Campus Curricula Committee Meeting Agenda
May 9, 2018
2:00-3:30 p.m., 106 Parker Hall
(For Faculty Senate Meeting of June 14, 2018)

Review of submitted Course Change forms:

File: 4470.3	BUS 5730: Machine Learning and Artificial Intelligence for Business
File: 2375.8	COMP ENG 5450: Digital Image Processing
File: 180.9	COMP ENG 5460: Machine Vision
File: 2214.3	ELEC ENG 4096: Electrical Engineering Senior Project I
File: 904.3	ELEC ENG 5170: Introduction To Circuit Synthesis
File: 898.4	ELEC ENG 5210: Fourier Optics
File: 2538.1	ELEC ENG 5600: Interference Control in Electronic Systems
File: 2431.3	ENG MGT 4110: General Management-Design and Integration
File: 4407.5	IS&T 5520: Data Science and Machine Learning with Python
File: 4471.6	IS&T 5535: Machine Learning Algorithms and Applications
File: 1250.1	GEO ENG 5331: Subsurface Hydrology
File: 1890.9	GEOLOGY 1141: Physical Oceanography
File: 2611.1	GEOLOGY 4310: Remote Sensing Technology
File: 1603.5	MECH ENG 5763: Computer Aided Design: Theory and Practice
File: 689.1	PET ENG 4511: Applied Petroleum Reservoir Engineering

Review of submitted Degree Change forms:

File: 146.21	BIO SC-BA: Biological Sciences BA
File: 147.13	BIO SC-BS: Biological Sciences BS
File: 186.18	BUS AD-MBA: Business Administration MBA
File: 14.11	CH ENG-MS: Chemical Engineering MS
File: 151.3	CHEM-BA: Chemistry BA
File: 153.47	CP ENG-BS: Computer Engineering BS
File: 155.40	EL ENG-BS: Electrical Engineering BS
File: 44.26	ENG MG-BS: Engineering Management BS
File: 46.9	ENG MG-MS: Engineering Management MS
File: 45.8	ENG MGT-MI: Engineering Management Minor
File: 261.1	FR ENG-UN: Freshman Engineering Program
File: 156.18	GE ENG-BS: Geological Engineering BS
File: 64.23	GL&GPH-BS: Geology and Geophysics BS
File: 157.18	HIST-BA: History BA
File: 75.23	IST-BS: Information Science and Tch BS
File: 108.17	PE ENG-BS: Petroleum Engineering BS
File: 115.24	PHYSIC-BS: Physics BS
File: 131.9	SYS EN-PHD: Systems Engineering PhD

Review of submitted Experimental Course forms:

File: 4535	CIV ENG 5001.T002: Environmental Water Resources Field Methods
File: 4539	HISTORY 3001.004: World War I: A Global Perspective
File: 4538	PET ENG 6001.010: Advanced Applied Reservoir Engineering

For informational purposes, the Campus Curricula Committee has reviewed the Undergraduate Certificate in Automation Engineering.

Course Change Request

Date Submitted: 04/14/18 7:31 pm

Viewing: **BUS 5730 : Machine Learning and Artificial Intelligence for Business**

File: 4470.3

Last approved: 11/20/17 3:28 am

Last edit: 04/16/18 1:43 pm

Changes proposed by: barryf

Requested Effective Change Date	**Fall** ~~Spring~~ 2018
Department	Business and Information Technology
Discipline	Business (BUS)
Course Number	5730
Title	Machine Learning and Artificial Intelligence for Business
Abbreviated Course Title	Mach Learning AI for BUS

Catalog Description

In Workflow

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

Approval Path

1. 04/15/18 5:30 pm siauk: Approved for RBUSADMN Chair
2. 04/16/18 1:44 pm Brittany Parnell (ershenb): Approved for CCC Secretary

3. 04/16/18 1:49 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Nov 20, 2017 by Barry Flachsbart (barryf)

Explores various approaches to machine learning and artificial intelligence, along with their numerous applications in business. Describes some of the many technological approaches to business problems that are considered part of machine learning and artificial intelligence, such as neural networks and deep learning.

Prerequisites

IS&T **1750;** ~~1552~~ or ~~Comp Sci 1510; or~~ Graduate Standing, understanding of management information **systems.** ~~systems, programming knowledge.~~

Field Trip Statement

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

Justification for change:

Revise prerequisites.

Semesters previously offered as an experimental course

None

Co-Listed Courses:

Course Reviewer Comments

Key: 4470

Preview Bridge

Course Change Request

Date Submitted: 04/06/18 10:43 am

Viewing: **COMP ENG 5450 : Digital Image Processing**

File: 2375.8

Last approved: 10/23/17 3:28 am

Last edit: 04/06/18 10:43 am

Changes proposed by: sweetk

Programs referencing this course

CP ENG-BS: Computer Engineering BS

Other Courses referencing this course

In The Catalog Description:

ELEC ENG 5450 : Digital Image Processing

Requested Effective Change Date	Spring **2019** ~~2018~~
Department	Electrical and Computer Engineering
Discipline	Computer Engineering (COMP ENG)
Course Number	5450
Title	Digital Image Processing

In Workflow

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

Approval Path

1. 04/07/18 5:43 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/10/18 3:26 pm Brittany Parnell (ershenb): Approved for CCC Secretary

Abbreviated Course Title	Digital Image Processing
Catalog Description	

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:47 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by lahne (2375.1)
2. Sep 28, 2015 by martins (2375.2)
3. Oct 23, 2017 by martins (2375.3)

Fundamentals of human perception, sampling and quantization, image transforms, enhancement, restoration, channel and source coding.

Prerequisites

Elec Eng **3430.** ~~3410.~~

Field Trip Statement

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

Justification for change:

EE 3410 is being phased out.

Semesters previously offered as an experimental course

Co-Listed Courses:

ELEC ENG 5450 - Digital Image Processing

Course Reviewer Comments

Key: 2375

Preview Bridge

Course Change Request

Date Submitted: 04/06/18 10:40 am

Viewing: COMP ENG 5460 : Machine Vision

File: 180.9

Last approved: 10/23/17 3:27 am

Last edit: 04/06/18 10:40 am

Changes proposed by: sweetk

Programs referencing this course

CP ENG-BS: Computer Engineering BS

Other Courses referencing this course

In The Catalog Description:

ELEC ENG 5460 : Machine Vision

Requested Effective Change Date	Spring **2019** ~~2018~~
Department	Electrical and Computer Engineering
Discipline	Computer Engineering (COMP ENG)
Course Number	5460
Title	Machine Vision
Abbreviated Course Title	Machine Vision

In Workflow

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

Approval Path

1. 04/07/18 5:43 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/10/18 3:27 pm Brittany Parnell (ershenb): Approved for CCC Secretary

Catalog Description

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:48 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by lahne (180.1)
2. Sep 21, 2015 by martins (180.3)
3. Oct 23, 2017 by martins (180.4)

Image information, image filtering, template matching, histogram transformations, edge detection, boundary detection, region growing and pattern recognition. Complementary laboratory exercises are required.

Prerequisites

Elec Eng **3430.** ~~3410.~~

Field Trip Statement

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

Justification for change:

EE 3410 is being phased out.

Semesters previously offered as an experimental course

Co-Listed Courses:

ELEC ENG 5460 - Machine Vision

Course Reviewer Comments

Key: 180

Preview Bridge

Course Change Request

Date Submitted: 04/05/18 12:54 pm

Viewing: **ELEC ENG 4096 : Electrical Engineering Senior Project I**

File: 2214.3

Last approved: 10/20/14 3:36 am

Last edit: 04/10/18 3:32 pm

Changes proposed by: sweetk

Programs referencing this course

EL ENG-MI: Minor in Electrical Engineering

CP ENG-BS: Computer Engineering BS

EL ENG-BS: Electrical Engineering BS

Other Courses referencing this course

In The Prerequisites:

ELEC ENG 4097 : Electrical Engineering Senior Project II

Requested Effective Change Date	**Spring 2019** ~~01/13/2015~~
Department	Electrical and Computer Engineering
Discipline	Electrical Engineering (ELEC ENG)
Course Number	4096
Title	

In Workflow

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

Approval Path

1. 04/07/18 5:46 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/10/18 3:32 pm Brittany Parnell (ershenb): Approved for CCC Secretary

Electrical Engineering Senior Project I

Abbreviated Course Title	EE Senior Project I

Catalog Description

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:49 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by lahne (2214.1)
2. Oct 20, 2014 by lahne (2214.2)

A complete design cycle. Working in small teams, students will design, document, analyze, implement and test a product. Topics include: Iteration in design, prototyping, group dynamics, design reviews, making effective presentations, concurrent design, designing for test, ethics and standards, testing and evaluation.

Prerequisites

Comp Eng 2210, Econ 1100 or **Econ** 1200, English 3560, **and** at least 3 of the following: Elec Eng **3500 or** ~~3500,~~ Elec Eng 3540, Elec Eng 3320, Elec Eng **3430,** ~~3420,~~ Elec Eng 3600, Elec Eng 3100.

