Minutes of the Campus Curricula Committee Meeting
September 28, 2021
8:15am, Bertelsmeyer 110H
(For Faculty Senate Meeting of October 21, 2021)

Attendees: Steve Raper, Petra Dewitt, Katie Shannon, Michael Davis, Kyle Perry, Kristy Giacomelli-Feys, Marita Tibbetts

The following curriculum forms were discussed and approved:

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

Program Change Forms:

File: 141.33 AE ENG-BS : Aerospace 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
File: 352.4 SUB WAT-CT : Subsurface Water Resources Certificate

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

The meeting adjourned at 8:42 am.

Stephen A. Raper, Chair
Missouri S&T Campus Curricula Committee

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 Course Title

Aero Vehicle Performance

Catalog Description

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.

Approved for CCC Secretary

3. 09/08/21 3:16 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:08 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:49 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

1. Oct 12, 2017 by nisbett (2564.1)

Field Trip Statement				
Credit Hours Total: 3	LEC: 3	LAB: 0	IND: 0	RSD: 0
Required for Majors	Yes			
Elective for Majors	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

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 Effective Change: **Fall 2022** ~~01/08/2018~~

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 Course Title Aerospace Structures I

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 andfatigue.~~Design of thin walled structures. ~~Introduction to advanced composite materials.~~

Approved for CCC Secretary
3. 09/08/21 3:32 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:08 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:49 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

1. Oct 7, 2017 by nisbett (873.1)

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

~~MECH ENG 3613 Intermediate Dynamics of Mechanical And~~ Aerospace Systems

Requested Effective Change Date	**Spring 2022** ~~01/08/2018~~
Department	Mechanical & Aerospace Engineering
Discipline	Aerospace Engineering (AERO ENG)
Course Number	3613
Title	Aerospace Mechanics I
Abbreviated Course Title	Aerospace Mechanics I

Catalog Description

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

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.

3. 09/08/21 3:33 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:10 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:49 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

1. Oct 7, 2017 by nisbett (835.1)

Field Trip Statement				
Credit Hours Total: 3	LEC: 3	LAB: 0	IND: 0	RSD: 0
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

Requested Effective Change Date	**Fall 2022** ~~08/14/2018~~
Department	Mechanical & Aerospace Engineering
Discipline	Aerospace Engineering (AERO ENG)
Course Number	4253
Title	Aerospace Structures II
Abbreviated Course Title	Aerospace Structures II

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. 07/27/21 10:44 am Marita Tibbetts (tibbettsmg):

Catalog Description

~~Introduction to the finite element method for static and dynamic analysis of aerospacestructures.~~**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.

Approved for CCC Secretary

3. 09/08/21 3:21 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:10 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:49 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

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

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 Effective Change Date	**Fall 2022** ~~08/01/2014~~
Department	Biological Sciences
Discipline	Biological Sciences (BIO SCI)
Course Number	5010
Title	Graduate Seminar
Abbreviated Course Title	Graduate Seminar

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 (duvernelld): 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
4. 09/13/21 3:11 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:49 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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: 09/29/21 11:08 am

Changes proposed by: mfitch

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

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

Catalog Description

Course discusses fundamental chemical, physical, and biological principles in environmental engineering and science. Topics include environmental phenomena,

3. 09/08/21 3:24 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:12 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 11:08 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 11:10 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

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

aquatic pollution and control, solid waste management, air pollution and control, water and wastewater treatment systems, sustainability and life cycle analyses.

Prerequisites

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

Field Trip Statement

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

tibbettsmg (09/29/21 11:08 am): prerequisites reordered per CCC request. mt

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: 09/29/21 11:09 am

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

Approval Path

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

Requested Effective Change Date	**Spring 2022** ~~Fall 2020~~
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Geological Engineering (GEO ENG)
Course Number	5331
Title	Subsurface Hydrology
Abbreviated Course Title	Subsurface Hydrology

Catalog Description

Approved for CCC Secretary
3. 09/08/21 3:25 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:13 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 11:11 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 11:12 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

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

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 **1215 or Math 1221.** ~~**1215.**~~

Field Trip Statement

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

tibbettsmg (09/29/21 11:09 am): reordered prereq per CCC request. 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: 09/29/21 11:12 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 Effective Change Date	**Fall 2022** ~~08/14/2018~~
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Geophysics (GEOPHYS)
Course Number	4231
Title	Seismic Interpretation
Abbreviated Course Title	Seismic Interpretation

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
4. 09/13/21 3:13 pm
   Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 11:12 am
   Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 11:13 am
   Stephen Raper (sraper): Approved for Campus Curricula Committee 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,** ~~1208 or~~ Math **1211, or Math** 1214; Geology 1110 or Geo Eng 1150.

