1215 or Math 1221~~; Math 2222; Physics 1135 or Physics 1111.

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:

Updating the prerequisite to include the new Math 1210 and 1211 as an option in place of Math 1214.

Also removing Math 1208 and 1221 which are no longer offered.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

sraper (09/08/21 3:34 pm): Removed Math 1210 from prereq statement.

Key: 517

[Preview Bridge](#)

Course Change Request

Date Submitted: 07/22/21 2:53 pm

Viewing: **MECH ENG 3411 : Modeling and Analysis of Dynamic Systems**

File: 1286.6

Last approved: 10/07/17 3:29 am

Last edit: 09/08/21 3:35 pm

Changes proposed by: nisbett

Programs
referencing this
course

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

Other Courses
referencing this
course

In The Prerequisites:

[AERO ENG 5307 : Vibrations I](#)

[AERO ENG 5309 : Engineering Acoustics I](#)

[MECH ENG 4479 : Automatic Control Of Dynamic Systems](#)

[MECH ENG 5307 : Vibrations I](#)

[MECH ENG 5309 : Engineering Acoustics I](#)

[MECH ENG 5420 : Signal Processing for Instrumentation and Control](#)

Requested **Spring 2022** ~~01/08/2018~~
Effective Change
Date

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. 07/22/21 4:08 pm
David Bayless (djbkqf):
Approved for RMECHENG Chair
2. 07/23/21 1:14 pm
Marita Tibbetts (tibbettsmg):
Approved for CCC Secretary

Department Mechanical & Aerospace Engineering

Discipline Mechanical Engineering (MECH ENG)

Course Number 3411

Title
Modeling and Analysis of Dynamic Systems

Abbreviated Model Analysis Dyn Sys
Course Title

3. 09/08/21 3:36 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

Catalog
Description

History

1. Oct 19, 2015 by
nisbett (1286.1)
2. Oct 7, 2017 by
nisbett (1286.3)

Concepts of modeling mechanical systems as linear systems are studied and applied to hydraulic, pneumatic, and electromechanical systems. Analysis techniques described include matrix formulations, Laplace transforms, and time domain response methods.

Prerequisites

A grade of "C" or better in each of the following: Comp Sci 1570 or Comp Sci 1970 or Comp Sci 1971 or Comp Sci 1972; Mech Eng 2360 or Aero Eng 2360; Math 1214 (or ~~or~~ Math **1211**); ~~1208~~; Math **1215**; ~~1215~~ or Math ~~1221~~; Math 2222; Math 3304; Physics 1135 or Physics 1111; Physics 2135 or Physics 2111.

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:

Updating the prerequisite to include the new Math 1210 and 1211 as an option in place of Math 1214.

Also removing Math 1208 and 1221 which are no longer offered.

Semesters

previously

offered as an

experimental

course

Co-Listed

Courses:

Course Reviewer

Comments

sraper (09/08/21 3:35 pm): Removed Math 1210 from prereq statement.

Key: 1286

[Preview Bridge](#)

Course Change Request

Date Submitted: 05/05/21 8:24 am

Viewing: **NUC ENG 5428 : Advanced Reactor Laboratory I**

File: 617.4

Last approved: 05/05/21 6:01 am

Last edit: 07/27/21 9:08 am

Changes proposed by: tibbettsmg

Programs
referencing this
course

[NU ENG-BS: Nuclear Engineering BS](#)

Other Courses
referencing this
course

In The Prerequisites:

[NUC ENG 5438 : Reactor Laboratory II](#)

Requested **Fall Spring** 2022

Effective Change
Date

Department Mining & Nuclear Engineering

Discipline Nuclear Engineering (NUC ENG)

Course Number 5428

Title

Advanced Reactor Laboratory I

In Workflow

1. **NUC ENG 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. 05/05/21 1:48 pm
AYODEJI Alajo
(alajoa):
Approved for NUC
ENG Chair
2. 05/05/21 2:31 pm
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary

Abbreviated
Course Title

Advanced Reactor **Lab**
~~Laboratory~~ I

Catalog
Description

3. 05/05/21 2:34 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair
4. 05/05/21 2:58 pm
Marita Tibbetts
(tibbettsmg):
Rollback to
Engineering DSCC
Chair for Pending
CCC Agenda post
5. 07/08/21 11:22
am
Stephen Raper
(sraper): Rollback
to NUC ENG Chair
for Engineering
DSCC Chair
6. 07/26/21 3:32 pm
AYODEJI Alajo
(alajoa):
Approved for NUC
ENG Chair
7. 07/27/21 8:56 am
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary
8. 07/27/21 9:08 am
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

History

1. May 5, 2021 by
schlegelj (617.1)

Acquaints the student with neutron flux measurement, reactor operation, control rod calibration, reactor power measurement and neutron activation experiments. Experiments with the thermal column and neutron beam port are also demonstrated.

Prerequisites

Nuc Eng 4312, Nuc Eng 3205.

Field Trip

Statement

| | | | | |
|---------------------|--------|--------|--------|--------|
| Credit Hours | LEC: 2 | LAB: 1 | IND: 0 | RSD: 0 |
| Total: 3 | | | | |
| Required for Majors | No | | | |
| Elective for Majors | Yes | | | |

Justification for
change:

updated title and description to differentiate between ugrd and grad level course.

Semesters

previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer

Comments

tibbettsmg (05/05/21 2:58 pm): Rollback: rollback to DSCC chair per request. MT

sraper (07/08/21 11:22 am): Rollback: Please remove the statement "additional course work/exams are required for graduate level. This is not an appropriate statement. The instructor for the lab can inform graduate students of additional expectations.

tibbettsmg (07/27/21 8:56 am): updated term to FS22. mt

sraper (07/27/21 9:08 am): removed last statement.

Key: 617

[Preview Bridge](#)

Course Change Request

Date Submitted: 05/05/21 8:27 am

Viewing: **NUC ENG 5438 : Advanced Reactor Laboratory II**

File: 1652.4

Last approved: 05/05/21 6:01 am

Last edit: 07/27/21 9:08 am

Changes proposed by: tibbettsmg

Programs
referencing this
course

[NU ENG-BS: Nuclear Engineering BS](#)

Requested **Fall Spring** 2022

Effective Change

Date

Department Mining & Nuclear Engineering

Discipline Nuclear Engineering (NUC ENG)

Course Number 5438

Title

Advanced Reactor Laboratory II

Abbreviated **Advanced** Reactor **Lab**

Course Title **Laboratory** II

Catalog
Description

In Workflow

1. **NUC ENG 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. 05/05/21 1:48 pm
AYODEJI Alajo
(alajoa):
Approved for NUC
ENG Chair
2. 05/05/21 2:31 pm
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary

3. 05/05/21 2:34 pm
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair
4. 05/05/21 2:58 pm
Marita Tibbetts
(tibbettsmg):
Rollback to
Engineering DSCC
Chair for Pending
CCC Agenda post
5. 07/08/21 11:23
am
Stephen Raper
(sraper): Rollback
to NUC ENG Chair
for Engineering
DSCC Chair
6. 07/26/21 3:32 pm
AYODEJI Alajo
(alajoa):
Approved for NUC
ENG Chair
7. 07/27/21 8:56 am
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary
8. 07/27/21 9:08 am
Stephen Raper
(sraper):
Approved for
Engineering DSCC
Chair

History

1. May 5, 2021 by
schlegelj (1652.1)

A continuation of Nuclear Engineering 4428 with experiments of a more advanced nature.

Prerequisites

Nuc Eng 4428 or Nuc Eng 5428.

Field Trip

Statement

| | | | | |
|---------------------|--------|--------|--------|--------|
| Credit Hours | LEC: 1 | LAB: 1 | IND: 0 | RSD: 0 |
| Total: 2 | | | | |
| Required for Majors | Yes | | | |
| Elective for Majors | No | | | |

Justification for
change:

updated title and description to differentiate between ugrd and grad level course.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

tibbettsmg (05/05/21 2:58 pm): Rollback: rollback to DSCC Chair per request. mt
srafer (07/08/21 11:23 am): Rollback: Please remove the statement "Additional course work/exams are required at the graduate level. this is not an appropriate statement. The lab instructor can inform graduate students of additional requirements.

tibbettsmg (07/27/21 8:56 am): updated term to FS 22. mt

srafer (07/27/21 9:08 am): removed last statement.

Program Change Request

Date Submitted: 08/26/21 9:30 am

Viewing: **SUB WAT-CT : Subsurface Water
Resources Certificate**

File: 352.4

Last approved: 07/01/20 1:39 pm

Last edit: 09/01/21 9:20 am

Changes proposed by: grotekr

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

Start Term

Fall **2022** ~~2020~~

Program Code

SUB WAT-CT

Department

Geosciences and Geological and Petroleum Engineering

Title

Subsurface Water Resources Certificate

Program Requirements and Description

In Workflow

1. **RGEOENG 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. **Kristy Giacomelli-Feys**

Approval Path

1. 08/26/21 9:52 am
Jeff Cawfield (jdc):
Approved for
RGEOENG Chair
2. 09/01/21 9:20 am
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary
3. 09/08/21 3:29 pm
Stephen Raper
(sraper): Approved
for Engineering
DSCC Chair

History

1. Jul 1, 2020 by
Sharon Lauck
(laucks)

The graduate certificate in Subsurface Water Resources is designed to provide formalized education in the area of subsurface water resource engineering, with emphasis on groundwater extraction, protection, and remediation

The Subsurface Water Resources Certificate Program is open to all persons holding a B.S., M.S., or Ph.D. degree in Geology, Geophysics, Geological Engineering, Geotechnics, or Civil Engineering or who are currently accepted into a graduate degree program in one of these fields at Missouri S&T. Once admitted to the program, the student must take the four designated courses (provided in the curriculum section). In order to receive a Graduate Certificate, the student must have an average cumulative grade point of 3.0 or better in the certificate courses. Once admitted to the program, a student will be given three years to complete the program.

Students admitted to the Subsurface Water Resources Certificate Program will have non-degree graduate status, however, they will earn graduate credit for the courses they complete. If the student completes the four-course sequence with a grade of B or better in each of the courses taken, they, upon application, will be admitted to their choice of non-thesis M.S. degree programs in either Geological Engineering or Geotechnics. The certificate credits taken by the students admitted to the M.S. degree program will count towards their master's degree. Students who do not have all of the prerequisite courses necessary to begin the courses in the Subsurface Water Resources Certificate Program will be allowed to take "bridge" courses at either the graduate or undergraduate level to prepare for the formal certificate courses.

| | | |
|--|--|---|
| Required Courses: | | |
| GEO ENG 5331 | Subsurface Hydrology | 3 |
| or GEO ENG 5332 | Fundamentals of Groundwater Hydrology | |
| or GEOLOGY 4411 | Hydrogeology | |
| And | | |
| GEO ENG 5381 | Intermediate Subsurface Hydrology And Contaminant Transport Mechs | 3 |
| Two of the following courses are required: | | |
| GEOLOGY 4431 | Methods Of Karst Hydrogeology | 3 |
| GEOLOGY 4451 | Aqueous Geochemistry | 3 |
| GEO ENG 5233 | Risk Assessment In Environmental Studies | 3 |
| GEO ENG 5443 | Subsurface Exploration | 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 5640 | Environmental Law And Regulations | 3 |
| GEO ENG 5782 | Environmental and Engineering Geophysics | 3 |
| or GEO ENG 6784 | Advanced Engineering And Environmental Geophysics | |
| GEO ENG 6331 | Advanced Subsurface Hydrology | 3 |
| GEO ENG 5235 | Environmental Geological Engineering | 3 |

Justification for request

GE 6784 is an advanced version of GE 5782 and meets the requirements of this elective.

Supporting Documents

~~App Ltrs Subsurface Water Resources.pdf~~

~~MDHE Approvals DEC 2019.pdf~~

Course Reviewer Comments

tibbettsmg (09/01/21 9:20 am): updated effective term to FS22. mt

Program Change Request

Date Submitted: 07/22/21 3:20 pm

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

File: 141.33

Last approved: 03/03/20 1:41 pm

Last edit: 08/17/21 9:40 am

Changes proposed by: nisbett

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

Start Term

Fall **2022** ~~2020~~

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
10. Kristy Giacomelli-Feys

Approval Path

1. 07/22/21 3:46 pm
David Bayless
(djbkqf): Approved for RMECHENG Chair
2. 08/17/21 9:40 am
Marita Tibbetts
(tibbettsmg): Approved for CCC Secretary
3. 09/08/21 3:16 pm
Stephen Raper
(sraper): Approved for Engineering DSCC Chair

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
Brittany Parnell
(ershenb)
7. Mar 3, 2020 by
Brittany Parnell
(ershenb)

Bachelor of Science Aerospace Engineering

Entering freshmen desiring to study aerospace engineering will be admitted to the Foundational Engineering and Computing Program. They will, however, be permitted, if they wish, to state an aerospace engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Foundational Engineering and Computing Program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision regarding the choice of a major.