Field Trip Statement

Credit Hours	LEC: 0	LAB: .5	IND: 0	RSD: .5	Total: 1
Required for Majors	Yes				
Elective for Majors	No				

Justification for change:

Removed EE 3420 - no longer taught

Replaced with EE 3430

Update requirements to reflect that students must only take one of the two courses, EE 3500 or EE 3540

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

ershenb (04/10/18 3:32 pm): updated Start Term to Spring 2019

Key: 2214

Preview Bridge

Course Change Request

Date Submitted: 04/05/18 12:56 pm

Viewing: **ELEC ENG 5170 : Introduction To Circuit Synthesis**

File: 904.3

Last approved: 09/21/15 3:55 am

Last edit: 04/24/18 8:50 am

Changes proposed by: sweetk

Requested Effective Change Date	**Fall 2018** ~~Spring 2016~~
Department	Electrical and Computer Engineering
Discipline	Electrical Engineering (ELEC ENG)
Course Number	5170
Title	Introduction To Circuit Synthesis
Abbreviated Course Title	**Intro Circuit** ~~Intro/Circuit~~ Synthesis
Catalog Description	

In Workflow

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

Approval Path

1. 04/05/18 6:33 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/06/18 8:54 am Brittany Parnell (ershenb): Approved for CCC Secretary

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:53 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Sep 21, 2015 by martins (904.1)

Fundamentals of linear circuit theory. Matrix formulation, and topological methods as applied to circuit analysis. Properties of network functions and introductory network synthesis.

Prerequisites

Elec Eng **3430.** ~~3400.~~

Field Trip Statement

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

Justification for change:

Replace 3400 (no longer taught) with 3430

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

ershenb (04/06/18 8:54 am): updated Start Term to Fall 18.

Key: 904

Preview Bridge

Course Change Request

Date Submitted: 04/05/18 1:50 pm

Viewing: ELEC ENG 5210 : Fourier Optics

File: 898.4

Last approved: 06/30/14 3:55 am

Last edit: 04/10/18 3:37 pm

Changes proposed by: sweetk

Other Courses referencing this course

In The Catalog Description:

PHYSICS 5503 : Fourier Optics

Requested Effective Change Date	**Fall 2018** ~~08/01/2014~~
Department	Electrical and Computer Engineering
Discipline	Electrical Engineering (ELEC ENG)
Course Number	5210
Title	Fourier Optics
Abbreviated Course Title	Fourier Optics

Catalog Description

In Workflow

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

Approval Path

1. 04/05/18 6:33 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/10/18 3:37 pm Brittany Parnell (ershenb): Approved for CCC Secretary

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:55 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Jun 30, 2014 by lahne (898.1)

Applications of Fourier analysis and linear systems theory to optics. Topics include scalar diffraction theory, Fourier transforming properties of lenses, optical information processing, and imaging systems.

Prerequisites

Both **Elec Eng 3430** ~~ELEC ENG 3400~~ and **Elec Eng** 3600 or both **Physics** ~~PHYSICS~~ 2401 and **Physics** 4211.

Field Trip Statement

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

Justification for change:

Replace EE 3400 with EE 3430. EE 3400 no longer taught.

Semesters previously offered as an experimental course

Co-Listed Courses:

PHYSICS 5503 - Fourier Optics

Course Reviewer Comments

Key: 898

Preview Bridge

Course Change Request

Date Submitted: 04/05/18 1:44 pm

Viewing: **ELEC ENG 5600 : Interference Control in Electronic Systems**

File: 2538.1

Last edit: 04/11/18 3:13 pm

Changes proposed by: sweetk

Catalog Pages referencing this course

Electrical Engineering

Requested Effective Change Date	**Spring 2019** ~~08/01/2014~~
Department	Electrical and Computer Engineering
Discipline	Electrical Engineering (ELEC ENG)
Course Number	5600
Title	Interference Control in Electronic Systems
Abbreviated Course Title	Interference Control

Catalog Description

In Workflow

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

Approval Path

1. 04/05/18 6:29 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/11/18 3:13 pm Brittany Parnell (ershenb): Approved for CCC Secretary

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:56 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Principles of high frequency effects in PCBs and components, generation of unwanted radio-frequency (RF) signals by ICs, RF radiation mechanisms, shielding, and immunity against electrostatic discharge and RF signals.

Prerequisites

Elec Eng **3430** ~~3400~~ and 3600.

Field Trip Statement

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

Justification for change:

EE 3400 no longer taught. Replace with EE 3430

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

Key: 2538

Preview Bridge

Course Change Request

Date Submitted: 04/06/18 1:14 pm

Viewing: **ENG MGT 4110 : General Management-Design and Integration**

File: 2431.3

Last approved: 02/09/15 3:18 am

Last edit: 04/11/18 3:24 pm

Changes proposed by: sraper

Programs referencing this course

ENG MG-BS: Engineering Management BS

Other Courses referencing this course

In The Prerequisites:

ENG MGT 4907 : Engineering Management Senior Design

Requested Effective Change Date	**Spring 2019** ~~Fall 2015~~
Department	Engineering Management and Systems Engineering
Discipline	Engineering Management (ENG MGT)
Course Number	4110

Title

General Management-Design and Integration

In Workflow

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

Approval Path

1. 04/06/18 5:16 pm Suzanna Long (longsuz): Approved for RENGMNGT Chair
2. 04/11/18 3:24 pm Brittany Parnell (ershenb): Approved for CCC

Abbreviated Course Title	**Gen Mgt Dsgn and Integ** ~~General Mgt-Dsgn & Integ~~
Catalog Description	

Secretary
3. 04/23/18 1:53 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 9:03 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History
1. Feb 9, 2015 by sraper (2431.1)

Integrating and executing marketing, production, finance, and engineering policies and strategies for the benefit of an enterprise. Analysis, forcasting, and design methods using case studies and management simulation.

Prerequisites

Eng Mgt **2110,** ~~2210,~~ 2211; preceded or accompanied by Eng Mgt 3310, 3320, 4710, and senior standing.

Field Trip Statement

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

Justification for change:

Corrected prerequisite that was a typo.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

Key: 2431

Preview Bridge

Course Change Request

Date Submitted: 03/24/18 8:41 pm

Viewing: **IS&T 5520 : Data Science and Machine Learning with Python**

File: 4407.5

Last approved: 11/20/17 3:28 am

Last edit: 03/29/18 9:48 am

Changes proposed by: barryf

Catalog Pages referencing this course

Information Science and Technology

Programs referencing this course

ANA&DTA-MI: Business Analytics and Data Science Minor

AI-MI: Minor in Artificial Intelligence and Machine Learning in Business

BUSAPPS-MI: Business Applications and Software Development Minor

FIN TCH-MI: Minor in Financial Technology (FinTech)

Requested Effective Change Date	**Fall** ~~Spring~~ 2018
Department	Business and Information Technology
Discipline	Info Science & Technology (IS&T)
Course Number	5520

In Workflow

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

Approval Path

1. 03/28/18 5:59 pm siauk: Approved for RINFSCTE Chair
2. 03/29/18 9:51 am Brittany Parnell (ershenb): Approved for CCC Secretary

Title

Data Science and Machine Learning with Python

Abbreviated Course Title: Data Sci ML in Python

Catalog Description

Examines data science methodologies for scraping, manipulating, transforming, cleaning, visualizing, summarizing, and modeling large-scale data as well as supervised and unsupervised machine learning algorithms applied in various business analytics and data science scenarios. Python libraries such as Pandas, NumPy, Matplotib, and Scikit-learn are utilized.

Prerequisites

One of Stat 3111, Stat 3113, Stat 3115, Stat 3117 and either IS&T 1552 or Comp Sci **1575;** ~~1510;~~ for Graduate Students: Graduate Standing and Knowledge of Calculus, Statistics, and Programming.

Field Trip Statement

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

3. 03/29/18 7:56 pm
   Barry Flachsbart (barryf):
   Approved for Social Sciences DSCC Chair
4. 04/17/18 10:15 am
   Brittany Parnell (ershenb):
   Approved for Pending CCC Agenda post

History

1. Sep 29, 2017 by Barry Flachsbart (barryf)
2. Nov 20, 2017 by barryf (4407.2)

Required for Majors	No
Elective for Majors	Yes

Justification for change:

Comp Sci changed their course number from 1510 to 1575. This fixes the prerequisite statement to reflect the new number.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

Key: 4407

Preview Bridge

Course Change Request

Date Submitted: 03/24/18 8:41 pm

Viewing: **IS&T 5535 : Machine Learning Algorithms and Applications**

File: 4471.6

Last approved: 11/20/17 3:28 am

Last edit: 03/29/18 9:53 am

Changes proposed by: barryf

Catalog Pages referencing this course

Information Science and Technology

Programs referencing this course

AI-MI: Minor in Artificial Intelligence and Machine Learning in Business

Requested Effective Change Date	**Fall** ~~Spring~~ 2018
Department	Business and Information Technology
Discipline	Info Science & Technology (IS&T)
Course Number	5535
Title	Machine Learning Algorithms and Applications

In Workflow

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

Approval Path

1. 03/28/18 6:00 pm siauk: Approved for RINFSCTE Chair
2. 03/29/18 9:54 am Brittany Parnell (ershenb): Approved for CCC Secretary

Abbreviated Course Title	ML Algs and Apps
Catalog Description	

3. 03/29/18 7:56 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 04/17/18 10:15 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Nov 20, 2017 by Barry Flachsbart (barryf)

Introduces techniques of modern machine learning methods with applications in marketing, finance, and other business disciplines. Topics include regression, classification, resampling methods, model selection, regularization, decision trees, support vector machines, principal component analysis, and clustering. R programming is required.