Field Trip Statement

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

tibbettsmg (09/29/21 11:12 am): removed Math 1210 per CCC. 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: 09/29/21 11:13 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. **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 10:51 am Marita Tibbetts (tibbettsmg):

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

Catalog Description

Approved for CCC Secretary
3. 09/09/21 4:03 pm Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 09/13/21 3:14 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 11:14 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 11:18 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

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,** ~~1208 or~~ Math **1211, or Math** 1214; Geology 1110 or Geo Eng 1150.

Field Trip Statement

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

tibbettsmg (09/29/21 11:13 am): removed Math 1210 per CCC. 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: 09/29/21 11:15 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 Effective Change Date	**Fall 2022** ~~08/14/2018~~
Department	History and Political Science
Discipline	History (HISTORY)
Course Number	4245
Title	Nazi Germany and the Holocaust
Abbreviated Course Title	Nazi Germany / Holocaust

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
4. 09/13/21 3:15 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 11:15 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 11:18 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 **of**

~~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 Total: 3	LEC: 3	LAB: 0	IND: 0	RSD: 0

Required for Majors: No

Elective for Majors: **Yes** ~~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 Effective Change Date	Spring 2022
Department	Mechanical & Aerospace Engineering
Discipline	Mechanical Engineering (MECH ENG)
Course Number	1761
Title	Introduction to Computer Aided Design
Abbreviated Course Title	Intro to CAD

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
4. 09/13/21 3:16 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:50 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 Majors	Yes
Elective for Majors	No

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

Requested Effective Change Date	**Spring 2022** ~~Fall 2021~~
Department	Mechanical & Aerospace Engineering
Discipline	Mechanical Engineering (MECH ENG)
Course Number	2519
Title	Thermodynamics
Abbreviated Course Title	Thermodynamics

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.

3. 09/08/21 3:33 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:38 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:50 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

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)

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

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: 09/29/21 11:16 am

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

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

3. 09/08/21 3:25 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:39 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 11:16 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 11:18 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

1. Oct 16, 2017 by nisbett (105.1)

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

Field Trip Statement				
Credit Hours Total: 3	LEC: 3	LAB: 0	IND: 0	RSD: 0
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 Effective Change Date	**Fall 2022** ~~01/08/2018~~
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 Course Title Intro To Mfg Processes

Catalog Description

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

Approved for CCC Secretary
3. 09/08/21 3:26 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:40 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:50 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

1. Oct 7, 2017 by nisbett (1474.1)

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

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 Effective Change Date	**Fall 2022** ~~01/08/2018~~
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 Course Title	**Intro Mechanical** ~~Introduction To~~ Design

Catalog Description

3. 09/08/21 3:35 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:41 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:50 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

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 designtool.The solid modeling environment will also be used to reinforce the concepts of tolerancing, dimensioning, and~~

~~multiviewrepresentation.~~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 Effective Change Date	**Spring 2022** ~~01/08/2018~~
Department	Mechanical & Aerospace Engineering
Discipline	Mechanical Engineering (MECH ENG)
Course Number	3313
Title	Machine Dynamics
Abbreviated Course Title	Machine Dynamics

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

3. 09/08/21 3:34 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:42 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:51 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

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

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 Total: 3	LEC: 3	LAB: 0	IND: 0	RSD: 0
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 Effective Change Date: **Spring 2022** ~~01/08/2018~~

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 Course Title	Model Analysis Dyn Sys

Catalog Description

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

3. 09/08/21 3:36 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 09/13/21 3:42 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:51 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair

History

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

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 Total: 3	LEC: 3	LAB: 0	IND: 0	RSD: 0
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 Effective Change Date	**Fall** ~~Spring~~ 2022
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

9. 09/13/21 3:43 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
10. 09/29/21 7:51 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
11. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 Effective Change Date	**Fall** ~~Spring~~ 2022
Department	Mining & Nuclear Engineering
Discipline	Nuclear Engineering (NUC ENG)
Course Number	5438
Title	**Advanced** Reactor Laboratory II
Abbreviated Course Title	**Advanced** Reactor **Lab** ~~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

9. 09/13/21 3:44 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
10. 09/29/21 7:51 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
11. 09/29/21 8:08 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 Total: 2	LEC: 1	LAB: 1	IND: 0	RSD: 0
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

sraper (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

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

Key: 1652

Preview Bridge

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: 09/29/21 2:20 pm

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
4. 09/13/21 2:53 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 2:20 pm Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda

6. 09/30/21 7:52 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 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"

tibbettsmg (09/29/21 2:20 pm): removed Math 1210 from footnote per CCC. mt

Key: 141

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: mfitch

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
4. 09/13/21 2:55 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:52 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am Stephen Raper