A cumulative GPA of 2.5, and math science GPA of 2.25 are the minimum requirements for admission to the aerospace engineering program.

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.

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.

| Freshman Year | | | |
|----------------|---------|-----------------|---------|
| First Semester | Credits | Second Semester | Credits |
| | | | |

| | | | |
|--|----------------|---|----------------|
| FR ENG 1100 | 1 | MECH ENG 1720 | 3 |
| CHEM 1310 & CHEM 1319 & CHEM 1100 ¹ | 6 | MATH 1215 ⁴ | 4 |
| ENGLISH 1120 | 3 | PHYSICS 1135 ⁴ | 4 |
| MATH 1214 or 1211 ⁴ | 4 | H/SS Economics elective ³ | 3 |
| H/SS History Elective ² | 3 | | |
| | 17 | | 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 | 1 | 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 |
| | 17-18 | | 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 |
| Electives-Advanced Math/Cmp Sci ⁵ | 3 | Elective/Ethics ⁹ | 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 | 2 | 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 |
| | 16 | | 16 |
| Total Credits: 128-129 | | | |

¹ [CHEM 1310](#), [CHEM 1319](#) and [CHEM 1100](#) or an equivalent training program approved by Missouri S&T.

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 1210 and 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

Adding the new MATH 1210 and MATH 1211 option as an alternative for MATH 1214.

Supporting Documents

Course Reviewer Comments

tibbettsmg (07/27/21 10:37 am): updated formatting. mt

tibbettsmg (07/27/21 10:39 am): insert spacing. mt

tibbettsmg (08/17/21 9:40 am): updated formatting for plan of study to "Math 1214 or Math 1211"

Program Change Request

Date Submitted: 07/19/21 3:28 pm

Viewing: **CH ENG-BS : Chemical Engineering BS**

File: 150.88

Last approved: 05/05/21 8:29 am

Last edit: 09/01/21 9:11 am

Changes proposed by: luksc

Catalog Pages Using this Program
[Chemical & Biochemical Engineering](#)

Start Term

Fall **2022** ~~2024~~

Program Code

CH ENG-BS

Department

Chemical and Biochemical Engineering

Title

Chemical Engineering BS

Program Requirements and Description

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. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. Kristy Giacomelli-Feys

Approval Path

1. 07/19/21 3:40 pm
Hu Yang (huyang):
Approved for
RCHEMENG Chair
2. 08/17/21 9:35 am
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary
3. 09/08/21 3:28 pm
Stephen Raper
(sraper): Approved
for Engineering
DSCC Chair

History

1. Mar 18, 2014 by
Lahne Black (lahne)
2. May 2, 2014 by
Lahne Black (lahne)
3. Jan 30, 2015 by
kleb6b
4. Jul 15, 2015 by
pantaleoa
5. Jul 15, 2015 by
pantaleoa

6. Nov 18, 2015 by
marlene
7. Mar 7, 2016 by
Daniel Forciniti
(forcinit)
8. Mar 27, 2017 by
Daniel Forciniti
(forcinit)
9. May 3, 2018 by
Daniel Forciniti
(forcinit)
10. May 7, 2018 by
Brittany Parnell
(ershenb)
11. May 7, 2018 by
Brittany Parnell
(ershenb)
12. May 7, 2018 by
Brittany Parnell
(ershenb)
13. Jul 3, 2018 by
Brittany Parnell
(ershenb)
14. Nov 2, 2018 by Jee
C. Wang (jcwang)
15. Jan 29, 2019 by
Jee C. Wang
(jcwang)
16. Jan 30, 2019 by
Brittany Parnell
(ershenb)
17. Jan 30, 2019 by
Brittany Parnell
(ershenb)
18. Mar 3, 2020 by
Brittany Parnell
(ershenb)
19. May 5, 2021 by
Christi Luks (luksc)

Bachelor of Science Chemical Engineering

Entering freshmen desiring to study chemical engineering will be admitted to the Foundational Engineering and Computing Program. They will be permitted, if they wish, to state a chemical engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Foundational Engineering and Computing Program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision regarding the choice of a major.

For the bachelor of science degree in chemical 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 chemical engineering.

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, one humanities 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](#). The humanities course must be selected and meets the 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 1000 level or above and must be selected from the approved list. 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 3000 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 meets the 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 and meets the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.
5. Special topics and special problems and honors seminars are allowed only by petition to and approval by the student's department chairman.

The chemical 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.

| Freshman Year | | | |
|--|--------------|--|--------------|
| First Semester | Credits | Second Semester | Credits |
| FR ENG 1100 | 1 | MECH ENG 1720 | 3 |
| CHEM 1310 | 4 | CHEM 1320 | 3 |
| CHEM 1319 | 1 | COMP SCI 1500 | 3 |
| ENGLISH 1120 | 3 | OR | |
| HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200 | 3 | COMP SCI 1972 & COMP SCI 1982 | |
| MATH 1214 or 1211 ⁷ | 4 | MATH 1215 ⁷ | 4 |
| CHEM 1100 | 1 | PHYSICS 1135 | 4 |
| | 17 | | 17 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| CHEM ENG 2100 ¹ | 4 | CHEM ENG 2110 ¹ | 3 |
| CHEM ENG 2300 | 4 | CHEM ENG 2310 ² | 4 |
| CHEM 2210 | 3 | Science Elective ⁵ | 4 |
| MATH 2222 | 4 | MATH 3304 | 3 |
| PHYSICS 2135 | 4 | STAT 3113 | 3 |

| | | | |
|--|----------|--|--------------|
| Humanities and Social Sciences Elective ⁴ | | 3 | |
| 15 | | 16 | |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| CHEM ENG 3101 | 4 | CHEM ENG 3131 | 3 |
| CHEM ENG 3111 | 3 | CHEM ENG 3141 | 3 |
| CHEM ENG 3120 ¹ | 3 | CHEM ENG 3150 | 3 |
| ECON 1100 or 1200 | 3 | SP&M S 1185 | 3 |
| Upper level Humanities or Social Science Elective ⁴ | 3 | ENGLISH 3560 | 3 |
| 16 | | 15 | |
| Senior Year ³ | | | |
| First Semester | Credits | Second Semester | Credits |
| CHEM ENG 4091 | 3 | CHEM ENG 4097 ² | 3 |
| CHEM ENG 4101 ² | 3 | CHEM ENG 4130 ² | 3 |
| CHEM ENG 4110 | 3 | CHEM ENG 5XXX-Chem Eng Elective ⁶ | 3 |
| CHEM ENG 4241 | 3 | Chem Eng 5xxx --Chem Eng Elective ⁶ | 3 |
| CHEM ENG 5XXX-Chem Eng Elective ⁶ | 3 | Chem Eng 5xxx --Chem Eng Elective⁶ | 3 |
| CHEM ENG 4301 | 1 | CHEM ENG 4311 | 1 |
| 16 | | 13 | |
| Total Credits: 125 | | | |

Note: The minimum number of hours required for a degree in chemical engineering is 128.

A cumulative grade point average of 2.50 or better and a "C" or better in [CHEM 1310](#), [CHEM 1319](#), [CHEM 1320](#), [MATH 1214](#), [MATH 1215](#) and [PHYSICS 1135](#) are required to be admitted into the chemical engineering major. [MATH 1208](#) or [MATH 1210](#) and [MATH 1211](#) may be substituted for [MATH 1214](#). [MATH 1221](#) may be substituted for [MATH 1215](#).

| | |
|--------------|--|
| ¹ | A grade of "C" or better is required in CHEM ENG 2100 & CHEM ENG 2110 in order to enroll in Chem Eng 3120 . |
| ² | Communications emphasized course (See bachelor of science degree, general education communications requirement). |
| ³ | Chemical engineering majors are encouraged to take the fundamentals of engineering exam prior to graduation. It is the first step toward becoming a registered professional engineer. |
| ⁴ | Must meet the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. The prerequisites for the upper level course must be completed with a passing grade. |
| ⁵ | CHEM 2510 , or CHEM 4610 and CHEM 4619 , or BIO SCI 2213 and BIO SCI 2219 , or CHEM 2220 and CHEM 2219 , or Bio Sci 3313 and Bio Sci 3319 , or CHEM 3420 and CHEM 3459 . |
| ⁶ | A minimum of 12 cr. hr. from any Chem Eng 5xxx and any class from the approved list published on the Chemical Engineering web site but only 3 cr. hr. of CHEM ENG 4000 , CHEM ENG 4099 or Chem Eng 4099H. Students may have no more than three hours from approved out-of-department electives. |
| ⁷ | MATH 1208 or MATH 1210 and MATH 1211 may be substituted for MATH 1214. MATH 1221 may be substituted for MATH 1215. |

Chemical Engineering Biochemical Engineering Emphasis

| Freshman Year | | | |
|--|--------------|--|--------------|
| First Semester | Credits | Second Semester | Credits |
| FR ENG 1100 | 1 | MECH ENG 1720 | 3 |
| CHEM 1310 | 4 | COMP SCI 1500 | 3 |
| CHEM 1319 | 1 | OR | |
| ENGLISH 1120 | 3 | COMP SCI 1972 & COMP SCI 1982 | |
| HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200 | 3 | CHEM 1320 | 3 |
| MATH 1214 ⁶ | 4 | MATH 1215 ⁶ | 4 |
| CHEM 1100 | 1 | PHYSICS 1135 | 4 |
| | 17 | | 17 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| CHEM ENG 2100 ¹ | 4 | CHEM ENG 2110 ¹ | 3 |
| CHEM ENG 2300 | 4 | CHEM ENG 2310 ² | 4 |
| CHEM 2210 | 3 | STAT 3113 | 3 |
| MATH 2222 | 4 | Science Elective ⁵ | 4 |
| PHYSICS 2135 | 4 | MATH 3304 | 3 |
| | | ECON 1100 or 1200 | 3 |
| | 15 | | 16 |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| CHEM ENG 3101 | 4 | CHEM ENG 3131 | 3 |
| CHEM ENG 3111 | 3 | CHEM ENG 3141 | 3 |
| CHEM ENG 3120 ¹ | 3 | CHEM ENG 3150 | 3 |
| SP&M S 1185 | 3 | Science Elective ⁵ | 4 |
| Science Elective ⁵ | 4 | ENGLISH 3560 | 3 |
| | 17 | | 16 |
| Senior Year ³ | | | |
| First Semester | Credits | Second Semester | Credits |
| CHEM ENG 4091 | 3 | CHEM ENG 4097 ² | 3 |
| CHEM ENG 4110 | 3 | CHEM ENG 4210 | 3 |
| CHEM ENG 5250 | 3 | CHEM ENG 4220 | 3 |
| CHEM ENG 4201 | 3 | CHEM ENG 4241 | 3 |
| Upper Level Humanities or Social Sciences Elective ⁴ | 3 | Humanities or Social Science Elective ⁴ | 3 |
| CHEM ENG 4301 | 1 | CHEM ENG 4311 | 1 |
| | 16 | | 16 |
| Total Credits: 130 | | | |

Note: The minimum number of hours required for a degree in chemical engineering with an emphasis in biochemical engineering is 130.

A cumulative grade point average of 2.50 or better and a "C" or better in [CHEM 1310](#), [CHEM 1319](#), [CHEM 1320](#), [MATH 1214](#), [MATH 1215](#) and [PHYSICS 1135](#) are required to be admitted into the chemical engineering major.

| | |
|---|---|
| 1 | A grade of "C" or better is required in CHEM ENG 2100 & CHEM ENG 2110 in order to enroll in CHEM ENG 3120 . |
| 2 | Communications emphasized course (See bachelor of science degree, general education communications requirement). |
| 3 | Chemical engineering majors are encouraged to take the fundamentals of engineering exam prior to graduation. It is the first step toward becoming a registered professional engineer. |
| 4 | Must meet the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. The prerequisites for the upper level course must be completed with a passing grade. |
| 5 | A minimum of 12 credit hours in Science Electives are required. Select three courses from CHEM 2220 , CHEM 4610 , CHEM 4620 , BIO SCI 2213 , BIO SCI 3313 , and BIO SCI 4323 ; and a minimum of two laboratory courses from CHEM 2229 or CHEM 2219 , CHEM 4619 , BIO SCI 2219 , BIO SCI 3319 , and BIO SCI 4329 . |
| 6 | MATH 1208 or MATH 1210 and MATH 1211 may be substituted for MATH 1214. MATH 1221 may be substituted for MATH 1215. |

Justification for request

1. To incorporate changes in math curriculum. Also corrects that we did not delete old footnotes from a change to the CompSci course offerings.

2. Renumbered ChemEng 2300 and 2310 to 4301 and 4311 was approved recently and is in effect beginning Sp22. This now moves those courses to the appropriate semesters.