Prerequisites

One of Stat 3111, Stat 3113, Stat 3115, Stat 3117 and either IS&T 1552 or Comp Sci **1575;** ~~1510;~~ or Graduate Standing with knowledge of calculus, statistics, and programming.

Field Trip Statement

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

Elective for Majors	Yes

Justification for change:

Comp Sci changed their course number from 1510 to 1575. This fixes the prerequisite statement to reflect the new number.

Semesters previously offered as an experimental course

None

Co-Listed Courses:

Course Reviewer Comments

Key: 4471

Preview Bridge

Course Change Request

Date Submitted: 03/16/18 8:30 am

Viewing: GEO ENG 5331 : Subsurface Hydrology

File: 1250.1

Last edit: 03/20/18 2:11 pm

Changes proposed by: grotekr

Programs referencing this course

- EV ENG-BS: Environmental Engineering BS
- GE ENG-MI: Geological Engineering Minor
- HUM ENG-MI: Humanitarian Engineering and Science Minor
- GE ENG-BS: Geological Engineering BS
- 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

Requested Effective Change Date: **Spring 2019** ~~08/01/2014~~

Department

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. 03/19/18 3:30 pm David Borrok (borrokd): Approved for RGEOSENG Chair
2. 03/20/18 2:11 pm Brittany Parnell (ershenb): Approved for CCC Secretary

Geosciences and Geological and Petroleum Engineering

Discipline: Geological Engineering (GEO ENG)

Course Number: 5331

Title: Subsurface Hydrology

Abbreviated Course Title: Subsurface Hydrology

3. 04/13/18 12:39 pm sraper: Approved for Engineering DSCC Chair
4. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Catalog Description

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

Prerequisites

Geo Eng **1150 or equivalent,** ~~1150,~~ Math **1215.** ~~3304.~~

Field Trip Statement

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

Justification for change:

Catalog description: The modified description more clearly describes the content of the course.

Prerequisites: Math 1215 is a more appropriate prerequisite and is sufficient for the

material covered in the course.

Required for majors: This course has always been required for majors, so that change is correcting a mistake in the catalog.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

ershenb (03/20/18 2:11 pm): changed Start Term to Spring 2019.

Key: 1250

Preview Bridge

Course Change Request

Date Submitted: 03/19/18 2:15 pm

Viewing: **GEOLOGY 1141 : Physical Oceanography**

File: 1890.9

Last approved: 07/07/14 3:48 am

Last edit: 03/19/18 3:46 pm

Changes proposed by: ikuenobe

Requested Effective Change Date	**Fall 2018** ~~01/13/2015~~
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Geology (GEOLOGY)
Course Number	1141
Title	Physical Oceanography
Abbreviated Course Title	Physical Oceanography
Catalog 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. CAT entry
11. Peoplesoft

Approval Path

1. 03/19/18 3:30 pm David Borrok (borrokd): Approved for RGEOSENG Chair
2. 03/19/18 3:47 pm Brittany Parnell (ershenb): Approved for CCC Secretary

3. 04/20/18 10:06 am
   Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/24/18 9:06 am
   Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Jul 7, 2014 by ikuenobe (1890.1)

An introduction to the study of the physical and geological processes in the world's oceans including the importance of the oceans to the environment and to life on Earth.

Prerequisites

Entrance requirements. ~~GEOLOGY 1110 or GEOLOGY 1120 or equivalent.~~

Field Trip Statement

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

Justification for change:

Introductory geology knowledge is not required to take this general science elective course.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

Key: 1890

Preview Bridge

Course Change Request

Date Submitted: 03/19/18 2:55 pm

Viewing: **GEOLOGY 4310 : Remote Sensing Technology**

File: 2611.1

Last edit: 03/20/18 2:15 pm

Changes proposed by: ikuenobe

Programs referencing this course

GL&GPH-BS: Geology and Geophysics BS

Other Courses referencing this course

In The Catalog Description:

GEO ENG 5144 : Remote Sensing Technology

Requested Effective Change Date	**Fall 2018** ~~08/01/2014~~
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Geology (GEOLOGY)
Course Number	4310

Title

Remote Sensing Technology

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. 03/19/18 3:30 pm David Borrok (borrokd): Approved for RGEOSENG Chair
2. 03/20/18 2:15 pm Brittany Parnell (ershenb): Approved for CCC Secretary

Abbreviated Course Title	Remote Sensing Tech

3. 04/20/18 10:07 am
   Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/24/18 9:08 am
   Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Catalog Description

Principles of digital image processing including image enhancement and multispectral classification. Emphasis upon design and implementation of remote sensing systems and analysis of remotely sensed data for geotechnical and environmental investigations.

Prerequisites

Geology 1110. ~~Geo Eng 3148.~~

Field Trip Statement

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

Justification for change:

Introductory geology knowledge is sufficient to understand the theory of remote sensing.

Semesters previously offered as an experimental course

Co-Listed Courses:

GEO ENG 5144 - Remote Sensing Technology

Course Reviewer Comments

Key: 2611

Preview Bridge

Course Change Request

Date Submitted: 04/11/18 11:13 am

Viewing: **MECH ENG 5763 : ~~Principles And Practice Of~~ Computer Aided Design: ~~Design~~ Theory and Practice**

File: 1603.5

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

Last edit: 04/11/18 3:52 pm

Changes proposed by: nisbett

Catalog Pages referencing this course

Information Science and Technology

Manufacturing Engineering

Mechanical Engineering

Programs referencing this course

DSCMGMT-MI: Digital Supply Chain Mgt Minor

MC ENG-BS: Mechanical Engineering BS

Other Courses referencing this course

In The Prerequisites:

MECH ENG 6663 : Advanced Digital Design and Manufacturing

In Workflow

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

Approval Path

1. 04/11/18 11:56 am
   James Drallmeier (drallmei): Approved for RMECHENG Chair
2. 04/11/18 3:53 pm
   Brittany Parnell (ershenb): Approved for CCC

Requested Effective Change Date	**Fall 2018** ~~01/08/2018~~
Department	Mechanical & Aerospace Engineering
Discipline	Mechanical Engineering (MECH ENG)
Course Number	5763
Title	~~Principles And Practice Of~~ Computer Aided **Design:** ~~Design~~ **Theory and Practice**
Abbreviated Course Title	**CAD Theory and Practice** ~~Prin & Pract Cmp Aid Dsg~~

Secretary
3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 9:10 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History
1. Oct 7, 2017 by nisbett (1603.1)

Catalog Description

Lectures cover the fundamentals of computer-aided design with emphasis on geometric modeling of curves, surfaces and solids, CAD/CAM data exchange, and computer graphics. In the lab session, students practice with commercial CAD/CAM systems including NX and SolidWorks to gain practical experience.

Prerequisites

Comp Sci 1570 or Comp Sci 1970 or Comp Sci 1971 or Comp Sci 1972; Mech Eng 2761; Math 2222; at least Junior standing.

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:

The title is being modified to better emphasize the content of the course.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

Key: 1603

Preview Bridge

Course Change Request

Date Submitted: 04/06/18 1:54 pm

Viewing: **PET ENG 4511 : Applied Petroleum Reservoir Engineering**

File: 689.1

Last edit: 04/16/18 9:15 am

Changes proposed by: reflori

Programs referencing this course

PE ENG-BS: Petroleum Engineering BS

Requested Effective Change Date	**Fall 2018** ~~08/01/2014~~
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Petroleum Engineering (PET ENG)
Course Number	4511
Title	Applied Petroleum Reservoir Engineering
Abbreviated Course Title	Appl Petr Reservoir Engr

Catalog 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. CAT entry
11. Peoplesoft

Approval Path

1. 04/06/18 3:00 pm David Borrok (borrokd): Approved for RGEOSENG Chair
2. 04/11/18 3:55 pm Brittany Parnell (ershenb): Approved for CCC Secretary

3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 9:16 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Quantitative study of oil production by natural forces, gas cap, water influx, solution gas, etc.; material balance equations, study of gas, non-retrograde gas condensate, and black oil reservoirs. Predictive calculations of oil recovery from different reservoir types.

Prerequisites

Pet Eng **3520.** ~~3520 and 3529.~~

Field Trip Statement

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

Justification for change:

One of the prerequisites is no longer taught.

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

sraper (04/16/18 9:15 am): Checked elective for majors.