(sraper): Approved for Campus Curricula Committee 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: 09/29/21 2:22 pm

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

Approval Path

1. 07/22/21 10:40 am David Borrok (borrokd): Approved for RGEOSENG Chair
2. 07/29/21 12:00 pm Marita Tibbetts (tibbettsmg): Rollback to Initiator
3. 08/26/21 9:39 am Jeff Cawlfield (jdc): Approved for RGEOSENG 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
6. 09/13/21 2:56 pm Marita Tibbetts (tibbettsmg): Approved for

Pending CCC Agenda post
7. 09/29/21 2:22 pm Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
8. 09/30/21 7:52 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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.

Freshman Year			
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.
g	**MATH 1208 or 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
tibbettsmg (09/29/21 2:22 pm): removed Math 1210 from footnote per CCC. mt

Key: 156

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: 09/29/21 2:24 pm

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. **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. Kristy Giacomelli-Feys

Approval Path

1. 07/22/21 10:40 am David Borrok (borrokd): Approved for RGEOSENG Chair
2. 07/29/21 12:00 pm Marita Tibbetts (tibbettsmg): Rollback to Initiator
3. 08/26/21 9:35 am Jeff Cawlfield (jdc): Approved for RGEOSENG 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
6. 09/13/21 2:56 pm Marita Tibbetts (tibbettsmg):

Approved for Pending CCC Agenda post
7. 09/29/21 2:24 pm Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
8. 09/30/21 7:52 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 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

tibbettsmg (09/29/21 2:24 pm): removed Math 1210 from footnote per CCC. mt

Key: 64

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: 09/29/21 2:46 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
4. 09/13/21 2:57 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 2:46 pm Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda

6. 09/30/21 7:52 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 11202. 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[e]	3
MATH 1214 or 1211[a]	4		
	16		17
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
MATH 2222[a]	4	MECH ENG 2761	2
~~Programming Elective[a, c]~~	~~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, b]**	**3**
	15		17
Junior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
MECH ENG 3313	3	MECH ENG 3411[a]	3
MECH ENG 3521	3	MECH ENG 3131	3
ELEC ENG 2800	3	MECH ENG 4840	2
CIV ENG 2210[a]	3	Elective-Communications[c]	3

CIV ENG 2211	1	MECH ENG 3708	3
Elective-Advanced Math/Stat[d]	3	MECH ENG 3525	3
	16		17

Senior Year

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

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

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

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

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

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

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

h This elective consists of three credit hours, subject to approval by the student's advisor, and may be satisfied by any of the following: (1) A three credit hour course from any of the following areas: math, statistics, science, engineering, computer science, business, or IST. The course must be at the 3000 or higher level, or have a prerequisite that is part of the required mechanical engineering curriculum. Exceptions to the course level may be approved by the student's advisor; (2) Any three credit hour course

	in the list of approved courses for the global studies minor; or (3) Any combination of three credit hours from co-op (3002), special problems (3000, 4000, or 5000), research (4099), or design team credit (ENG MGT 2011, ENG MGT 2012, or ENG MGT 2013).
i	All mechanical engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade on this examination is not required to earn a B.S. degree. However, it is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process as described in assessment requirements found elsewhere in this catalog.
~~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[c]	3
	16		17
Senior Year			
First Semester	**Credits**	**Second Semester**	**Credits**

MECH ENG 4842	2	ENG MGT 1100	1
MECH ENG 4479	3	ENG MGT 1210	2
MECH ENG 3708	3	MECH ENG 4761	3
Manufacturing Technical Elective[e]	3	MECH ENG 4480	1
Manufacturing Technical Elective[e]	3	Manufacturing Technical Elective[e]	3
Elective Literature[d]	3	Electives-Hum or Soc Sci[d]	3
	17		13
Total Credits: 63			

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

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

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

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

e The nine hours of manufacturing technical elective must be selected as follows:
One course from the following manufacturing/automation courses: MECH ENG 5653, MECH ENG 5655, MECH ENG 5449, MECH ENG 5606.
One of the following design courses: MECH ENG 5763, MECH ENG 5656, MECH ENG 5702.
One course from the following list: MECH ENG 5708, MECH ENG 5758.