Supporting Documents

Course Reviewer Comments

tibbettsmg (08/17/21 9:35 am): updated term to FS22 and plan of study to "Math 1214 or Math 1211"

tibbettsmg (09/01/21 9:11 am): Updated formatting and changed 2300 to 4301 and 2310 to 4311 in plan of study grid. mt

Program Change Request

Date Submitted: 08/17/21 1:01 pm

Viewing: **EV ENG-BS : Environmental Engineering BS**

File: 51.21

Last approved: 07/23/20 2:45 pm

Last edit: 08/18/21 3:51 pm

Changes proposed by: mfitc

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

Start Term

Fall **2022** ~~2020~~

Program Code

EV ENG-BS

Department

Civil, Architectural, and Environmental Engineering

Title

Environmental Engineering BS

Program Requirements and Description

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. Kristy Giacomelli-Feys

Approval Path

1. 08/18/21 3:43 pm
Joel Burken
(burken): Approved for RCIVILEN Chair
2. 08/18/21 3:51 pm
Marita Tibbetts
(tibbettsmg): Approved for CCC Secretary
3. 09/08/21 3:24 pm
Stephen Raper
(sraper): Approved for Engineering DSCC Chair

History

1. Aug 30, 2013 by pantaleoa
2. Sep 3, 2013 by pantaleoa
3. Sep 27, 2013 by Lahne Black (lahne)
4. Mar 18, 2014 by Lahne Black (lahne)
5. Jul 20, 2015 by pantaleoa

6. Sep 15, 2016 by
Crystal Wilson
(wilsoncry)
7. Sep 22, 2017 by
Crystal Wilson
(wilsoncry)
8. Apr 19, 2019 by
Brittany Parnell
(ershenb)
9. Mar 3, 2020 by
mfitch
10. Jul 23, 2020 by
Kristy Giacomelli-
Feys (kristyg)

Environmental Engineering Bachelor of Science

Entering freshmen desiring to study environmental engineering will be admitted to the Foundational Engineering and Computing Program. They will, however, be permitted, if they wish, to state a environmental engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Foundational Engineering and Computing Program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision regarding the choice of a major.

For the bachelor of science degree in environmental engineering a minimum of 129 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 environmental engineering.

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, one humanities 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](#). The humanities course must be selected from the approved lists for art, English, foreign languages, music, philosophy, speech and media studies, or theater.
2. [HISTORY 2510](#) or [HISTORY 3530](#) is required.
3. The remaining two courses are to be chosen from the list of approved humanities/social sciences courses and may include one communications course in addition to [ENGLISH 1120](#).
4. Special topics and special problems and honors seminars are allowed only by petition to and approval by the student's department chair.

The environmental 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.

| Freshman Year | | | |
|--|---------|-------------------------------|---------|
| First Semester | Credits | Second Semester | Credits |
| FR ENG 1100 ² | 1 | MECH ENG 1720 | 3 |

| | | | |
|---|----------------|---|----------------|
| CHEM 1310 & CHEM 1319 | 5 | MATH 1215 | 4 |
| MATH 1214 or 1211 | 4 | PHYSICS 1135 | 4 |
| ENGLISH 1120 | 3 | General Education Elective ¹ | 6 |
| General Education Elective ¹ | 3 | | |
| | 16 | | 17 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| CIV ENG 2200 | 3 | CIV ENG 2210 | 3 |
| MATH 2222 | 4 | CIV ENG 2211 | 1 |
| ENV ENG 2601 ³ | 3 | MECH ENG 2350 | 2 |
| CHEM 1320 or GEOLOGY 3410 | 3 | CHEM ENG 2100 | 4 |
| BIO SCI 1113 | 3 | ENV ENG 2602 | 3 |
| | | ENV ENG 3603 | 3 |
| | 16 | | 16 |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| ENV ENG 3615 ³ | 3 | ENV ENG 5619 | 3 |
| CIV ENG 3330 ² | 3 | STAT 3113 | 3 |
| MATH 3304 | 3 | CHEM ENG 2110 | 3 |
| GEO ENG 1150 | 3 | ENV ENG Technical Elective ^{5,6} | 3 |
| PHYSICS 2135 | 4 | Communications Elective ⁷ | 3 |
| | 16 | | 15 |
| Senior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| CIV ENG 4448 | 3 | ENV ENG 4097 ³ | 3 |
| ENV ENG 4010 ³ | 1 | ENV ENG Depth Elective ^{5,6} | 3 |
| CIV ENG 3334 | 4 | ENV ENG Depth Elective ^{5,6} | 3 |
| ENV ENG Air Pollution Elective ^{4,5} | 3 | ENV ENG Technical Elective ^{5,6} | 3 |
| HISTORY 2510 or 3530 | 3 | ENV ENG 4609 | 1 |
| ENV ENG Depth Elective ^{5,6} | 3 | General Education Elective ¹ | 3 |
| | 17 | | 16 |
| Total Credits: 129 | | | |

¹ All general education 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.

² A grade of 'C' or better required to satisfy graduation requirements

³ Existing CIV ENG course that is cross-listed as ENV ENG course.

⁴ Air Pollution Elective: Choose [ENV ENG 5660](#), [ENV ENG 5662](#) or [ENV ENG 5665](#). One class may not be used to fulfill both the air

pollution requirement and a depth elective.

⁵ A grade of 'C' or better may be required in ENV ENG technical and depth elective prerequisite courses. Refer to the Missouri S&T undergraduate catalog for this prerequisite information.

⁶ Select depth and technical electives from approved lists. A maximum total of 6 credit hours of independent study ([ENV ENG 5000](#) or [ENV ENG 4099](#)) can be used as depth or technical electives in the B.S. environmental engineering curriculum.

⁷ Choose 1 of the following: [CIV ENG 2003](#), [ENGLISH 1160](#), [ENGLISH 3560](#), or [SP&M S 1185](#)

Note: All environmental 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. Students must sign a release form giving the university access to their Fundamentals of Engineering Examination score.

Environmental Engineering Depth Electives

The following classes may be used to fulfill the three depth elective courses required for the B.S. in environmental engineering:

| | | |
|------------------------------|--|---|
| ENV ENG 5640 | Environmental Law And Regulations | 3 |
| ENV ENG 5630 | Remediation of Contaminated Groundwater And Soil | 3 |
| ENV ENG 5650 | Public Health Engineering | 3 |
| ENV ENG 5670 | Solid Waste Management | 3 |
| ENV ENG 5605 | Environmental Systems Modeling | 3 |
| ENV ENG 5642 | Sustainability, Population, Energy, Water, and Materials | 3 |
| ENV ENG 5665 | Indoor Air Pollution | 3 |
| ENV ENG 5660 | Introduction To Air Pollution | 3 |
| ENV ENG 5662 | Air Pollution Control Methods | 3 |
| GEO ENG 5331 | Subsurface Hydrology | 3 |
| ENV ENG 5360 | Water Resources And Wastewater Engineering | 3 |
| ENV ENG 5635 | Phytoremediation and Natural Treatment Systems: Science and Design | 3 |

One class may not be used to fulfill both the air pollution requirement and depth elective.

Environmental Engineering Technical Electives

The following classes may be used to fulfill the two technical elective courses required for the B.S. in environmental engineering:

| | | |
|-------------------------------|---|---|
| CIV ENG 5331 | Hydraulics Of Open Channels | 3 |
| CIV ENG 5335 | Water Infrastructure Engineering | 3 |
| CIV ENG 5446 | Management Of Construction Costs | 3 |
| CIV ENG 5360 | Water Resources And Wastewater Engineering | 3 |
| CIV ENG 5448 | Green Engineering: Analysis of Constructed Facilities | 3 |
| CHEM ENG 3101 | Fundamentals of Transport in Chemical and Biochemical Engineering | 4 |
| CIV ENG 5744 | Geosynthetics in Engineering | 3 |
| CHEM ENG 5340 | Principles of Environmental Monitoring | 3 |
| GEO ENG 3148 | Fundamentals Of Geographic Information Systems | 3 |

| | | |
|---|---|--------------|
| GEO ENG 3175 | Geomorphology And Terrain Analysis | 3 |
| GEO ENG 5233 | Risk Assessment In Environmental Studies | 3 |
| GEO ENG 5235 | Environmental Geological Engineering | 3 |
| GEO ENG 5239 | Groundwater Remediation | 3 |
| GEO ENG 4276 | Environmental Aspects Of Mining | 3 |
| GEOLOGY 3410 | Introduction To Geochemistry | 3 |
| PET ENG 4210 | Drilling and Well Design | 3 |
| GEOLOGY 4451 | Aqueous Geochemistry | 3 |
| CIV ENG 5662/ENV ENG 5662 | Air Pollution Control Methods | 3 |
| GEOLOGY 3811 | Fundamentals Of Geographic Information Systems | 3 |
| GEOLOGY 4421 | Radioactive Waste Management And Remediation | 3 |
| CHEM 3410 | Chemical Thermodynamics I | 3 |
| CHEM 5510 | Introduction to Chemical Analysis | 4 |
| CHEM 4510 | Instrumental Methods Of Chemical Analysis | 4 |
| CHEM ENG 3120 | Chemical Engineering Thermodynamics II | 3 |
| CHEM ENG 3100 | Course CHEM ENG 3100 Not Found | 3 |
| CHEM ENG 3110 | Course CHEM ENG 3110 Not Found | 2 |
| CHEM ENG 5130 | Risk Assessment and Reduction | 3 |
| CHEM 2210 | Organic Chemistry I | 3 |
| BIO SCI 2263 | Ecology | 3 |
| BIO SCI 5313 | Pathogenic Microbiology | 3 |
| BIO SCI 4323 | Molecular Genetics | 3 |
| GEO ENG 5237 | Geological Aspects Of Hazardous Waste Management | 3 |
| GEO ENG 5276 | Advanced Environmental Aspects Of Mining | 3 |
| GEO ENG 5320 | Groundwater Modeling | 3 |
| GEO ENG 5331 | Subsurface Hydrology | 3 |
| GEO ENG 5332 | Fundamentals of Groundwater Hydrology | 3 |
| GEO ENG 5381 | Intermediate Subsurface Hydrology And Contaminant Transport Mechs | 3 |
| MIN ENG 5742 | Environmental Aspects of Mining | 3 |
| BIO SCI 3313 | Microbiology | 3 |
| BIO SCI 4313 | Introduction to Environmental Microbiology | 3 |
| BIO SCI 4343 | Introduction to Geomicrobiology | 3 |
| BIO SCI 4363 | Freshwater Ecology | 3 |
| BIO SCI 4563 | Global Ecology | 3 |
| BIO SCI 4329 | Molecular Genetics Laboratory | 2 |
| BIO SCI 4383 | Toxicology | 3 |
| CIV ENG 5330 | Unsteady Flow Hydraulics | 3 |
| CIV ENG 5332 | Transport Processes in Environmental Flows | 3 |
| CIV ENG 5333 | Intermediate Hydraulic Engineering | 3 |

| | | |
|------------------------------|--|---|
| CIV ENG 5337 | River Mechanics And Sediment Transport | 3 |
| CIV ENG 5338 | Hydrologic Engineering | 3 |

Justification for request

New Math 1211, remove discontinued ChemE classes, adjust Chem 2110 to correct crhr value.

Supporting Documents

Course Reviewer Comments

tibbettsmg (08/18/21 3:51 pm): updated term to FS22. mt

Key: 51

Program Change Request

Date Submitted: 08/26/21 8:48 am

Viewing: **GE ENG-BS : Geological Engineering BS**

File: 156.60

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

Last edit: 09/02/21 9:49 am

Changes proposed by: grotekr

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

Start Term

Fall **2022** ~~2021~~

Program Code

GE ENG-BS

Department

Geosciences and Geological and Petroleum Engineering

Title

Geological Engineering BS

Program Requirements and Description

In Workflow

1. **RGEOENG 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. **Kristy Giacomelli-Feys**

Approval Path

1. 07/22/21 10:40 am
David Borrok
(borrokd): Approved for RGEOENG Chair
2. 07/29/21 12:00 pm
Marita Tibbetts
(tibbettsmg): Rollback to Initiator
3. 08/26/21 9:39 am
Jeff Cawfield (jdc): Approved for RGEOENG Chair
4. 09/02/21 9:49 am
Marita Tibbetts
(tibbettsmg): Approved for CCC Secretary
5. 09/08/21 3:29 pm
Stephen Raper
(sraper): Approved for Engineering DSCC Chair

History

1. Mar 18, 2014 by Lahne Black (lahne)
2. Nov 18, 2014 by pantaleoa
3. Nov 18, 2014 by pantaleoa
4. Jul 20, 2015 by pantaleoa
5. Feb 27, 2018 by Katherine Grote (grotekr)
6. Jun 18, 2018 by Katherine Grote (grotekr)
7. Jun 14, 2019 by Katherine Grote (grotekr)
8. Mar 3, 2020 by Brittany Parnell (ershenb)
9. Jul 1, 2020 by Leslie Gertsch (gertschl)
10. Jun 10, 2021 by Sharon Lauck (laucks)

Bachelor of Science Geological Engineering

Entering freshmen desiring to study geological engineering will be admitted to the Foundational Engineering and Computing Program. They may state a geological engineering preference, which is a consideration for geological engineering program scholarships. The focus of the Foundational Engineering and Computing Program is on enhanced advising and career counseling, to provide the student with the information necessary to make an informed decision regarding the choice of a major.