Key: 689

Preview Bridge

Program Change Request

Date Submitted: 04/24/18 12:57 pm

Viewing: BIO SC-BA : Biological Sciences BA

File: 146.21

Last approved: 11/14/17 2:29 pm

Last edit: 04/25/18 3:27 pm

Changes proposed by: shannonk

Catalog Pages Using this Program

Biological Sciences

Start Term

Fall 2018

Program Code

BIO SC-BA

Department

Biological Sciences

Title

Biological Sciences BA

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/24/18 1:00 pm David Duvernell (duvernelld): Approved for RBIOLSCI Chair
2. 04/25/18 8:57 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/25/18 11:58 am Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/25/18 12:54 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 1, 2014 by Katie Shannon (shannonk)

2. Jul 14, 2015 by pantaleoa
3. Oct 7, 2016 by Katie Shannon (shannonk)
4. Jun 28, 2017 by Katie Shannon (shannonk)
5. Nov 14, 2017 by Katie Shannon (shannonk)

Bachelor of Arts
Biological Sciences
Degree Requirements

Specific requirements for the B.A. degree in biological sciences include a minimum of 120 semester hours of credit, including 30 hours of biology core courses. A "C" or better is required for all Biological Science courses.

Core Courses		
BIO SCI 1201	Biological Sciences Freshman Seminar	1
BIO SCI 1113	General Biology	3
or BIO SCI 1213	Principles of Biology	
BIO SCI 1219	General Biology Lab	2
BIO SCI 1223	Biodiversity	3
BIO SCI 1229	Biodiversity Lab	1
BIO SCI 2213	Cell Biology	3
BIO SCI 2219	Cell Biology Laboratory	1
BIO SCI 2223	General Genetics	3
~~BIO SCI 2233~~	~~Course BIO SCI 2233 Not Found~~	~~3~~
BIO SCI 2263	Ecology	3
BIO SCI 3233	**Evolution**	**3**
BIO SCI 4010	Seminar	1
Advanced courses, 2000 level or higher (at least one with laboratory and one 3000 or 4000 level)		9
Chemistry		
CHEM 1310 & CHEM 1319 & CHEM 1320 & CHEM 1100	General Chemistry I and General Chemistry Laboratory and General Chemistry II and Introduction To Laboratory Safety & Hazardous Materials	9
CHEM 2210 & CHEM 2220	Organic Chemistry I and Organic Chemistry II	8
Mathematics & Physical Science		
Various courses in mathematics, physics, and/or geology chosen in consultation with academic advisor. (Note: Proficiency in		9

College Algebra must be demonstrated by a grade of "C" or better in a College Algebra course or by examination)		
Computer Science/Statistics (Select one of the following:)		3-4
COMP SCI 1570 & COMP SCI 1580	Introduction To Programming and Introduction To Programming Laboratory	
or COMP SCI 1971 & COMP SCI 1981	Introduction To Programming Methodology and Programming Methodology Laboratory	
STAT 3111	Statistical Tools For Decision Making	
STAT 5425	Introduction to Biostatistics	
General Requirements for BA		
English Composition		6
ENGLISH 1120	Exposition And Argumentation	
One additional composition course		
Western Civilizations		6
HISTORY 1100	Early Western Civilization	
HISTORY 1200	Modern Western Civilization	
Foreign Language (three semesters of a foreign language)		12
Humanities (including one class in each of literature, philosophy, and fine arts)		12
Social Sciences (including classes in two of the following three subjects: economics, political science, psychology)		12

Elective credits: In consultation with his or her advisor, each student will elect sufficient additional courses to complete a minimum of 120 credit hours.

Bachelor of Arts Biological Sciences Pre-Medicine Emphasis Area Degree Requirements

The student will fulfill the requirements for a bachelor of arts in biological sciences as outlined above. The following classes are also required:

CHEM 2219 & CHEM 2229	Organic Chemistry I Lab and Organic Chemistry II Lab	2
2 semesters of Physics and labs:		8-10
PHYSICS 1145 & PHYSICS 1119	College Physics I and General Physics Laboratory	
or PHYSICS 1111 & PHYSICS 1119	General Physics I and General Physics Laboratory	
PHYSICS 2145 & PHYSICS 2119	College Physics II and General Physics Laboratory	
or PHYSICS 2111 & PHYSICS 2119	General Physics II and General Physics Laboratory	

The following classes are highly recommended:

BIO SCI 3333	Human Anatomy and Physiology I	3

BIO SCI 3339	Human Anatomy Physiology I Lab	1
BIO SCI 3343	Human Anatomy and Physiology II	3
BIO SCI 3349	Human Anatomy and Physiology II Laboratory	1
CHEM 4610	General Biochemistry	3

Bachelor of Arts
Biological Sciences
Secondary Education Emphasis Area
Degree Requirements

You may earn a B.A. degree in biological sciences from Missouri S&T and certification to teach at the secondary level in the schools of Missouri with this emphasis area. This program can be completed in four academic years, and student teaching is arranged with public schools within 30 miles of the Rolla campus.

Students interested in this emphasis area should consult with the advisor for biological sciences education majors in the biological sciences department.

In order to successfully complete this emphasis area, students must have at least a 22 ACT, maintain a cumulative GPA of at least 2.5, and attain at least a 2.5 GPA average for all biology courses. Current Missouri S&T or transfer students who wish to pursue this emphasis area must meet both these GPA requirements to be accepted into the program. Students must also meet all requirements listed under the teacher education program in this catalog. Students who do not meet all the teacher certification requirements will not be eligible for the secondary education emphasis area, even if they have completed all required course work.

A degree in this emphasis area requires 131 credit hours. The required courses are provided below. A minimum grade of “C” is required by the department in all biological sciences courses counted toward this degree.

Humanities: 18 semester hours		
ENGLISH 1120	Exposition And Argumentation	3
ENGLISH 1160	Writing And Research	3
or ENGLISH 3560	Technical Writing	
SP&M S 1185	Principles Of Speech	3
At least one course in each of the following: Literature, Philosophy and Fine Arts		9
Social Sciences: 15 semester hours		
HISTORY 3530	History of Science	3
HISTORY 1100	Early Western Civilization	3
HISTORY 1200	Modern Western Civilization	3
POL SCI 1200	American Government	3
PSYCH 1101	General Psychology	3
Mathematics/Physical Science: 9 semester hours		
MATH 1103	Fundamentals Of Algebra	3
PHYSICS 1145	College Physics I	3
or PHYSICS 1505	Introductory Astronomy	
GEOLOGY 1110	Physical And Environmental Geology	3
Computer Science/Statistics: 3 semester hours		
3 semester hours of Computer Science or Statistics		3

Chemistry: 17 semester hours		
CHEM 1310 & CHEM 1319 & CHEM 1320 & CHEM 1100	General Chemistry I and General Chemistry Laboratory and General Chemistry II and Introduction To Laboratory Safety & Hazardous Materials	9
CHEM 2210 & CHEM 2220	Organic Chemistry I and Organic Chemistry II	8
Biological Sciences: 27 semester hours		
BIO SCI 1201	Biological Sciences Freshman Seminar	1
BIO SCI 1213	Principles of Biology	3
or BIO SCI 1113	General Biology	
BIO SCI 1219	General Biology Lab	2
BIO SCI 1223 & BIO SCI 1229	Biodiversity and Biodiversity Lab	4
BIO SCI 1173	Introduction to Environmental Sciences	3
BIO SCI 2213 & BIO SCI 2219	Cell Biology and Cell Biology Laboratory	4
BIO SCI 2223	General Genetics	3
~~BIO SCI 2233~~	~~Course BIO SCI 2233 Not Found~~	~~3~~
BIO SCI 2263	Ecology	3
BIO SCI 3233	**Evolution**	**3**
BIO SCI 4010	Seminar	1
Education: 42 semester hours		
EDUC 1040	Perspectives In Education	2
EDUC 1104	Teacher Field Experience	2
EDUC 1164	Aiding Elementary, Middle And Secondary Schools	2
EDUC 1174	School Organization & Adm For Elementary & Secondary Teachers	2
EDUC 3216	Teaching Reading in Content Area	3
EDUC 3280	Teaching Methods And Skills In The Content Areas	6
EDUC 4298	Student Teaching Seminar	1
EDUC 4299	Student Teaching	12
ENGLISH 3170	Teaching And Supervising Reading and Writing	3
PSYCH 2300	Educational Psychology	3
PSYCH 3310	Developmental Psychology	3
PSYCH 4310	Psychology Of The Exceptional Child	3

Justification for request

Evolution was renumbered from 2233 to 3233

Supporting Documents

Course Reviewer Comments

ershenb (04/25/18 3:27 pm): edited the start term to Fall 2018

Key: 146

Program Change Request

Date Submitted: 04/24/18 1:00 pm

Viewing: BIO SC-BS : Biological Sciences BS

File: 147.13

Last approved: 02/01/16 8:42 am

Last edit: 04/24/18 1:00 pm

Changes proposed by: shannonk

Catalog Pages Using this Program

Biological Sciences

Start Term

Fall 2018 ~~08/22/2016~~

Program Code

BIO SC-BS

Department

Biological Sciences

Title

Biological Sciences BS

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/24/18 1:02 pm David Duvernell (duvernelld): Approved for RBIOLSCI Chair
2. 04/25/18 8:59 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/25/18 11:58 am Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/25/18 12:54 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 1, 2014 by Katie Shannon (shannonk)

2. Feb 1, 2016 by Ilene Morgan (imorgan)

Bachelor of Science
Biological Sciences
Degree Requirements

A minimum of 130 credit hours is required for a Bachelor of Science degree in Biological Science.