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

~~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[f]	3
MECH ENG 4480	1	Literature elective[d]	3
MECH ENG technical elective[e]	3	Elective - Advanced Hum or Soc Sci[d]	3
Elective - Communications[c]	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	The programming elective consists of a lecture and lab combination, and may be selected from COMP SCI 1970/COMP SCI 1980, COMP SCI 1971/COMP SCI 1981, or COMP SCI 1972/COMP SCI 1982, or COMP SCI 1570/COMP SCI 1580. Note that COMP SCI 1570/COMP SCI 1580 requires one more credit hour than the other options.
c	This course must be selected from the following: ENGLISH 1160, ENGLISH 3560 or SP&M S 1185, or the complete four course sequence in Advanced ROTC (MIL ARMY 3250, MIL ARMY 3500, MIL ARMY 4250, and MIL ARMY 4500; or MIL AIR 3110, MIL AIR 3120, MIL AIR 4110 and MIL AIR 4120).
d	All electives must be approved by the student's advisor. Humanity and Social Science electives must be at least 3 credit hours of lecture designation, and also meet requirements as specified under “Engineering Degree Requirements” published in the current undergraduate catalog.
e	The mechanical engineering technical elective is subject to approval by the student's advisor, and must be in the department of mechanical and aerospace engineering. This elective may not include co-op, special problems, or research credits, such as 3002, 4000, or 4099. Honors students have special requirements for technical electives.
f	The systems integration technical elective must be selected from the following list: MECH ENG 5307, MECH ENG 5478, MECH ENG 5481, MECH ENG 5533, MECH ENG 5571, MECH ENG 5575, MECH ENG 5656, MECH ENG 5704, MECH ENG 5708, MECH ENG 5709, MECH ENG 5715, MECH ENG 5757, MECH ENG 5763.
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.
~~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.
tibbettsmg (09/29/21 2:46 pm): reformatted footnote order per CCC request. mt

Key: 86

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
5. 09/13/21 2:58 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post

6. 09/29/21 7:52 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
7. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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: 09/29/21 2:25 pm

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

Approval Path

1. 07/22/21 10:40 am David Borrok (borrokd): Approved for RGEOSENG Chair
2. 07/29/21 12:00 pm Marita Tibbetts (tibbettsmg): Rollback to Initiator
3. 08/26/21 9:39 am Jeff Cawlfield (jdc): Approved for RGEOSENG 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
6. 09/13/21 2:59 pm Marita Tibbetts (tibbettsmg): Approved for

Pending CCC Agenda post
7. 09/29/21 2:26 pm Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
8. 09/30/21 7:52 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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 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

tibbettsmg (09/29/21 2:25 pm): removed Math 1210 from footnote per CCC. mt

Key: 108

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** ~~2021~~
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
4. 09/13/21 3:00 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:52 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda

6. 09/29/21 8:08 am Stephen Raper (sraper): Approved for Campus Curricula Committee 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

Key: 115

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

Approval Path

1. 08/26/21 9:52 am Jeff Cawlfield (jdc): Approved for RGEOSENG 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
4. 09/13/21 3:01 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:52 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am Stephen Raper

(sraper): Approved for Campus Curricula Committee 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

Key: 352

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 Effective Change Date	Spring 2022
Department	Mining & Nuclear Engineering
Discipline	Mining Engineering (MIN ENG)
Course Number	6001
Topic ID	003
Experimental Title	Computational Rock Mechanics
Experimental Abbreviated Course Title	CRM
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
4. 09/13/21 3:02 pm Marita Tibbetts (tibbettsmg): Approved for Pending CCC Agenda post
5. 09/29/21 7:53 am Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am Stephen Raper (sraper): Approved for Campus Curricula Committee Chair
7. 09/29/21 11:47 am Evie Sherlock (esdk3): Approved for CAT entry

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 extend, 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 Effective Change Date	Spring 2022
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 moatsm: 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
5. 09/29/21 7:53 am
Marita Tibbetts (tibbettsmg): Approved for CCC Meeting Agenda
6. 09/29/21 8:08 am
Stephen Raper (sraper): Approved for Campus Curricula Committee Chair
7. 09/29/21 11:49 am
Evie Sherlock (esdk3): Approved for CAT entry

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

Key: 4807

Preview Bridge

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 Effective Change Date	Spring 2022
Department	Materials Science & Engineering
Discipline	Materials Science & Eng (MS&E)
Course Number	6001
Topic ID	006
Experimental Title	Advanced Medical Nanomaterials
Experimental Abbreviated Course Title	Adv Med 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 moatsm: 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

Engineering DSCC Chair
4. 09/13/21 3:03 pm
Marita Tibbetts (tibbettsmg):
Approved for Pending CCC Agenda post
5. 09/29/21 7:53 am
Marita Tibbetts (tibbettsmg):
Approved for CCC Meeting Agenda
6. 09/29/21 8:07 am
Stephen Raper (sraper):
Approved for Campus Curricula Committee Chair
7. 09/29/21 11:52 am
Evie Sherlock (esdk3):
Approved for CAT entry

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

Key: 4808

Preview Bridge