For the bachelor of science degree in geological engineering a minimum of 128 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. The student must maintain at least two grade points per credit hour (grade of C) for all courses taken in geological engineering. Their program of study must contain a minimum of 18 credit hours of course work in the humanities and the social sciences areas, selected as described in the Engineering Degree Requirements section of this catalog. Geological engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade is not required; however, passing this examination is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process.

The geological engineering program at Missouri S&T is characterized by comprehensive understanding of the scientific basics of engineering and innovative application. We focus on solving the problems and meeting the needs of civilization as those are affected by geological materials, structures, or events. The necessary interactions required for this among the various sciences, engineering disciplines, and human professions are emphasized in research, analysis, synthesis, and design. Learning occurs in classroom, laboratory, online, field, and combined modes.

| First Semester | Credits | Second Semester | Credits |
|--|---------|--|---------|
| MATH 1214 or 1211 ¹ | 4 | MATH 1215 ¹ | 4 |
| CHEM 1100 | 1 | MECH ENG 1720 | 3 |
| CHEM 1310 | 4 | PHYSICS 1135 | 4 |
| CHEM 1319 | 1 | GEO ENG 1150 or GEOLOGY 1110 | 3 |
| ENGLISH 1120 | 3 | Humanities/Soc Sci Elective ^a | 3 |
| FR ENG 1100 | 1 | | |
| Humanities/Soc Sci Elective ^a | 3 | | |
| | 17 | | 17 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| MATH 2222 | 4 | MATH 3304 | 3 |
| PHYSICS 2135 | 4 | CIV ENG 2200 | 3 |
| GEO ENG 3148 | 3 | GEO ENG 2110 | 1 |
| GEO ENG 3249 | 3 | GEOLOGY 2611 | 3 |
| Humanities/Soc Sci Elective ^a | 3 | GEO ENG 3175 | 3 |
| | | Humanities/Soc Sci Elective ^a | 3 |
| | 17 | | 16 |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| MECH ENG 2350 | 2 | CIV ENG 3330 | 3 |
| CIV ENG 2210 | 3 | CIV ENG 3715 or MIN ENG 5823 | 3 |
| GEO ENG 5331 | 3 | GEO ENG 5174 | 3 |
| GEOLOGY 3310 | 3 | Chemistry/Geochemistry Elective ^b | 3 |
| GEOLOGY 3319 | 1 | Technical Elective ^c | 3 |
| ECON 1100 or 1200 | 3 | | |
| | 15 | | 15 |
| Senior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| GEO ENG 4010 | 0.5 | GEO ENG 4010 | 0.5 |
| GEO ENG 5441 | 3 | GEO ENG 4115 | 3 |
| GEO ENG 5443 | 3 | GEO ENG 5090 | 3 |
| ENGLISH 3560 | 3 | Geo Eng Elective ^e | 3 |
| Geophysics Elective ^d | 3 | Eng Econ Elective ^f | 3 |
| Technical Elective ^c | 3 | Humanities/Soc Sci Elective ^a | 3 |
| | 15.5 | | 15.5 |
| Total Credits: 128 | | | |

a Humanities/Social Sciences Elective: This course sequence must provide both breadth and depth of content and meet

| | |
|--------------|--|
| | requirements specified in the Engineering Degree Requirements section of the current undergraduate catalog. A total of 18 credit hours is required. |
| b | Chemistry/Geochemistry Elective: Select from chemistry, geochemistry or biology courses as approved by advisor. |
| c | Technical Elective: Select from advanced courses in science or engineering as approved by advisor. |
| d | Geophysics Elective: Select from GEO ENG 5736 , GEO ENG 5761 , or GEO ENG 5782 . |
| e | Geological Engineering Elective: Select from GEO ENG 5471 , GEO ENG 5381 , GEO ENG 5556 , MIN ENG 5823 , PET ENG 2510 , PET ENG 3520 , CIV ENG 3715 , CIV ENG 4729 , or CIV ENG 5715 . |
| f | Engineering Economics Elective: Select from ENG MGT 5210 , MIN ENG 3512 , or PET ENG 4590 or both ENG MGT 1100 and ENG MGT 1210 . |
| ¹ | MATH 1208 or MATH 1210 and MATH 1211 may be substituted for MATH 1214. MATH 1221 may be substituted for MATH 1215. |

Geological Engineering Focus Areas

The student uses the following course lists as guidance to satisfy the various elective requirements (chemistry/geochemistry, technical, geophysics, and geological engineering) while focusing preparation for their chosen career specialty. Other courses can be substituted with advisor approval.

Dual Professional Registration as a Geologist

| | | |
|------------------------------|--------------------------------|---|
| GEOLOGY 2096 | Field Geology | 3 |
| GEOLOGY 3410 | Introduction To Geochemistry | 3 |
| GEOLOGY 3620 | Stratigraphy And Sedimentation | 3 |
| GEOLOGY 4097 | Advanced Field Geology | 3 |
| GEOLOGY 4841 | Geological Field Studies | 3 |
| GEO ENG 5144 | Remote Sensing Technology | 3 |

Engineering Geology and Geotechnics

| | | |
|------------------------------|--|---|
| GEO ENG 5146 | Applications Of Geographic Information Systems | 3 |
| GEO ENG 5471 | Rock Engineering | 3 |
| CIV ENG 3715 | Fundamentals of Geotechnical Engineering | 3 |
| CIV ENG 4729 | Foundation Engineering | 3 |
| MIN ENG 5823 | Rock Mechanics | 3 |

Environmental and Engineering Geophysics

| | | |
|------------------------------|---|---|
| GEO ENG 5144 | Remote Sensing Technology | 3 |
| GEO ENG 5736 | Geophysical Field Methods | 3 |
| GEO ENG 5761 | Transportation Applications of Geophysics | 3 |
| GEO ENG 5782 | Environmental and Engineering Geophysics | 3 |
| GEOPHYS 4241 | Electrical Methods In Geophysics | 3 |
| GEOPHYS 4261 | Geophysical Instrumentation | 1 |
| GEOPHYS 5231 | Seismic Data Processing | 3 |

Groundwater Hydrology and Environmental Protection

| | | |
|------------------------------|---------------------------------|---|
| GEO ENG 4276 | Environmental Aspects Of Mining | 3 |
|------------------------------|---------------------------------|---|

| | | |
|------------------------------|---|---|
| GEO ENG 5233 | Risk Assessment In Environmental Studies | 3 |
| GEO ENG 5235 | Environmental Geological Engineering | 3 |
| GEO ENG 5237 | Geological Aspects Of Hazardous Waste Management | 3 |
| GEO ENG 5320 | Groundwater Modeling | 3 |
| GEO ENG 5381 | Intermediate Subsurface Hydrology And Contaminant Transport Mechs | 3 |
| CIV ENG 5640 | Environmental Law And Regulations | 3 |
| PET ENG 3330 | Well Logging | 3 |

Quarry and Mine Engineering

| | | |
|------------------------------|--|---|
| GEO ENG 4276 | Environmental Aspects Of Mining | 3 |
| GEO ENG 5471 | Rock Engineering | 3 |
| GEO ENG 5575 | Aggregates And Quarrying | 3 |
| CIV ENG 3116 | Construction Materials, Properties And Testing | 3 |
| MIN ENG 3913 | Mineral Identification and Exploration | 3 |
| MIN ENG 5612 | Principles of Explosives Engineering | 3 |
| MIN ENG 5822 | Strata Control | 3 |
| MIN ENG 5823 | Rock Mechanics | 3 |
| MIN ENG 5912 | Mine Power and Drainage | 3 |

Renewable and Conventional Energy Resources

| | | |
|---------------------------------|--|---|
| GEO ENG 5146 | Applications Of Geographic Information Systems | 3 |
| GEO ENG 5556 | Renewable Energy Systems | 3 |
| GEOLOGY 4421 | Radioactive Waste Management And Remediation | 3 |
| or NUC ENG 4367 | Radioactive Waste Management And Remediation | |
| GEOLOGY 5511 | Applied Petroleum Geology | 3 |
| MIN ENG 5322 | Coal Mining Methods | 3 |
| MIN ENG 5422 | Coal Preparation | 3 |
| MIN ENG 5823 | Rock Mechanics | 3 |
| PET ENG 2510 | Properties Of Hydrocarbon Fluids | 3 |
| PET ENG 3330 | Well Logging | 3 |
| PET ENG 3520 | Petroleum Reservoir Engineering | 3 |
| PET ENG 4520 | Well Test Analysis | 3 |

Accelerated BS/MS Option (Graduate Pathway)

Students nearing completion of a BS in geological engineering can share up to nine 5000- or 6000-level credit hours toward their BS degree and a MS degree in geological engineering simultaneously, if they satisfy the following criteria:

- Have completed 64 credit hours of course work, including:
 - All chemistry and mathematics requirements, and
 - 21 credit hours of geological engineering courses with a minimum GPA of 3.20 in the geological engineering courses.
- Complete an application listing the courses to be shared, with approval from the undergraduate advisor and a recommendation from the geological engineering faculty member who agrees to serve as their MS advisor. The shared courses may not be

undergraduate research, special problems, or transfer courses. Applications are due within one semester of completing the last shared course.

- Follow all geological engineering non-thesis MS program requirements (see the Graduate Catalog).

All other MS degree requirements remain the same. The program may be combined with existing honors research, emphasis areas, and certificate options. An additional six 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 as a dual enrolled student will require formal application to the graduate program. Upon application, acceptance to the geological engineering MS degree program from this option is automatic as long as the student remains in good standing (GPA above 3.0 and B's or better in all graduate courses within the program). To remain in this option, the student must meet geological engineering graduate academic performance requirements and maintain continuous enrollment at Missouri S&T. If the student exits the program before completion of the MS degree, 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.

It is the student's responsibility to check how dual-enrollment status and graduate coursework would affect scholarships and other financial aid. Graduate students are not eligible for Federal Pell Grants, though they are eligible for Federal Financial Aid, as well as fellowships and teaching/research assistantships. International students are responsible for checking with the International Affairs Office during completion of an accelerated BS/MS to ensure immigration status is properly maintained throughout the program.

This option reduces the cost and the time required to earn a MS. See the Graduate Pathway section of this catalog, and the Geological Engineering Masters section of the Graduate Catalog, for additional details.

Justification for request

Updating to reflect changes in math requirements.

Supporting Documents

Course Reviewer Comments

tibbettsmg (07/29/21 12:00 pm): Rollback: rollback per request. mt

tibbettsmg (09/02/21 9:49 am): updated formatting and eff term to FS 22. mt

Program Change Request

Date Submitted: 08/26/21 8:50 am

Viewing: **GL&GPH-BS : Geology and Geophysics BS**

File: 64.59

Last approved: 06/10/21 4:08 pm

Last edit: 09/02/21 9:40 am

Changes proposed by: grotekr

Catalog Pages Using this Program
[Geology and Geophysics](#)

Start Term

Fall **2022** ~~2021~~

Program Code

GL&GPH-BS

Department

Geosciences and Geological and Petroleum Engineering

Title

Geology and Geophysics BS

Program Requirements and Description

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. FS Meeting Agenda
8. Faculty Senate Chair
9. Registrar
10. Kristy Giacomelli-Feys

Approval Path

1. 07/22/21 10:40 am
David Borrok
(borrokd): Approved for RGEOENG Chair
2. 07/29/21 12:00 pm
Marita Tibbetts
(tibbettsmg): Rollback to Initiator
3. 08/26/21 9:35 am
Jeff Cawfield (jdc): Approved for RGEOENG Chair
4. 09/02/21 9:40 am
Marita Tibbetts
(tibbettsmg): Approved for CCC Secretary
5. 09/09/21 4:03 pm
Katie Shannon
(shannonk): Approved for Sciences DSCC Chair

History

1. May 6, 2014 by Francisca Oboh-Ikuenobe (ikuenobe)
2. Apr 24, 2015 by wronk
3. Mar 27, 2017 by Kelly Liu (liukh)
4. Jun 18, 2018 by Kelly Liu (liukh)
5. Jun 14, 2019 by Sharon Lauck (laucks)
6. Jul 1, 2020 by Sharon Lauck (laucks)
7. Jun 10, 2021 by Sharon Lauck (laucks)

Bachelor of Science Geology and Geophysics

A minimum of 127 credit hours is required for a Bachelor of Science degree in Geology and Geophysics. Students must average at least two grade points per credit hour and must obtain a letter grade of "C" or better in all Geology and Geophysics courses.