A minimum grade of "C" is required for each Biological Science course used to fulfill the B.S. degree requirements.

These requirements for the B.S. degree are in addition to credit that is received for basic ROTC.

The Biological Science B.S. degree must include 49 semester hours of biological sciences course work, to include:

BIO SCI 1201	Biological Sciences Freshman Seminar	1
BIO SCI 1113	General Biology	3
or BIO SCI 1213	Principles of Biology	
BIO SCI 1219	General Biology Lab	2
BIO SCI 1223	Biodiversity	3
BIO SCI 1229	Biodiversity Lab	1
BIO SCI 2213	Cell Biology	3
BIO SCI 2219	Cell Biology Laboratory	1
BIO SCI 2223	General Genetics	3
~~BIO SCI 2233~~	~~Course BIO SCI 2233 Not Found~~	~~3~~
BIO SCI 2263	Ecology	3
BIO SCI 3233	**Evolution**	**3**
BIO SCI 4010	Seminar	1
Advanced biological sciences or approved course work in other departments for a total of 49 credit hours of biology-related classes to include at least one laboratory course from the following:		25
BIO SCI 3319	Microbiology Lab	
or BIO SCI 3339	Human Anatomy Physiology I Lab	
or BIO SCI 3349	Human Anatomy and Physiology II Laboratory	
or BIO SCI 4329	Molecular Genetics Laboratory	
19 semester hours of chemistry to include general chemistry		19
CHEM 1310 & CHEM 1319 & CHEM 1320 & CHEM 1100	General Chemistry I and General Chemistry Laboratory and General Chemistry II and Introduction To Laboratory Safety & Hazardous Materials	
CHEM 2210 & CHEM 2219	Organic Chemistry I and Organic Chemistry I Lab	

& CHEM 2220 & CHEM 2229	and Organic Chemistry II and Organic Chemistry II Lab	
2 semesters of College (Engineering) Physics and labs		8
PHYSICS 1145 & PHYSICS 1119	College Physics I and General Physics Laboratory	
or PHYSICS 1135	Engineering Physics I	
PHYSICS 2145 & PHYSICS 2119	College Physics II and General Physics Laboratory	
or PHYSICS 2135	Engineering Physics II	
Math and Statistics		8-9
MATH 1208	Calculus With Analytic Geometry I	
or MATH 1214	Calculus For Engineers I	
or MATH 1212	Business Calculus	
STAT 5425	Introduction to Biostatistics	
12 semester hours of humanities, excluding foreign language, and to include:		12
ENGLISH 1120 & ENGLISH 1160	Exposition And Argumentation and Writing And Research (entering students will normally take ENGLISH 1120 either semester of the first year)	
9 hours of social sciences, to include		9
HISTORY 1200	Modern Western Civilization (or equivalent)	
or HISTORY 1300	American History To 1877	
or HISTORY 1310	American History Since 1877	
or POL SCI 1200	American Government	
Total Credits		105-106

Elective credits: In consultation with his or her advisor, each student will elect sufficient additional courses to complete a minimum of 130 credit hours.

Justification for request

Evolution was renumbered from 2233 to 3233

Supporting Documents

Course Reviewer Comments

Key: 147

Program Change Request

Date Submitted: 03/22/18 3:11 pm

Viewing: BUS AD-MBA : Business Administration MBA

File: 186.18

Last approved: 05/16/16 11:01 am

Last edit: 03/24/18 5:06 pm

Changes proposed by: barryf

Catalog Pages Using this Program

Business Administration

Start Term

Fall **2018** ~~2016~~

Program Code

BUS AD-MBA

Department

Business and Information Technology

Title

Business Administration MBA

Program Requirements and Description

In Workflow

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

Approval Path

1. 03/23/18 12:28 am siauk: Approved for RINFSCTE Chair
2. 03/23/18 1:22 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 03/24/18 5:06 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by Barry Flachsbart (barryf)
2. Aug 15, 2014 by pantaleoa

3. Sep 30, 2014 by pantaleoa
4. Jun 18, 2015 by pantaleoa
5. Jul 22, 2015 by pantaleoa
6. May 16, 2016 by pantaleoa

Degree Requirements

In today's business environment, management requires the ability to leverage information across business functions and knowledge across internal and external boundaries. Students work in teams on comprehensive business cases, live simulations and real company assigned projects throughout the MBA program.

The Missouri S&T MBA requires a total of 36 graduate credit hours (5000-level and above) and is offered in two (2) parts: the MBA Core (21 credits) and electives (15 credits). The MBA core classes include **BUS 6121**, **BUS 6622**, **BUS 6723**, **BUS 6224**, **BUS 6425**, **BUS 6426**, ~~BUS 6121, BUS 6622, BUS 6723, BUS 6224, BUS 6425, BUS 6426,~~ and **BUS 6827**. ~~BUS 6827.~~ Courses below the 5000-level will not count toward the MBA degree, even if they are taken to fulfill prerequisites. A maximum of 6 credit hours may be taken outside the Business and Information Technology department, except where taking one of the approved Graduate Certificates listed below requires otherwise.

~~To fulfill the 15 credits hours of electives, students may choose to complete a graduate certificate from the list below with12 credit hours of the electives:Business Analytics and Data Science Business Intelligence Business Project Management Digital Media Digital Supply Chain Management Electronic and Social Commerce Enterprise Resource Planning Entrepreneurship and Technological Innovation Human-Computer Interaction and User Experience Information Systems Project Management Management and Leadership Mobile Business and Technology Military Construction Management (Offered by Engineering Management program) Military Geological Engineering (Offered by Geological Sciences and Engineering program)~~

Justification for request

Remove the list of graduate certificates from the degree requirements and put it in the description.

A graduate certificate is not required for the degree.

Thus, changes in the list won't require a DC Form, but only a minor edit of the description section of the catalog for this degree.

Supporting Documents

Course Reviewer Comments

ershenb (03/23/18 1:22 pm): Updated Start Term to Fall 2018.

barryf (03/24/18 5:06 pm): Clarified that GC is not required - in justification

Key: 186

Program Change Request

Date Submitted: 03/28/18 11:00 am

Viewing: CH ENG-MS : Chemical Engineering MS

File: 14.11

Last approved: 02/28/18 11:22 am

Last edit: 04/03/18 2:43 pm

Changes proposed by: marlene

Catalog Pages Using this Program

Chemical & Biochemical Engineering

Start Term

Fall **2018** ~~2017~~

Program Code

CH ENG-MS

Department

Chemical and Biochemical Engineering

Title

Chemical Engineering MS

Program Requirements and Description

In Workflow

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

Approval Path

1. 03/30/18 9:40 pm Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
2. 04/03/18 2:43 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/13/18 12:33 pm sraper: Approved for Engineering DSCC Chair
4. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 4, 2014 by pantaleoa
2. Oct 7, 2016 by Daniel Forciniti

(forcinit)
3. Feb 28, 2018 by Crystal Wilson (wilsoncry)

~~All students, except for those in their last semester of graduate study, need to register for 1 credit hour of CHEM ENG 5010 Seminar.~~All students, except for those in their first semester and in their last semester for PhD candidates, need to register for 1 credit hour of CHEM ENG 6015 Lecture Series. Lecture Series can be used for a total of 3 hours towards the students 6000 level requirement.

The master of science thesis program consists of a minimum of 30 semester hours, including 18-24 hours of coursework, in which CHEM ENG 5100, CHEM ENG 5110, and **CHEM ENG 5220** ~~CHEM ENG 6100~~ are required. In addition, a thesis from research that is equivalent to 6-12 credit hours in the major area must be prepared and defended.

A master of science non-thesis program consists of 30 semester hours of coursework, including **CHEM ENG 5100**, ~~CHEM ENG 5100,~~ **CHEM ENG 5150**, **CHEM ENG 5110**, **CHEM ENG 5220** **and** ~~CHEM ENG 5150, CHEM ENG 5110, CHEM ENG 5220 and~~ a minimum of 24 hours of coursework within the department. The program of study must include nine credit hours of 6000 level courses.

Justification for request

Deleted first sentence because seminar is now called lecture series with new number.

Changed Chem Eng 6100 in second paragraph to Chem Eng 5220 because non-thesis and thesis master's program should have the same courses.