The Geology and Geophysics curriculum must include [ENGLISH 1120](#) and [ENGLISH 1160](#), [ECON 1100](#) or [ECON 1200](#), either [HISTORY 1200](#), [HISTORY 1300](#), [HISTORY 1310](#) or [POL SCI 1200](#), and nine elective hours in humanities/social sciences. Specific requirements for the bachelor degree program are outlined in the sample program below

| Freshman Year | | | | | |
|--|---------|--|---------|------------------------------|---------|
| First Semester | Credits | Second Semester | Credits | | |
| GEOLOGY 1110 or GEO ENG 1150 | 3 | GEOLOGY 1120 ¹ | 3 | | |
| ENGLISH 1120 | 3 | GEOLOGY 1129 ¹ | 1 | | |
| CHEM 1310 | 4 | Elective (Science & Eng) ² | 3 | | |
| CHEM 1319 | 1 | Humanities/Social Science Elective | 3 | | |
| CHEM 1100 | 1 | MATH 1214 or 1211 ³ | 4 | | |
| Humanities/Social Science Elective | 3 | | | | |
| | 15 | | 14 | | |
| Sophomore Year | | | | | |
| First Semester | Credits | Second Semester | Credits | Summer Semester | Credits |
| GEOLOGY 2610 | 4 | GEOLOGY 2620 ¹ | 4 | GEOLOGY 2096 | 3 |
| GEOPHYS 3210 | 3 | GEOLOGY 3410 | 3 | | |

| | | | | | |
|---|----------------|--|----------------|------------------------------|----------------|
| MATH 1215 ³ | 4 | ENGLISH 1160 or 3560 | 3 | | |
| COMP SCI 1500 or GEO ENG 3249 | 3 | ECON 1100 or 1200 | 3 | | |
| | | HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200 | 3 | | |
| | 14 | | 16 | | 3 |
| Junior Year | | | | | |
| First Semester | Credits | Second Semester | Credits | Summer Semester | Credits |
| GEOLOGY 3310 | 3 | GEOLOGY 3620 | 3 | GEOLOGY 4097 | 3 |
| GEOLOGY 3319 | 1 | GEOLOGY 3629 | 1 | | |
| PHYSICS 1135 ⁴ | 4 | PHYSICS 2135 ⁴ | 4 | | |
| STAT 3113 , or 3115 , or 3117 , or GEO ENG 4115 | 3 | Elective (Geo & Geop) ⁵ | 6 | | |
| Elective (Geo & Geop) ⁵ | 3 | Humanities/Social Sciences Elective | 3 | | |
| | 14 | | 17 | | 3 |
| Senior Year | | | | | |
| First Semester | Credits | Second Semester | Credits | | |
| GEOLOGY 4010 | 0.5 | GEOPHYS 5096 | 3 | | |
| Elective (Science & Eng) ² | 6 | Elective (Science & Eng) ² | 9 | | |
| Elective (Geo & Geop) ⁵ | 9 | Free Elective ⁶ | 3 | | |
| | | GEOLOGY 4010 | .5 | | |
| | 15.5 | | 15.5 | | |
| Total Credits: 127 | | | | | |

¹ Communications Emphasized (CE) courses

² All Geology/Geophysics students must complete at least 15 hours of elective course work in science (which may include additional Geology/Geophysics courses), mathematics, and/or engineering, courses required for the basic program. 12 hours of this course work must be numbered 2000 or above.

³ [MATH 1208](#) or [MATH 1210](#) and [MATH 1211](#) may be substituted for [MATH 1214](#). [MATH 1221](#) may be substituted for [MATH 1215](#).

⁴ Students may substitute [PHYSICS 1111](#) and [PHYSICS 1119](#) for [PHYSICS 1135](#); [PHYSICS 2111](#) and [PHYSICS 2119](#) for [PHYSICS 2135](#).

⁵ All Geology and Geophysics students must complete at least 18 hours of elective course work numbered 2000 or above in the Department of Geology and Geophysics, in addition to the required core curriculum.

⁶ **Free elective hours may be taken in any combination of credit hours (1, 2, 3, etc.) and can include any course offerings at the University.**

Core Curriculum

| | | |
|--|------------------------------------|---|
| Taken by all students in Geology & Geophysics. | | |
| GEOLOGY 1110 | Physical And Environmental Geology | 3 |
| GEOLOGY 1120 | Evolution Of The Earth | 3 |

| | | |
|------------------------------|--|------|
| GEOLOGY 1129 | Evolution of the Earth Laboratory ⁵ | 1 |
| GEOLOGY 2610 | Mineralogy And Crystallography | 4 |
| GEOLOGY 2620 | Igneous And Metamorphic Petrology | 4 |
| GEOLOGY 3310 | Structural Geology | 3 |
| GEOLOGY 3319 | Structural Geology Lab | 1 |
| GEOLOGY 3410 | Introduction To Geochemistry | 3 |
| GEOLOGY 3620 | Stratigraphy And Sedimentation | 3 |
| GEOLOGY 3629 | Stratigraphy Lab | 1 |
| GEOLOGY 4010 | Seminar | 0.5 |
| GEOLOGY 2096 | Field Geology | 3 |
| GEOLOGY 4097 | Advanced Field Geology | 3 |
| GEOPHYS 3210 | Introduction to Geophysics | 3 |
| GEOPHYS 5096 | Global Tectonics | 3 |
| Total Credits | | 38.5 |

Geology and Geophysics Focus Areas

Geochemistry

Students should complete at least 5 courses (15 hours minimum) from the list. Students may also choose additional courses to be selected from an approval list and with guidance from student's advisor.

| | | |
|------------------------------|--|---|
| GEOLOGY 3511 | Introduction to Mineral Deposits | 3 |
| GEOLOGY 4451 | Aqueous Geochemistry | 3 |
| GEOLOGY 4461 | Isotope Geochemistry | 3 |
| GEOLOGY 4631 | Advanced Igneous and Metamorphic Petrology | 4 |
| GEOLOGY 4841 | Geological Field Studies | 3 |
| GEOLOGY 5611 | Granites And Rhyolites | 4 |
| GEOLOGY 5671 | Clay Mineralogy | 3 |
| CER ENG 2110 | Atomic Structure Of Crystalline Ceramics | 3 |
| CER ENG 3220 | Phase Equilibria | 3 |

General Geology

Students should complete at least 5 courses (15 hours minimum) from the list. Students may also choose additional courses to be selected from an approval list and with guidance from student's advisor.

| | | |
|---------------------------------|--|---|
| GEOLOGY 3511 | Introduction to Mineral Deposits | 3 |
| GEOLOGY 4630 | Systematic Paleontology | 3 |
| GEOLOGY 3811 | Fundamentals Of Geographic Information Systems | 3 |
| or GEO ENG 3148 | Fundamentals Of Geographic Information Systems | |
| GEOLOGY 4631 | Advanced Igneous and Metamorphic Petrology | 4 |
| GEOLOGY 4711 | Paleoclimatology and Paleoecology | 3 |
| GEOLOGY 4841 | Geological Field Studies | 3 |

| | | |
|------------------------------|------------------------------------|---|
| GEOLOGY 5513 | Petroleum Geology | 3 |
| GEOLOGY 5611 | Granites And Rhyolites | 4 |
| GEOLOGY 5741 | Micropaleontology | 3 |
| GEOLOGY 6311 | Advanced Structural Geology | 3 |
| GEO ENG 3175 | Geomorphology And Terrain Analysis | 3 |

Geophysics

| | | |
|---|--|---|
| Students must choose 1 math and 3 geophysics courses from the list. Students should also choose at least one additional course to be selected from an approved list and with guidance from student's advisor. | | |
| MATH 2222 | Calculus III | 4 |
| MATH 3304 | Elementary Differential Equations | 3 |
| MATH 3108 | Linear Algebra I | 3 |
| MATH 5325 | Partial Differential Equations | 3 |
| GEOPHYS 4231 | Seismic Interpretation | 3 |
| GEOPHYS 5202 | Exploration and Development Seismology | 3 |
| GEOPHYS 5231 | Seismic Data Processing | 3 |
| GEOPHYS 5261 | Computational Geophysics | 3 |
| GEOPHYS 5736 | Geophysical Field Methods | 3 |
| or GEO ENG 5736 | Geophysical Field Methods | |
| GEOLOGY 4310 | Remote Sensing Technology | 3 |

Groundwater and Environmental Geochemistry

| | | |
|--|---|---|
| Students should complete at least 5 courses (15 hours minimum) from the list. Students may also choose additional courses to be selected from an approval list and with guidance from student's advisor. | | |
| GEOLOGY 4431 | Methods Of Karst Hydrogeology | 3 |
| GEOLOGY 4451 | Aqueous Geochemistry | 3 |
| GEOLOGY 4711 | Paleoclimatology and Paleoecology | 3 |
| GEOPHYS 5782 | Environmental and Engineering Geophysics | 3 |
| or GEO ENG 5782 | Environmental and Engineering Geophysics | |
| BIO SCI 1173 | Introduction to Environmental Sciences | 3 |
| ENV ENG 2601 | Fundamentals Of Environmental Engineering and Science | 3 |
| ENV ENG 5640 | Environmental Law And Regulations | 3 |
| GEO ENG 5237 | Geological Aspects Of Hazardous Waste Management | 3 |
| GEO ENG 5331 | Subsurface Hydrology | 3 |
| GEO ENG 5381 | Intermediate Subsurface Hydrology And Contaminant Transport Mechs | 3 |

Petroleum Geology

| | | |
|--|--|--|
| Students should complete at least 5 courses (15 hours minimum) from the list. Students may also choose additional courses to be selected from an approval list and with guidance from student's advisor. | | |
|--|--|--|

| | | |
|------------------------------|---|---|
| GEOLOGY 4630 | Systematic Paleontology | 3 |
| GEOLOGY 5311 | Depositional Systems | 3 |
| GEOLOGY 5513 | Petroleum Geology | 3 |
| GEOLOGY 5661 | Advanced Stratigraphy and Basin Evolution | 3 |
| GEOLOGY 5741 | Micropaleontology | 3 |
| GEOPHYS 5202 | Exploration and Development Seismology | 3 |
| PET ENG 3330 | Well Logging | 3 |
| GEOLOGY 4310 | Remote Sensing Technology | 3 |

Accelerated BS/MS Program Option for Geology and Geophysics Majors

Geology and Geophysics undergraduates in G&G at Missouri S&T may opt to apply for an accelerated BS/MS G&G program where a student can achieve both the BS and MS degrees in G&G faster than if pursuing the degrees separately. The degrees awarded will be a BS & MS (non-thesis or thesis) in Geology and Geophysics.

The benefits for undergraduate students admitted to the program are:

- Undergraduate and graduate courses may be chosen with greater flexibility,
- Up to nine hours of 5000-level or above G&G 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 courses can be taken any time after entering the program as a dual enrolled student,
- Work on a thesis project may begin before the BS requirements are completed.

To be eligible for the accelerated BS/MS G&G program, a G&G undergraduate must be at or beyond the junior level standing with a minimum of 48 credit hours. They must have successfully completed the Chemistry and Math requirements and have completed 21 credit hours of G&G courses at Missouri S&T with at least a 3.2 GPA in the G&G courses. To be admitted, the student must complete the program application and non-thesis MS students must have the recommendation of a G&G faculty member, while thesis MS students must have the recommendation of a G&G faculty member who agrees to serve as the graduate thesis advisor. All other MS degree requirements remain the same. The program may be combined with existing honors research, emphasis areas, and certificate 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 shared-credit courses are completed. Courses taken for shared credit will be identified on the application form. These courses will also be listed on the student's Graduate Form 1 to be submitted after the student enters the graduate program. The nine hours of shared-credit coursework, to be taken as undergraduate credit, must be approved by the academic advisor, and may not be undergraduate research, special problems, or transfer courses. An additional six 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 as a dual enrolled student will require formal application to the graduate program. Upon application, acceptance to the G&G MS degree from the Accelerated Program is automatic so long as the student remains in good standing (GPA above 3.0 and B's or better in all graduate courses) within the program. To remain in the Accelerated Program, the student must maintain good standing within the undergraduate G&G 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.

It is the student's responsibility to check on how dual-enrollment status and graduate coursework affects scholarships and other financial aid. As a graduate student, you **are not** eligible for Federal Pell Grants. You are still eligible for Federal Financial Aid. You may be eligible for fellowships and teaching/research assistantships. It is the International student's responsibility to check with international affairs during completion of an accelerated BS/MS to ensure immigration status will be maintained throughout the program.

Justification for request

Updating to reflect new math requirements.

Supporting Documents

Course Reviewer Comments

tibbettsmg (07/29/21 12:00 pm): Rollback: rollback per request. mt

tibbettsmg (09/02/21 9:40 am): updated formatting and effective term to FS22. mt

Program Change Request

Date Submitted: 07/22/21 3:50 pm

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

File: 86.48

Last approved: 05/05/21 8:29 am

Last edit: 09/13/21 2:48 pm

Changes proposed by: nisbett

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

Start Term

Fall **2022** ~~2021~~

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
10. Kristy Giacomelli-Feys

Approval Path

1. 07/22/21 4:09 pm
David Bayless
(djbkqf): Approved for RMECHENG Chair
2. 08/19/21 10:35 am
Marita Tibbetts
(tibbettsmg): Approved for CCC Secretary
3. 09/08/21 3:37 pm
Stephen Raper
(sraper): Approved for Engineering DSCC Chair

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 Brittany Parnell (ershenb)
7. Oct 8, 2020 by Crystal Wilson (wilsoncry)
8. May 5, 2021 by J. Keith Nisbett (nisbett)

Bachelor of Science Mechanical Engineering

Entering freshmen desiring to study mechanical engineering will be admitted to the Foundational Engineering and Computing Program. They will, however, be permitted, if they wish, to state a mechanical engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Foundational Engineering and Computing Program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision regarding the choice of a major.

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

~~1. ENGLISH 1120~~ 2. ~~HISTORY 1200 or HISTORY 1300 or HISTORY 1310 or POL SC 1200~~ 2. HISTORY 1200 3. ~~ECON 1100 or HISTORY 1300 or HISTORY 1310 or POL SCI 1200~~ ECON 1200

3. ECON 1100 or ECON 1200

4. ENGLISH 1160 ~~ENGL 1160~~ or ENGLISH 3560 ~~ENGL 3560~~ or SP&M S 1185 ~~SP&MS 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.

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.

| 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 ^f | 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 |
| Programming Elective^{a, e} | 3 | MECH ENG 2519^a | 3 |
| CIV ENG 2200^a | 3 | MECH ENG 2360^a | 3 |
| PHYSICS 2135^a | 4 | MATH 3304^a | 3 |
| MECH ENG 2653 | 3 | MET ENG 2110^a | 3 |
| MECH ENG 1761 | 1 | Programming Elective^{a, c} | 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 ^d | 3 |
| CIV ENG 2211 | 1 | MECH ENG 3708 | 3 |
| Elective-Advanced Math/Stat ^e | 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 ^g | 3 | MECH ENG 4761 | 3 |
| Literature elective ^f | 3 | MECH ENG 4480 | 1 |
| Technical elective ^h | 3 | MECH ENG 5000-level technical elective ^g | 3 |
| Elective-Advanced Hum or Soc Sci ^f | 3 | Breadth elective ⁱ | 3 |
| | 17 | | 13 |
| Total Credits: 128 | | | |

Note: Students must satisfy the common freshman year academic requirements, and be admitted into the department, in addition to the sophomore, junior and senior year requirements listed above with a minimum of 128 hours.

| | |
|---|--|
| 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 | MATH 1208 and MATH 1221 may be substituted for MATH 1214 and MATH 1215, respectively. |
| c | 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. |
| d | 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). |
| e | 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. |
| f | 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. |
| g | 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. |
| h | 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. |
| i | 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), research (4099), or design team credit (ENG MGT 2011 , ENG MGT 2012 , or ENG MGT 2013). |
| j | 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 |
| 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 ^d | 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 ^f | 3 | MECH ENG 4480 | 1 |
| Manufacturing Technical Elective ^f | 3 | Manufacturing Technical Elective ^f | 3 |
| Elective Literature ^e | 3 | Electives-Hum or Soc Sci ^e | 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 | MATH 1208 and MATH 1221 may be substituted for MATH 1214 and MATH 1215, respectively. |
| c | 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. |
| d | 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). |

| | |
|---|---|
| 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 | <p>The nine hours of manufacturing technical elective must be selected as follows:</p> <p>One course from the following manufacturing/automation courses: MECH ENG 5653, MECH ENG 5655, MECH ENG 5449, MECH ENG 5606.</p> <p>One of the following design courses: MECH ENG 5763, MECH ENG 5656, MECH ENG 5702.</p> <p>One course from the following list: MECH ENG 5708, MECH ENG 5758.</p> |
| g | 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 |
| ENG MGT 3320 | Introduction to Project Management | 3 |
| 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 | Concurrent Engineering | 3 |
| MECH ENG 5757 | Integrated Product And Process Design | 3 |
| 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 ^g | 3 |
| MECH ENG 4480 | 1 | Literature elective ^e | 3 |
| MECH ENG technical elective ^f | 3 | Elective - Advanced Hum or Soc Sci ^e | 3 |
| Elective - Communications ^d | 3 | ENG MGT 3320 | 3 |
| ENG MGT 1210 | 2 | | |
| | 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 [MATH 1208](#) and [MATH 1221](#) may be substituted for [MATH 1214](#) and [MATH 1215](#), respectively.~~
- c 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.
- d 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](#)).
- 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 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.
- g 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](#),

- 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

Adding the new option for MATH 1210 and 1211 as an alternative to MATH 1214.

Splitting Mech Eng 2761 (3 credits) into Mech Eng 1761 (1 credit) and Mech Eng 2761 (2 credits). CC forms have been submitted for these courses. Reflecting the change in the sophomore year of the curriculum.

Supporting Documents

Course Reviewer Comments

tibbettsmg (08/17/21 9:55 am): Updated formatting, plan of study to "Math 1214 or Math 1211", removed redundant footnote stating the same. MT

tibbettsmg (08/19/21 10:34 am): updated formatting so that all listed courses have an active link. mt

tibbettsmg (09/13/21 2:42 pm): updated formatting on footnotes

tibbettsmg (09/13/21 2:48 pm): removed math 1210 per DSCC Chair directive.

Program Change Request

Date Submitted: 07/23/21 11:14 am

Viewing: **MI ENG-BS : Mining Engineering BS**

File: 95.29

Last approved: 07/06/20 8:52 am

Last edit: 08/17/21 9:31 am

Changes proposed by: caseysc

Catalog Pages Using this Program
[Mining_Engineering](#)

Start Term

Fall **2022** ~~2020~~

Program Code

MI ENG-BS

Department

Mining & Nuclear Engineering

Title

Mining Engineering BS

Program Requirements and Description

In Workflow

1. MINEXP ENG 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. 07/23/21 11:12 am
Kwame Awuah-Offei (kwamea): Rollback to Initiator
2. 07/23/21 11:16 am
Kwame Awuah-Offei (kwamea): Approved for MINEXP ENG Chair
3. 08/17/21 9:31 am
Marita Tibbetts (tibbettsmg): Approved for CCC Secretary
4. 09/08/21 3:26 pm
Stephen Raper (sraper): Approved for Engineering DSCC Chair

History

1. Apr 28, 2014 by
Kwame Awuah-Offei (kwamea)

2. Jan 30, 2015 by
Tina Alobaidan
(cifarellit)
3. Jun 28, 2017 by
Tina Alobaidan
(cifarellit)
4. Mar 21, 2018 by
Tina Alobaidan
(cifarellit)
5. Jul 6, 2020 by
Brittany Parnell
(ershenb)

Bachelor of Science Mining Engineering

Entering freshmen desiring to study Mining Engineering will be admitted to the Foundational Engineering and Computing Program. They will, however, be permitted, if they wish, to state a Mining Engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Foundational Engineering and Computing Program is on fundamental sciences and mathematics, enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision regarding the choice of a major. In addition, students who state the Mining Engineering preference are required to complete [MIN ENG 2126](#) during the first or second semester on campus.

For the Bachelor of Science degree in Mining Engineering a minimum of 128 credit hours is required, although completion of an emphasis area may require up to 132 credits. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. A student must maintain at least two grade points per credit hour for all courses taken in the student's major department, and an average of at least two grade points per credit hour must be maintained in Mining Engineering.

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, two economics courses, one humanities course, [ENGLISH 1120](#) and either [ENGLISH 1160](#), [ENGLISH 3560](#) or [TCH COM 1600](#). The history course is to be selected from [HISTORY 1200](#), [HISTORY 1300](#), [HISTORY 1310](#), or [POL SCI 1200](#). The economics courses must be either [ECON 1100](#) or [ECON 1200](#), and [ECON 3512](#). The humanities course must meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.
2. The remaining three credit hours must meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. Foreign language courses can be considered to be one of these courses. (Students may receive humanities credit for foreign language courses in their native tongue only if the course is at the 4000 or 5000 level.)
3. Special topics, special problems courses and honors seminars are allowed only by petition to and approval by the student's department chairman.

The Mining 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.

| Freshman Year | | | |
|----------------|---------|-----------------|---------|
| First Semester | Credits | Second Semester | Credits |
| | | | |

| | | | |
|--|----------------|--|----------------|
| MATH 1214 or 1211 | 4 | MATH 1215 | 4 |
| CHEM 1310 | 4 | PHYSICS 1135 | 4 |
| CHEM 1319 | 1 | MECH ENG 1720 | 3 |
| CHEM 1100 | 1 | MIN ENG 1912 | 2 |
| MIN ENG 2126 | 1 | GEO ENG 1150 | 3 |
| FR ENG 1100 | 1 | | |
| HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200 | 3 | | |
| ENGLISH 1120 | 3 | | |
| | 18 | | 16 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| MIN ENG 2925 | 2 | MIN ENG 2412 | 3 |
| MIN ENG 3912 | 3 | MATH 3304 | 3 |
| MATH 2222 | 4 | MECH ENG 2527 | 3 |
| MIN ENG 3913 | 3 | MECH ENG 2350 | 2 |
| CIV ENG 2200 | 3 | PHYSICS 2135 | 4 |
| ECON 1100 or 1200 | 3 | | |
| | 18 | | 15 |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| STAT 3113 or 3115 | 3 | MIN ENG 4512 | 3 |
| NUC ENG 3221 or CIV ENG 3330 | 3 | MIN ENG 5522 | 3 |
| MIN ENG 5932 | 3 | MIN ENG 5823 | 3 |
| CIV ENG 2210 | 3 | MIN ENG 5933 | 3 |
| ECON 3512 | 3 | ENGLISH 1600 , or 1160 , or 3560 | 3 |
| GEOLOGY 3310 | 3 | | |
| | 18 | | 15 |
| Senior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| MIN ENG 5612 | 3 | MIN ENG 5742 | 3 |
| MIN ENG 5912 | 3 | MIN ENG 4097 | 4 |
| MIN ENG 4096 | 3 | Technical Elective ^{1,2,3,4,5,6} | 3 |
| H/SS Elective | 3 | H/SS Elective | 3 |
| MIN ENG 5113 | 3 | | |
| | 15 | | 13 |
| Total Credits: 128 | | | |

¹ **Explosives Engineering Emphasis:** [MIN ENG 5622](#) (Blasting Tech) and [MIN ENG 5823](#) (Rock Mechanics) or [MIN ENG 5922](#) (Tunneling/Construction) have to be taken as Technical Electives.

² **Quarrying Emphasis:** Two of [CIV ENG 3116](#) (Construction Materials); [MIN ENG 5212](#) (Aggregate and Quarrying);

and [MIN ENG 5412](#) (Aggregate Materials) have to be taken as Technical Electives.

- 3 **Coal Emphasis:** Two of [MIN ENG 5322](#) (Coal Mine Development and Production), [MIN ENG 4414](#) (Mine Plant Management) or an approved substitute course must be taken as Technical Electives.
- 4 **Mining and the Environment Emphasis:** [GEO ENG 5235](#) (Environmental Geological Engineering) and [GEO ENG 5233](#) (Risk Assessment in Environmental Studies), or approved substitute courses have to be taken as Technical Electives.
- 5 **Mining Health and Safety Emphasis:** [MIN ENG 3002](#) (Mine Rescue), [ENG MGT 4330](#) (Human Factors), or other approved substitute courses must be taken as Technical Electives.
- 6 **Sustainable Development Emphasis:** [POL SCI 3310](#) (Public Policy Analysis), [ECON 4440](#) (Environmental and Natural Resource Economics), or other approved substitute courses must be taken as Technical Electives.

Graduating Mining Engineers Examination

Mining engineering students must complete the Fundamentals of Engineering Examination prior to graduation as a senior assessment requirement. A passing grade is not required to earn a B.S. degree in mining engineering; however it is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process.