Supporting Documents

Course Reviewer Comments

ershenb (04/03/18 2:43 pm): updated Start Term to Fall 2018

Key: 14

Program Change Request

Date Submitted: 04/13/18 2:35 pm

Viewing: CHEM-BA : Chemistry BA

File: 151.3

Last approved: 07/15/15 10:57 am

Last edit: 04/13/18 2:35 pm

Changes proposed by: tschuman

Catalog Pages Using this Program

Chemistry

Start Term

Fall **2018** ~~2015~~

Program Code

CHEM-BA

Department

Chemistry

Title

Chemistry BA

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/13/18 2:50 pm Philip Whitefield (pwhite): Approved for RCHEMIST Chair
2. 04/13/18 3:14 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/25/18 11:58 am Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/25/18 12:55 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Mar 18, 2014 by Lahne Black (lahne)

2. Jul 15, 2015 by pantaleoa

Bachelor of Arts
Chemistry

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM 1310	4	CHEM 1320	3
CHEM 1319	1	CHEM 1510	2
CHEM 1100	1	HISTORY 1100	3
MATH 1208	5	MATH 1221	5
ENGLISH 1120	3	Humanities Electives	3
	14		16
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM 2210	4	CHEM 2220	4
CHEM 2219	1	CHEM 2229	1
Electives	5	Elective	4
HISTORY 1200	3	ENGLISH 1160	3
Humanities Elective	3	Social Elective	3
	16		15
Junior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM 2510	4	Chem Electives (see list below)	4
PHYSICS 1111	4	PHYSICS 2111	4
PHYSICS 1119	1	PHYSICS 2119	1
STAT 3113	3	Electives	6
Elective	3		
	15		15
Senior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM 3410, or 3430, or 3420	3	CHEM 4010	1
CHEM 3419 or 3429	1	Humanities Elective	3
Humanities Elective Literature	3	Social Sciences Elective	3
Social Electives	6	Electives	6
Elective	3		
	16		13

Total Credits: 120

Students must complete a minimum of 120 credit hours for the bachelor of arts in chemistry degree. Students may have to take more than the minimum number of coursework hours to comply with the B.A. requirements due to variations in minor degree and foreign language requirements within an individual's program of study.

Elective credits include a required minor in one of the following areas: English, economics, history, philosophy, psychology, sociology, communications, speech, media, political science, music, mathematics, statistics, foreign language, computer science, biology, or art. See Undergraduate catalog for courses required for specific minor. All chemistry majors are encouraged to do research through CHEM 4099 . A total of 9 credits of a modern foreign language must also be taken as part of the electives above.

Chem Elective must be from one or more of the following: CHEM 4210 , CHEM 4297 , CHEM 4410 , CHEM 4510 , CHEM 4610 , CHEM 4619 , CHEM 4620 , CHEM 4710 , CHEM 4810 , CHEM 4819 , CHEM 4850 . This program of study allows students to design, in conjunction with their chemistry advisor, a program for many disciplines including pre-law, business, pre-dentistry, pre-veterinary medicine, as well as pre-medicine. An example of such a program is shown for pre-medical studies:

BIO SCI 1113	General Biology	3
BIO SCI 1219	General Biology Lab	2
BIO SCI 2213	Cell Biology	3
BIO SCI 2219	Cell Biology Laboratory	1
CHEM 4610	General Biochemistry	3
CHEM 4619	General Biochemistry Laboratory	2

A grade of "C" or better is required for each Chemistry course counted towards the degree.

Bachelor of Arts
Chemistry
Secondary Education Emphasis Area

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM 1310	4	CHEM 1320	3
CHEM 1319	1	CHEM 1510	2
CHEM 1100	1	~~POL SCI 1200~~	~~3~~
~~MATH 1208~~	~~5~~	~~MATH 1221~~	~~5~~
ENGLISH 1120	3	ENGLISH 1160	3
MATH 1214	**4**	**MATH 1215**	**4**
PSYCH 1101	3	**BIO SCI 1113**	**3**
EDUC 1040	**2**	**EDUC 1104**	**2**
	18		17
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM 2210	4	CHEM 2220	4
CHEM 2219	1	CHEM 2229	1
~~PHYSICS 1111~~	~~4~~	~~PHYSICS 2111~~	~~4~~

~~PHYSICS 1119~~	~~4~~	~~PHYSICS 2119~~	~~4~~
~~EDUC 1140~~	~~2~~	STAT 3113	3
~~EDUC 1104~~	~~2~~	~~EDUC 1174~~	~~2~~
~~BIO SCI 1113~~	~~3~~	~~PSYCH 3311~~	~~3~~
PHYSICS 1135	**4**	**PHYSICS 2135**	**4**
EDUC 2102 or PSYCH 2300	**3**	**EDUC 3216**	**3**
ENGLISH 1221 or 1222	**3**	**SP&M S 1185**	**3**
EDUC 1174	**2**		
	17		18

Junior Year

First Semester	Credits	Second Semester	Credits
CHEM 2510	4	CHEM 3410, or 3430, or 3420	3
~~PHYSICS 1605~~	~~3~~	CHEM 3419 or 3429	1
~~PSYCH 2300~~	~~3~~	~~SP&M S 1185~~	~~3~~
PHYSICS 1505 or GEOLOGY 1110	**3**	~~HISTORY 2530~~	~~3~~
ENGLISH 3170	**3**	~~EDUC 3280~~	~~6~~
BIO SCI 2263	**3**	~~Humanities Elective~~	~~3~~
HISTORY 1300 or 1310	3	**HISTORY 3530**	**3**
EDUC 1164	2	**EDUC 4310 or PSYCH 4310**	**3**
Humanities Elective	3	**ART 1180 or Fine art**	**3**
		POL SCI 1200	**3**
	21		16

Senior Year

First Semester	Credits	Second Semester	Credits
~~Chemistry Elective~~	~~4~~	EDUC 4298	1
CHEM 4010	1	EDUC 4299	12
~~PSYCH 4310~~	~~3~~		
~~EDUC 2216~~	~~3~~		
~~EDUC 2251~~	~~3~~		
~~Humanities Elective~~	~~3~~		
EDUC 3280	**6**		
PSYCH 3310	**3**		
PHILOS 1105	**3**		
CHEM 4610	**3**		
CHEM 4619	**2**		
	18		13
Total Credits: 138			

Students must complete a minimum of 135 credit hours for the Bachelor of Arts in Chemistry degree with a Secondary Education Emphasis Area. The degree program is intended to culminate in a Certification Recommendation for an initial Missouri teaching certification. Students

should also consult the Secondary Teacher Education Program section for Teacher Certification requirements through the Education department.

For this Bachelor of Arts degree program, the minor degree and foreign language requirements of the typical program of study are waived and there are other course substitutions in lieu of education coursework and requirements. A total of nine humanities credit hours are required to be selected from ENGLISH 1221 or ENGLISH 1222 , PHILOS 1105 , ART 1180 , MUSIC 1150 , or THEATRE 1190 .

Four hours of a Chemistry Elective must be selected from one or more of the following: CHEM 4210 , CHEM 4297 , CHEM 4410 , CHEM 4510 , CHEM 4610 , CHEM 4619 , CHEM 4620 , CHEM 4710 , CHEM 4810 , CHEM 4819 , CHEM 4850 , and CHEM 4099 . CHEM 4099 may not count for more than 3 hr credit toward the degree. All chemistry majors are encouraged to do research through CHEM 4099 .

A grade of “C” or better is required for each Chemistry course counted towards the degree.

Justification for request

The course content is required and is specified by DESE, who has restricted the degree requirements to establish certification. Recently DESE became even more restrictive and specific and added degree requirements. The changes here accommodate the degree requirements specified by DESE to permit secondary education teacher certification.

In this edit, many courses are rearranged via semester with some increase in content. All course contents were required by DESE after their review, with exception of course ordering. Course ordering is a result of establishing prerequisites.

Supporting Documents

Course Reviewer Comments

Key: 151

Program Change Request

Date Submitted: 04/03/18 4:44 pm

Viewing: CP ENG-BS : Computer Engineering BS

File: 153.47

Last approved: 09/19/17 10:37 am

Last edit: 04/03/18 8:22 pm

Changes proposed by: stanleyj

Catalog Pages Using this Program

Computer Engineering

Start Term

Fall ~~Spring~~ 2018

Program Code

CP ENG-BS

Department

Electrical and Computer Engineering

Title

Computer Engineering BS

Program Requirements and Description

In Workflow

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

Approval Path

1. 01/24/18 12:41 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 01/29/18 9:47 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 03/28/18 12:11 pm sraper: Rollback to RELECENG Chair for Engineering DSCC Chair
4. 04/03/18 10:57 am Daryl Beetner (daryl): Rollback to Initiator
5. 04/03/18 3:33 pm Brittany Parnell (ershenb): Rollback to Initiator
6. 04/03/18 8:25 pm Daryl Beetner (daryl): Approved for RELECENG Chair

7. 04/04/18 9:22 am Brittany Parnell (ershenb): Approved for CCC Secretary
8. 04/13/18 12:39 pm sraper: Approved for Engineering DSCC Chair
9. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 6, 2014 by Stanley (stanleyj)
2. Aug 13, 2014 by pantaleoa
3. Sep 21, 2015 by kleb6b
4. Apr 25, 2016 by Stanley (stanleyj)
5. Dec 1, 2016 by Stanley (stanleyj)
6. Sep 19, 2017 by Stanley (stanleyj)

Bachelor of Science Computer Engineering[1]

Entering freshmen desiring to study Computer Engineering will be admitted to the Freshman Engineering Program. They will be permitted to state a Computer Engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Freshman Engineering 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 Computer Engineering, a minimum of 128 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry, and basic ROTC courses. An average of at least two grade points per credit hour must be attained. At least two grade points per credit hour must also be attained in all courses taken in Computer Engineering.