Mining Health and Safety Emphasis

| | | |
|------------------------------|--|---|
| Junior and Senior Years | | |
| MIN ENG 3002 | Mine Rescue (or approved substitute course in lieu of Technical Elective.) | 3 |
| ENG MGT 4330 | Human Factors (or approved substitute course in lieu of Technical Elective.) | 3 |

Sustainable Development Emphasis

| | | |
|------------------------------|---|---|
| Junior and Senior Years | | |
| POL SCI 3300 | Principles Of Public Policy (or approved substitute course in lieu of Technical Elective.) | 3 |
| ECON 4440 | Environmental And Natural Resource Economics (or approved substitute course in lieu of Technical Elective.) | 3 |

Quarrying Engineering Emphasis

| | | |
|------------------------------|---|---|
| Senior Year | | |
| CIV ENG 3116 | Construction Materials, Properties And Testing (in lieu of Technical Elective.) | 3 |
| MIN ENG 5212 | Aggregates and Quarrying | 3 |

Explosives Engineering Emphasis

| | | |
|---|---|---|
| Junior and Senior Years | | |
| Choose one of the following courses in lieu of Technical Elective in Junior Year: | | |
| A three-credit hour explosives engineering (EXP ENG) course | | |
| EXP ENG 5922 | Tunneling & Underground Construction Techniques | 3 |
| GEO ENG 5471 | Rock Engineering | |
| In lieu of Technical Elective in Senior Year: | | |
| EXP ENG 5622 | Blasting Design And Technology | |

Coal Emphasis

| | | |
|------------------------------|--|---|
| Junior and Senior Years | | |
| MIN ENG 5322 | Coal Mining Methods | 3 |
| MIN ENG 4414 | Mine Plant Management (or approved substitute course in lieu of Technical Elective.) | 2 |

Mining and the Environment Emphasis

| | | |
|------------------------------|---|---|
| Junior and Senior Years | | |
| ENV ENG 5640 | Environmental Law And Regulations | 3 |
| GEO ENG 5233 | Risk Assessment In Environmental Studies (or approved substitute course in lieu of Technical Elective.) | 3 |

Justification for request

Change to Math 1214 requirement first semester freshmen year, to also accept new courses Math 1210 and Math 1211 combination

Supporting Documents

Course Reviewer Comments

kabp3 (07/23/21 11:12 am): Rollback: Put in the justification

tibbettsmg (08/17/21 9:31 am): updated term to FS22 and changed to "Math 1214 or 1211"

Key: 95

Program Change Request

Date Submitted: 08/26/21 8:53 am

Viewing: **PE ENG-BS : Petroleum Engineering BS**

File: 108.48

Last approved: 06/10/21 4:08 pm

Last edit: 09/02/21 10:16 am

Changes proposed by: grotekr

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

Start Term

Fall **2022** ~~2021~~

Program Code

PE ENG-BS

Department

Geosciences and Geological and Petroleum Engineering

Title

Petroleum Engineering BS

Program Requirements and Description

In Workflow

1. **RGEOENG 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. **Kristy Giacomelli-Feys**

Approval Path

1. 07/22/21 10:40 am
David Borrok
(borrokd): Approved for RGEOENG Chair
2. 07/29/21 12:00 pm
Marita Tibbetts
(tibbettsmg): Rollback to Initiator
3. 08/26/21 9:39 am
Jeff Cawfield (jdc): Approved for RGEOENG Chair
4. 09/02/21 10:16 am
Marita Tibbetts
(tibbettsmg): Approved for CCC Secretary
5. 09/08/21 3:27 pm
Stephen Raper
(sraper): Approved for Engineering DSCC Chair

History

1. Sep 21, 2015 by
reflori
2. Jun 18, 2018 by
Shari Dunn-Norman
(caolila)
3. Jun 14, 2019 by
Sharon Lauck
(laucks)
4. Mar 3, 2020 by
Brittany Parnell
(ershenb)
5. Jul 1, 2020 by
Sharon Lauck
(laucks)
6. Jun 10, 2021 by
Sharon Lauck
(laucks)

Bachelor of Science Petroleum Engineering

Entering freshmen desiring to study Petroleum Engineering will be admitted to the Foundational Engineering and Computing Program. They will, however, be permitted, if they wish, to state a Petroleum Engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Foundational Engineering and Computing Program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision regarding the choice of a major. A grade point average of 2.80 or higher is required to enter the Petroleum Engineering program from the Foundational Engineering and Computing Program.

For the Bachelor of Science degree in Petroleum Engineering a minimum of 128 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. A student must maintain at least two grade points per credit hour for all courses taken in Petroleum Engineering.

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. Six credit hours of English: All students are required to take [ENGLISH 1120](#) and either [ENGLISH 3560](#) ~~ENGLISH 3560~~ (preferred) or [ENGLISH 1160](#) ~~ENGLISH 1160~~ or [ENGLISH 1600](#). ~~ENGLISH 1600~~.
2. Nine credit hours of basic humanities and social sciences: All students are required to take one history course, one economics course and one humanities course. 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](#). The humanities course selected must meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.
3. Three credit hours as a depth requirement. Three credit hours must be taken in humanities or social sciences at the 2000-level or above and meet 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. All courses taken to satisfy the depth requirement must be taken after graduating from high school.
4. Three credit hours of elective humanities and social sciences must meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog..

5. Special topics and special problems and honors seminars are allowed only by petition to and approval by the student's department chair.

The Petroleum Engineering program at Missouri S&T consists of a strong foundation in math, sciences and engineering fundamentals, plus strong content in the traditional Petroleum Engineering core areas of drilling, production and reservoir engineering. Two unique features of the curriculum are a strong sequence of courses in Geology and Geophysics, plus a two course sequence in finite element analysis and mechanical earth modeling. S&T Petroleum Engineering students are prepared to solve today's problems and tomorrow's. Students learn theory, have ample hands-on experiences in laboratories, and they learn many modern software packages used by the petroleum industry.

Students planning on majoring in petroleum engineering should take the following courses.

| Freshman Year | | | |
|--|---------|--|---------|
| First Semester | Credits | Second Semester | Credits |
| FR ENG 1100 | 1 | MATH 1215 ² | 4 |
| CHEM 1310 ¹ | 4 | PHYSICS 1135 | 4 |
| CHEM 1319 | 1 | MECH ENG 1720 | 3 |
| MATH 1214 or 1211 ² | 4 | GEO ENG 1150 or GEOLOGY 1110 | 3 |
| HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200 | 3 | PET ENG 2510 | 3 |
| ENGLISH 1120 | 3 | | |
| | 16 | | 17 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| MATH 2222 | 4 | MATH 3304 | 3 |
| PHYSICS 2135 | 4 | PET ENG 3520 | 3 |
| GEOLOGY 3310 (Geol 3319 lab optional) | 3 | MECH ENG 2350 | 2 |
| PET ENG 3320 | 3 | CIV ENG 2210 | 3 |
| CIV ENG 2200 | 3 | GEOLOGY 3620 | 3 |
| | | ECON 1100 or 1200 | 3 |
| | 17 | | 17 |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| GEOLOGY 5513 | 3 | PET ENG 3330 | 3 |
| GEOPHYS 4231 | 3 | PET ENG 4410 | 3 |
| CIV ENG 3330 | 3 | PET ENG 4590 | 3 |
| PET ENG Elective ³ | 3 | PET ENG 4710 | 3 |
| PET ENG 4210 | 3 | Humanities/Social Sci Elective ⁴ | 3 |
| | 15 | | 15 |
| Senior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| PET ENG 4010 ⁵ | 1 | PET ENG 4097 | 3 |
| MECH ENG 2527 | 3 | GEO ENG 4115 | 3 |
| PET ENG 4520 | 3 | Hum/Soc Sci Elective ⁴ | 3 |
| PET ENG 4720 | 3 | PET ENG Elective ³ | 3 |

| | | | |
|---|----|---|----|
| PET ENG Elective ³ | 3 | ENGLISH 1600 ⁶ | 3 |
| Humanities/Social Sci Elective ⁴ | 3 | | |
| | 16 | | 15 |
| Total Credits: 128 | | | |

| | |
|---|--|
| 1 | All freshmen Petroleum Engineering students must enroll in CHEM 1100 (Intro to Lab Safety and Haz Mat). |
| 2 | MATH 1208 or MATH 1210 and MATH 1211 may be substituted for MATH 1214 . MATH 1221 may be substituted for MATH 1215 . |
| 3 | Select Petroleum Engineering electives in accordance with interest area. Students interested in reservoir engineering select from topics in advanced reservoir engineering, simulation, natural gas engineering, and formation characterization. Students interested in drilling/completions and production select petroleum electives such as advanced drilling, well completions, stimulation. Other general interest petroleum electives may be selected as available. |
| 4 | Humanities/Social Science electives are to be selected from a list of approved courses to be taken in accordance with the University policy. Petroleum Engineering students are especially encouraged to study foreign languages |
| 5 | All Petroleum 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 to becoming a registered professional engineer. This requirement is part of Missouri S&T assessment process as described in Assessment Requirements found elsewhere in this catalog. Students must sign a release form giving the University access to their Fundamentals of Engineering Examination score. |
| 6 | Students may also select ENGLISH 1160 or ENGLISH 3560. |

The total number of credit hours required for a degree in Petroleum Engineering is 128.

Petroleum Engineering students must earn the grade of "C" or better in all Petroleum Engineering courses to receive credit toward graduation.

Accelerated BS/MS Program Option for Petroleum Engineering Majors

Missouri S&T Petroleum Engineering undergraduate students may opt to apply for an accelerated BS/MS program where a student can earn both the BS and MS degrees in Petroleum Engineering faster than if pursuing the degrees separately. The degrees awarded will be a BS & MS (non-thesis or thesis) in Petroleum Engineering.

The benefits for undergraduate students admitted to the program are:

- Undergraduate and graduate courses may be chosen with greater flexibility,
- Up to nine hours of 5000-level or above Petroleum Engineering 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 courses can be taken any time after entering the program as a dual enrolled student,
- Work on a thesis project may begin before the BS requirements are completed.

To be eligible for the accelerated BS/MS Petroleum Engineering program, a Petroleum Engineering undergraduate must be at or beyond the junior level standing with a minimum of 48 credit hours. They must have successfully completed the Chemistry and Math requirements and have completed 21 credit hours of Petroleum Engineering courses at Missouri S&T with at least a 3.2 GPA in the Petroleum Engineering courses. To be admitted, the student must complete the program application and non-thesis MS students must have the recommendation of a Petroleum Engineering faculty member, while thesis MS students must have the recommendation of a Petroleum Engineering faculty member who agrees to serve as the graduate thesis advisor. All other MS degree requirements remain the same. The program may be combined with existing honors research, emphasis areas, and certificate 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 shared-credit courses are completed. Courses taken for shared credit will be identified on the application form. These courses will also be listed on the student's Graduate Form 1 to be submitted after the student enters the graduate program. The nine hours of shared-credit coursework, to be taken as undergraduate credit, must be approved by the academic advisor, and may not be undergraduate research, special problems, or transfer courses. An additional six 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 as a dual enrolled student will require formal application to the graduate program. Upon application, acceptance to the Petroleum Engineering MS degree from the Accelerated Program is automatic so long as the student remains in good standing (GPA above 3.0 and B's or better in all graduate courses) within the program. To remain in the Accelerated Program, the student must meet Petroleum Engineering graduate student academic performance requirements 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.

It is the student's responsibility to check on how dual-enrollment status and graduate coursework affects scholarships and other financial aid. As a graduate student, you **are not** eligible for Federal Pell Grants. You are still eligible for Federal Financial Aid. You may be eligible for fellowships and teaching/research assistantships. It is the International student's responsibility to check with international affairs during completion of an accelerated BS/MS to ensure immigration status will be maintained throughout the program.

Justification for request

Updating to reflect new math requirements. I also realigned the existing footnotes since they were out of order.