Electrical and Computer Engineering degree programs will require ~~Each student's program of study must contain~~ a minimum of **24** ~~21~~ credit hours of **humanities/social-sciences as specified below:** ~~course work in general education and must be chosen according to the following rules:~~

- **ENGLISH 1120**
- **HISTORY 1200 or HISTORY 1300 or HISTORY 1310 or POL SCI 1200**
- **ECON 1100 or ECON 1200**
- **Technical Communication Elective: ENGL 1160 or ENGL 3560**

- **SP&M 1185**
- ~~All students are required to take one American history course, one economics course, one humanities course, and .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.Depth requirement.~~ **The remaining minimum of 9 additional** ~~Three~~ credit hours must be **three-credit hour lecture courses offered** ~~taken~~ in **disciplines in** ~~humanities or social sciences at~~ the **humanities** ~~2000-level or above~~ and **social sciences.** ~~must be selected from the approved list.~~ **Humanities courses are defined as those in: Art, English and Technical Communication, Etymology, Foreign Languages, Music, Philosophy, Speech and Media Studies, and Theatre. Social Sciences courses are defined as those in: Economics, History, Political Science, and Psychology. At least** ~~This course must have as a prerequisite~~ one of the ~~humanities or social sciences~~ courses **must be at the upper level.** ~~already taken.~~ **Upper-level H/SS courses are defined as those at the 2000-level or above, and that require as a prerequisite the successful completion of a lower-level H/SS course. Study abroad courses may count as upper-level H/SS courses, even if they do not have a prerequisite. H/SS courses numbered 2001, 3001, and 4001 (experimental courses) may also be used to complete these elective requirements.**

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

~~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.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.Any specific departmental requirements in the general studies area must be satisfied.Special topics and special problems and honors seminars are allowed only by petition to and approval by the student's department chairman.~~ The Computer Engineering program at Missouri S&T is characterized by its focus on the scientific basics of engineering and its innovative application; indeed, the underlying theme of this educational program is the application of the scientific basics to engineering practice through attention to problems and needs of the public. The necessary interrelations among the various topics, the engineering disciplines, and the other professions as they naturally come together in the solution of real world problems are emphasized as research, analysis, synthesis, and design. These interrelations are presented and discussed through classroom and laboratory instruction.

Free Electives Footnote:

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

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
FR ENG 1100[2]	1	MECH ENG 1720	3
MATH 1214[3]	4	MATH 1215[3]	4
CHEM 1310	4	PHYSICS 1135[3,4]	4
CHEM 1319	1	ECON 1100 or 1200	3
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3	Elective-Hum or Soc (any level)[5]	3
ENGLISH 1120	3		
	16		17
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
ELEC ENG 2100[3,6,7]	3	COMP ENG 2210[3,6,8]	3

ELEC ENG 2101[3,6]	1	COMP ENG 2211[3,6]	1
MATH 2222[3]	4	ELEC ENG 2120[3,7,9]	3
COMP SCI 1570[3]	3	MATH 3304[3]	3
COMP SCI 1580[3]	1	COMP SCI 1200[3]	3
PHYSICS 2135[3,4]	4	COMP SCI 1575	3
	16		16

Junior Year

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

Senior Year

First Semester	Credits	Second Semester	Credits
COMP ENG 5410 or COMP SCI 5600[3]	3	COMP ENG Elective D[3,15,16]	3
COMP ENG Elective C[3,15,16]	3	COMP ENG Elective E[3,15,16]	3
COMP ENG 4096[3,17]	1	COMP ENG 4097[3,17]	3
Elective-Hum or Soc (any level)[5]	3	Elective-Hum or Soc (upper level)[5]	3
Engineering Science Elective [11]	3	Free Elective[18]	3
COMP ENG Elective B[3,19]	3		
	16		15
Total Credits: 128			

Notes: Student must satisfy the common engineering freshman year requirements and be admitted into the department.

1	The minimum number of hours required for a degree in Computer Engineering is 128.
2	Students that transfer to Missouri S&T after their freshman year are not required to enroll in Freshman Engineering Seminars.
3	A minimum grade of "C" must be attained in MATH 1214, MATH 1215, MATH 2222, and MATH 3304, PHYSICS 1135 and PHYSICS 2135 (or their equivalents), COMP SCI 1570, COMP SCI 1580, COMP SCI 1575, COMP SCI 1200, COMP SCI 2500 or COMP SCI 3800, COMP ENG 2210, COMP ENG 2211, COMP ENG 3150, COMP ENG 3551, COMP ENG 3110, COMP ENG 5410 or COMP SCI 5600, COMP ENG 4096, and ELEC ENG 2100, ELEC ENG 2101, ELEC ENG 2120, ELEC ENG 2200, ELEC ENG 2201, and ELEC ENG 3410 and the COMP ENG electives A, B, C, D and E. Also, students may not enroll in other courses that use these courses as prerequisites until the minimum grade of "C" is attained.
4	Students may take PHYSICS 1111 and PHYSICS 1119 in place of PHYSICS 1135. Students may take PHYSICS 2111 and PHYSICS 2119 in place of PHYSICS 2135.
5	All electives must be approved by the student's advisor. Students must comply with the general education requirements with respect to selection and depth of study. These requirements are specified in the current catalog.

6	Students who drop a lecture course prior to the deadline to drop a class must also drop the corequisite lab course.
7	Students must earn a passing grade on the ELEC ENG Advancement Exam I (associated with ELEC ENG 2100) before they enroll in ELEC ENG 2120 or ELEC ENG 2200 and ELEC ENG 2201.
8	Students must earn a passing grade on the COMP ENG Advancement Exam (associated with COMP ENG 2210) before they enroll in any course with COMP ENG 2210 and COMP ENG 2211 as prerequisites.
9	Students must earn a passing grade on the ELEC ENG Advancement Exam II (associated with ELEC ENG 2120) before they enroll in ELEC ENG 3410 and ELEC ENG 3411.
10	Students must take one of the following courses: MATH 3103, MATH 3108, MATH 3109, MATH 5302, MATH 5603, MATH 5105, MATH 5106, MATH 5107, MATH 5108, MATH 4209, MATH 4211, MATH 5215, MATH 5222, MATH 5325, MATH 4530, MATH 5737, MATH 5351, MATH 5154, MATH 4096, MATH 5483, MATH 5585, STAT 5644, STAT 5346, STAT 5353.
11	Students must take MECH ENG 2340, MECH ENG 2519, MECH ENG 2527, PHYSICS 2311, PHYSICS 2401, CHEM 2210, BIO SCI 2213, or BIO SCI 2223. The following pairs of course are substitutions for any single course: CIV ENG 2200 and MECH ENG 2350, PHYSICS 2305 and PHYSICS 4311, PHYSICS 2305 and CER ENG 4240, or PHYSICS 2305 and NUC ENG 3205.
12	Students may replace STAT 3117 with STAT 3115 or STAT 5643.
13	Student must take English 3560 or English 1160. Students may replace SpMS 1185 with the ROTC sequence of Mil Army 4250 and 4500 or Mil Air 4110 and 4120
14	Comp Eng Elective A must be a 4000 or 5000-level Comp Eng, Elec Eng, or Comp Sci course with at least a 3-hour lecture component. This normally includes all Comp Eng and Elec Eng 4000 or 5000-level courses except Comp Eng or Elec Eng 4000, 4099, 4096, and 4097 or Comp Sci 5000, 4010, 5600, and 4099.
15	Comp Eng Electives C, D, and E must be 3000, 4000 or 5000-level courses from an approved list of science, mathematics, and engineering courses. In particular, this list includes all 3000, 4000 or 5000-level Comp Eng, Elec Eng and Comp Sci courses except required courses in Comp Eng, Elec Eng, and Comp Sci and except Comp Eng 4096 and 4097, Elec Eng 2800, 1002, 1003, 4096, and 4097, and Comp Sci 2002 and 4600/5600). Comp Eng Electives C, D, and E must include at least six hours of engineering or computer science courses.
16	COMP ENG Electives C, D, and E cannot include more than three hours of COMP ENG 4000, COMP ENG 4099, ELEC ENG 4000, or ELEC ENG 4099.
17	Students pursuing dual degrees in COMP ENG and ELEC ENG may take either COMP ENG 4096 or ELEC ENG 4096 and COMP ENG 4097 or ELEC ENG 4097. Students may not receive credit for both COMP ENG 4096 and ELEC ENG 4096 or COMP ENG 4097 and ELEC ENG 4097 in the same degree program.
18	Students are required to take at least three credit hours. Elec Eng 2800 level, ELEC ENG 4096, ELEC ENG 4097, COMP ENG 4096 and COMP ENG 4097 may not be used for free electives. No more than one credit hour of COMP ENG 3002 or ELEC ENG 3002 may be applied to the BS degree for free electives.
19	Comp Eng Elective B must be a 4000 or 5000 level COMP ENG course with at least a 3-hour lecture component, excluding COMP ENG 4096 and COMP ENG 4097. Students admitted to the accelerated BS/MS program must satisfy Cp Eng Electives B and C with 5xxx or 6xxx-level courses and a minimum grade of B.