Supporting Documents

Course Reviewer Comments

tibbettsmg (07/29/21 12:00 pm): Rollback: rollback per request. mt

tibbettsmg (09/02/21 10:16 am): updated formatting and effective term to FS22. mt

Program Change Request

Date Submitted: 07/23/21 8:26 am

Viewing: **PHYSIC-BS : Physics BS**

File: 115.45

Last approved: 06/10/21 4:08 pm

Last edit: 08/16/21 4:27 pm

Changes proposed by: vojtat

Catalog Pages Using this Program

[Physics](#)

Start Term

Fall **2022** ~~2024~~

Program Code

PHYSIC-BS

Department

Physics

Title

Physics BS

Program Requirements and Description

In Workflow

1. **RPHYSICS 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. **Kristy Giacomelli-Feys**

Approval Path

1. 07/23/21 8:27 am
Thomas Vojta
(vojtat): Approved
for RPHYSICS
Chair
2. 08/16/21 4:27 pm
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary
3. 09/09/21 4:04 pm
Katie Shannon
(shannonk):
Approved for
Sciences DSCC
Chair

History

1. May 6, 2014 by
[waddill](#)
2. Jul 21, 2015 by
[pantaleoa](#)
3. Jun 27, 2016 by
[waddill](#)
4. Jun 18, 2018 by
[Pamela Crabtree](#)

(crabtree)

5. Jun 26, 2018 by
Crystal Wilson
(wilsoncry)
6. Jun 14, 2019 by
Thomas Vojta
(vojtat)
7. Jan 30, 2020 by
Thomas Vojta
(vojtat)
8. Jun 10, 2021 by
Thomas Vojta
(vojtat)

Bachelor of Science Physics

A minimum of 128 credit hours is required for a bachelor of science degree in physics 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 physics curriculum requires twelve semester hours in humanities, exclusive of foreign language, and must include [ENGLISH 1160](#) or [ENGLISH 3560](#). A minimum of 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 |
| CHEM 1310 | 4 | CHEM 1320 | 3 |
| CHEM 1319 | 1 | HISTORY 1200 , or 1300 , or 1310 , or POL SCI 1200 | 3 |
| CHEM 1100 | 1 | PHYSICS 1135 | 4 |
| ENGLISH 1120 | 3 | MATH 1215 | 4 |
| PHYSICS 1101 | 1 | Electives ¹ | 2 |
| MATH 1214 or 1211 | 4 | | |
| | 14 | | 16 |
| Sophomore Year | | | |
| First Semester | Credits | Second Semester | Credits |
| ENGLISH 1160 | 3 | MATH 3304 | 3 |
| MATH 2222 | 4 | PHYSICS 2311 or 2305 | 3 |
| Elective ¹ | 3 | PHYSICS 2129 | 3 |
| COMP SCI 1500 or 1972 and 1982 | 3 | PHYSICS 2401 | 3 |
| PHYSICS 2135 | 4 | Elective ¹ | 3 |
| | 17 | | 15 |
| Junior Year | | | |
| First Semester | Credits | Second Semester | Credits |

| | | | |
|---------------------------------|----------------|---|----------------|
| PHYSICS 3201 | 3 | PHYSICS 3211 | 3 |
| PHYSICS 3119 | 3 | PHYSICS 3129 | 3 |
| PHYSICS 3311 | 3 | Math/Stat Elective ² | 3 |
| Math/Stat Elective ² | 3 | Electives ¹ | 7 |
| Electives ¹ | 6 | | |
| | 18 | | 16 |
| Senior Year | | | |
| First Semester | Credits | Second Semester | Credits |
| PHYSICS 4211 | 3 | PHYSICS 4311 | 3 |
| PHYSICS 4301 | 3 | Elective-Humanities (3000 level) ¹ | 3 |
| Physics Elective ³ | 3 | Physics Elective ³ | 3 |
| Electives ¹ | 7 | Electives ¹ | 7 |
| | 16 | | 16 |
| Total Credits: 128 | | | |

Note: The minimum credit hours required for a bachelor of science in physics is 128 hours. No more than two of the required physics and mathematics courses with a grade of “D” may be used to meet graduation requirements. Upon petition to and approval by the physics faculty, three semester hours of advanced ROTC (military science or aerospace credit studies) credit can be counted as elective credit to meet requirements for graduation.

| | |
|--------------|--|
| ¹ | Electives, in addition to the math/stat electives ² and Physics electives ³ , shall include six hours of social studies and nine hours of humanities, at least three of which must be literature and at least three of which must be at the 3000 level or above not including Special Problems courses (PHILOS 4345 recommended). 19 hours of free electives may be used to develop an emphasis area. 18 hours of elective credit shall be in courses at the 3000 level or above. |
| ² | Six hours of mathematics or statistics beyond MATH 3304 are required. MATH 3108 , MATH 5222 , MATH 5325 , or MATH 5351 are recommended. |
| ³ | In addition to the specific physics courses listed (PHYSICS 3311 , PHYSICS 3201 , PHYSICS 4311 , PHYSICS 4211 , PHYSICS 3119 , PHYSICS 3129 , and PHYSICS 4301) two other physics 3000 level or higher courses are required. |

Emphasis in Secondary Education

Students may develop an emphasis area in secondary education that will allow them to teach physics in grades 9-12 in Missouri. Please contact the Department of Teacher Education for a complete list of requirements.

In addition to maintaining a 3.0 content and professional requirement GPA, students must pass the appropriate content assessment to be eligible for student teaching. Missouri S&T allows students to choose their student teaching placement, if the district agrees and a qualified cooperating teacher is available. This program is approved by the Missouri Department of Elementary and Secondary Education for initial teacher certification. Students intending to teach in other states are responsible for investigating the reciprocity agreement of that state agency.

a. Professional requirements courses:

| | | |
|------------------------------|---|---|
| EDUC 1040 | Perspectives In Education | 2 |
| EDUC 1174 | School Organization and Administration For Teachers | 2 |
| PSYCH 2300 | Educational Psychology | 3 |
| or EDUC 2102 | Educational Psychology | |

| | | |
|--|--|---|
| ENGLISH 3170 | Teaching And Supervising Reading and Writing | 3 |
| EDUC 2310 | Education Of The Exceptional Child | 3 |
| EDUC 3216 | Instructional Literacy in the Content Area | 3 |
| EDUC 3280 | Instructional Strategies in the Content Area | 3 |
| EDUC 3340 | Assessment of Student Learning | 3 |
| PSYCH 3310 | Developmental Psychology | 3 |
| EDUC 4298 | Student Teaching Seminar | 1 |
| Fifteen of these credit hours may be used to substitute for six hours of mathematics electives, six hours of physics electives, and three hours of computer science courses. | | |

b. Clinical experience courses:

| | | |
|---------------------------|------------------------------|----|
| EDUC 1104 | Teacher Field Experience I | 1 |
| EDUC 1164 | Teacher Field Experience II | 2 |
| EDUC 3298 | Teacher Field Experience III | 1 |
| EDUC 4299 | Student Teaching | 12 |

c. Take these additional courses:

| | | |
|-------------------------------------|-------------------------|---|
| SP&M S 1185 | Principles Of Speech | 3 |
| POL SCI 1200 | American Government | 3 |
| PSYCH 1101 | General Psychology | 3 |
| BIO SCI 1113 | General Biology | 3 |
| PHYSICS 1605 | Environmental Physics I | 3 |
| HISTORY 3530 | History of Science | 3 |
| A 3 hour Art/Music/Theater elective | | 3 |

d. Complete the requirements for teacher certification listed in this catalog.

Justification for request

Added footnote to Math 1214 to allow substitution of new calculus sequence Math 1210 + 1211.

Supporting Documents

Course Reviewer Comments

tibbettsmg (07/27/21 10:59 am): updated formatting for Math 1214 in plan of study grid. mt

tibbettsmg (08/16/21 12:13 pm): modified plan of course study to reflect Math 1210/1211 updates. mt

tibbettsmg (08/16/21 4:27 pm): updated term to FS22. mt

Course Change Request

New Experimental Course Proposal

Date Submitted: 08/25/21 2:09 pm

Viewing: **MIN ENG 6001.003 : Computational Rock Mechanics**

File: 4822

Last edit: 08/26/21 8:22 am

Changes proposed by: sherizadeht

Requested Spring 2022

Effective Change

Date

Department Mining & Nuclear Engineering

Discipline Mining Engineering (MIN ENG)

Course Number 6001

Topic ID 003

Experimental

Title

Computational Rock Mechanics

Experimental CRM

Abbreviated

Course Title

Instructors Taghi Sherizadeh

Experimental

Catalog

Description

In Workflow

1. MINEXP ENG 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
9. Peoplesoft

Approval Path

1. 08/25/21 2:13 pm
Kwame Awuah-Offei (kwamea):
Approved for MINEXP ENG Chair
2. 08/26/21 8:23 am
Marita Tibbetts (tibbettsmg):
Approved for CCC Secretary
3. 09/08/21 3:27 pm
Stephen Raper

(sraper):
Approved for
Engineering DSCC
Chair

Constitutive models and boundary conditions; the theories and applications of Boundary Element Method (BEM), Finite Element Method (FEM), Finite Difference Method (FDM), and Discrete/Distinct Element Method (DEM), in rock engineering; and practical use of a number of computational software packages.

Prerequisites

Graduate standing or consent of instructor.

Field Trip

Statement

Credit Hours

LEC: 2

LAB: 1

IND: 0

RSD: 0

Total: 3

Justification for

new course:

There is an increasing need for both engineering and geoscience professionals to understand, manage and, in many instances, undertake complex rock mechanics investigations. Even where professionals are involved in engaging specialist consultants, it is important that they have an understanding of the issues to be investigated and the capabilities and limitations of rock mechanics design tools – whether they be stress analysis software packages, analytical methods, or instrumentation.

This course expands the MIN ENG 5823 Rock Mechanics course of providing a more comprehensive and theoretical understanding of the engineering principles of rock mechanics for practical industrial applications. This course aims to equip the student with the knowledge and skills to design and select appropriate numerical modeling techniques for different rock engineering applications. The course is intended to demonstrate how closely numerical methods relate to their practical applications to mining/civil/petroleum rock mechanics and to equip the students with knowledge of key numerical methods used in rock engineering.

Currently, there are a couple of courses that cover, up to some extent, numerical modeling techniques for civil (CIV ENG 6712: Computer Modeling in Geotechnical Engineering) and petroleum engineering (PET ENG 4720 Mechanical Earth Modeling) applications. Both of these courses are covering the FEM method, a continuum mechanics-based numerical modeling technique, which is not suitable for rock engineering applications. Currently, there is no course available on this campus to teach the Distinct/Discrete element modeling techniques for rock engineering applications. Students from mining, civil, petroleum, and geological engineering departments will benefit significantly from this course.

Semester(s)
previously taught

Co-Listed
Courses:

Course Reviewer
Comments

Key: 4822

[Preview Bridge](#)

Course Change Request

New Experimental Course Proposal

Date Submitted: 08/18/21 11:45 am

Viewing: **MS&E 4001.001 : Medical**

Nanomaterials

File: 4807

Last edit: 08/18/21 1:24 pm

Changes proposed by: smiller

| | |
|---------------------------------------|---------------------------------|
| Requested | Spring 2022 |
| Effective Change Date | |
| Department | Materials Science & Engineering |
| Discipline | Materials Science & Eng (MS&E) |
| Course Number | 4001 |
| Topic ID | 001 |
| Experimental Title | Medical Nanomaterials |
| Experimental Abbreviated Course Title | Medical Nanomaterials |
| Instructors | Anthony Convertine |

Experimental Catalog Description

In Workflow

1. **RMATSENG 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. 08/18/21 12:49 pm
moat-sm:
Approved for
RMATSENG Chair
2. 08/18/21 1:25 pm
Marita Tibbetts
(tibbettsmg):
Approved for CCC
Secretary
3. 09/08/21 3:28 pm
Stephen Raper
(sraper):
Approved for

Engineering DSCC
Chair

4. 09/13/21 3:02 pm

Marita Tibbetts

(tibbettsmg):

Approved for

Pending CCC

Agenda post

This course will focus on nanomaterials that have been engineered for medical applications. The engineering principles underlying these technologies will be detailed with an emphasis on design of nanomaterials and the biological ramifications of material composition and architecture. Nanomaterial solutions to range of medical problems will be covered.

Prerequisites

Cer Eng 3110.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Justification for

new course:

Information not included in other courses at S&T, emergent area, needed to complement the Biomedical Engineering minor

Semester(s)

previously taught

none

Co-Listed

Courses:

Course Reviewer

Comments

Course Change Request

New Experimental Course Proposal

Date Submitted: 08/18/21 11:47 am

Viewing: **MS&E 6001.006 : Advanced Medical Nanomaterials**

File: 4808

Last edit: 08/18/21 1:27 pm

Changes proposed by: smiller

Requested Spring 2022

Effective Change

Date

Department Materials Science & Engineering

Discipline Materials Science & Eng (MS&E)

Course Number 6001

Topic ID 006

Experimental

Title

Advanced Medical Nanomaterials

Experimental Adv Med Nanomaterials

Abbreviated

Course Title

Instructors Anthony Convertine

Experimental

Catalog

Description

In Workflow

1. **RMATSENG 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. 08/18/21 12:49 pm

moat-sm:

Approved for RMATSENG Chair

2. 08/18/21 1:27 pm

Marita Tibbetts

(tibbettsmg):

Approved for CCC Secretary

3. 09/08/21 3:27 pm

Stephen Raper

(sraper):

Approved for

This course will focus on nanomaterials that have been engineered for medical applications. The engineering principles underlying these technologies will be detailed with an emphasis on design of nanomaterials and the biological ramifications of material composition and architecture. Students will create an abbreviated NIH proposal in this course.

Prerequisites

Cer Eng 3110.

Field Trip

Statement

Credit Hours

LEC: 3

LAB: 0

IND: 0

RSD: 0

Total: 3

Justification for

new course:

Information not included in other courses at S&T, emergent area

Semester(s)

previously taught

Co-Listed

Courses:

Course Reviewer

Comments