A accelerated BS/MS program is optional.

Emphasis Areas for Computer Engineering

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

Computational Intelligence

Highly Recommended		
COMP ENG 5310	Computational Intelligence	3
ELEC ENG 5370	Introduction to Neural Networks and Applications	3
COMP ENG 6310	Markov Decision Processes	3
Suggested		
ELEC ENG 5330	Fuzzy Logic Control	3
COMP ENG 5450	Digital Image Processing	3
COMP ENG 5460	Machine Vision	3

Computer Architecture and Embedded Systems

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

Integrated Circuits and Logic Design

Highly Recommended		
COMP ENG 2210	Introduction to Digital Logic	3
COMP ENG 5210	Introduction To VLSI Design	3
COMP ENG 5220	Digital System Modeling	3
COMP ENG 6210	Digital Logic	3
Suggested		
ELEC ENG 3100	Electronics I	3
COMP ENG 5110	Principles of Computer Architecture	3
COMP ENG 5151	Digital Systems Design Laboratory	3
COMP ENG 5120	Digital Computer Design	3
COMP ENG 5130	Advanced Microcomputer System Design	3
COMP ENG 5510	Fault-Tolerant Digital Systems	3

Networking, Security, and Dependability

Highly Recommended		

COMP ENG 5420	Introduction to Network Security	3
COMP ENG 5430	Wireless Networks	3
COMP ENG 6440	Network Performance Analysis	3
COMP ENG 6510	Resilient Networks	3
Suggested		
COMP ENG 5510	Fault-Tolerant Digital Systems	3

Accelerated BS/MS Program Option for EE and CpE Majors

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

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

The BS-degree requirements are modified for admitted students such that EE Electives D and E or CpE Electives B and C will be satisfied by six-credit-hours of 5000-level or above ECE coursework. The courses must be identified as dual-counted courses and must be completed with a B or better. These six hours of coursework will be taken as undergraduate credit, must be approved by the academic advisor, and may not be undergraduate research, special problems, or transfer courses. (A co-listed course can only apply for these undergraduate requirements if it is under an EE or CpE registration. Note that the choice of EE or CpE registration may effect how a course can apply within an MS program.) Other courses for the MS degree program must be identified as graduate credit when taken. All other MS degree requirements are not changed and the MS degree must be for the thesis option. The program may be combined with existing honors research and emphasis area options. Admitted students will have both undergraduate and graduate records in the Registrar's Office. Upon separate completion of requirements, the BS degree would be awarded followed by the MS degree at a later semester, or the BS and MS degrees may be awarded simultaneously at the same semester.

To be eligible for the accelerated BS/MS ECE program, a EE or CpE undergraduate must be at or beyond the junior level with a minimum of 60 credit hours and must have completed 18 credit hours of EE and/or CpE courses at Missouri S&T with at least a 3.50 GPA in the ECE courses. To be admitted, the student must complete the program application and must have the recommendation of an ECE faculty member who agrees to serve as the graduate thesis advisor. The Graduate Form 1 must be completed no later than the beginning of the semester after the dual-counted courses are completed. Until completing their BS degree, students must fill out a form each semester indicating which courses will be completed for graduate credit. To remain in the program, the student must maintain good standing within the undergraduate EE or CpE program and must maintain continuous enrollment at Missouri S&T. If the student exits the program before completion of the MS degree requirements or fails to maintain continuous enrollment at Missouri S&T, the dual-counted courses may not apply toward graduate requirements in the event of future readmission. The student is responsible for checking on how dual-enrollment status and graduate coursework will affect scholarships and other financial aid. International students should check with international affairs during completion of an accelerated BS/MS to ensure immigration status will be maintained throughout the program.

~~Computational Intelligence Computer Architecture and Embedded Systems Integrated Circuits and Logic Design Networking, Security, and Dependability~~

Justification for request
Elec Eng 3411 has been deleted from footnote 3 because Elec Eng 3411 is no longer offered.

The description of the humanity and social science course requirements are being updated to be consistent with the College of Engineering and Computing requirements effective Fall 2018. Note that no course changes have been made-only the description of the humanity and social science course requirements has been changed.

The curriculum change to create and accelerated BS/MS program encourages Missouri S&T students to obtain both BS and MS degrees at Missouri S&T. A major financial and time-to-completion incentive is the use of six hours of ECE coursework to satisfy both BS and MS requirements. Graduate research can begin sooner and greater flexibility in course selection is provided.
Similar programs for simultaneous work on BS and MS degrees for EE and CpE majors are available at peer institutions and other prominent institutions including Georgia Tech, Worcester, Carnegie Mellon, The University of Texas at Austin, University of Illinois, and University of Florida.U MSL, UMKC, and UMC have similar programs which allow dual counting of credits between BS and MS programs to accelerate time to degree completion. The proposal should be considered as a group with the companion EE proposal. This program change has been approved by the ECE Faculty and endorsed by the Graduate Faculty Council.
Supporting Documents
Course Reviewer Comments
daryl (01/24/18 12:40 pm): Files summarizing change are attached.
ershenb (01/26/18 3:23 pm): Attached the supporting documents "ECE Combined BS MS" and "ECE Combined BS May 2017" per the request of Dr. Beetner.
ershenb (01/26/18 3:34 pm): .
ershenb (01/29/18 9:47 am): updated the start term to Fall 2018
sraper (03/28/18 12:11 pm): Rollback: To make changes to dual enrollment and HSS language
daryl (04/03/18 10:57 am): Rollback: to make changes
ershenb (04/03/18 3:33 pm): Rollback: Rollback out of curriculum workflow per the request of Dr. Beetner for Dr.Joe Stanley to make additional edits.
daryl (04/03/18 8:08 pm): Modified justification
daryl (04/03/18 8:19 pm): Added revised description of accelerated BS/MS program.
daryl (04/03/18 8:22 pm): Additional changes to description.

Key: 153

ATTACHMENT FOR PROGRAM CHANGE
Combined BS/MS ECE Program Option for EE and CpE Majors
Electrical & Computer Engineering Dept., Missouri University of Science & Technology

Summary
A new option is proposed for the Electrical and Computer Engineering majors at Missouri S&T. Juniors or seniors in electrical engineering or computer engineering may apply for acceptance to a "Combined BS/MS Program" in which they work toward both undergraduate and masters (BS EE and MS EE, BS CpE and MS CpE, BS EE and MS CpE, or BS CpE and MS EE) simultaneously. Also, six credit hours of ECE coursework (5000-level or above, identified as undergraduate credit) will be used to satisfy both BS and MS requirements. Upon separate completion of requirements, the BS degree would be awarded followed by the MS degree at a later semester or both BS and MS degrees awarded simultaneously at the same semester. The program may be combined with existing honors research and emphasis area options for undergraduates.

Before Curriculum
Separate BS EE (all emphasis options), MS, EE, BS CpE, and MS CpE are currently available.
No combined BS/MS program option currently exists.

After Curriculum
A new "Combined BS/MS Program" option is created that will modify requirements for the BS EE (all emphasis options), MS EE, BS CpE, and MS CpE.
Combined BS/MS Description
Electrical engineering or computer engineering undergraduates in ECE at Missouri S&T may opt to apply for a combined BS/MS ECE program. Upon separate completion of requirements, the BS degree would be awarded followed by the MS degree at a later semester or both BS and MS degrees awarded simultaneously at the same semester. The degrees may be BS EE and MS EE, BS CpE and MS CpE, BS EE and MS CpE, or BS CpE and MS EE. The benefits of the program for admitted students are:

- Undergraduate and graduate courses may be chosen with greater flexibility,
- Dual-enrollment status is automatically granted,
- Six hours of 5000-level or above ECE coursework may apply to both the BS and MS requirements,
- The dual-counted credit will be taken as undergraduate courses,
- Other graduate credit courses may be taken anytime after entering the program, and
- Work on a thesis project may begin before the BS requirements are completed.

The BS-degree requirements are modified for admitted students such that EE Electives D and E or CpE Electives B and C will be satisfied by six-credit-hours of 5000-level or above ECE coursework that are identified as dual-counted courses and that are completed with a B or better. These six hours of coursework will be taken as undergraduate credit, must be approved by the academic advisor, and may not be undergraduate research, special problems, or transfer courses. (A co-listed course can only apply for these undergraduate requirements if it is under an EE or CpE registration. Note that the choice of EE or CpE registration may effect how a course can apply within an MS program.) Other courses for the MS degree program must be identified as graduate credit when taken. All other MS degree requirements are not changed and the MS degree must be for the thesis option. The program may be combined with existing honors research and emphasis area options. Admitted students will have both undergraduate and graduate records in the Registrar's Office.

To be eligible for the combined BS/MS ECE program, a EE or CpE undergraduate must be at or beyond the junior level with a minimum of 60 credit hours and must have completed 18 credit hours of EE and/or CpE courses at Missouri S&T with at least a 3.50 GPA for ECE courses. To be admitted, the student must

complete the program application and must have the recommendation of an ECE faculty member who agrees to serve as the graduate thesis advisor. The Graduate Form 1 must be completed no later than the beginning of the semester after the dual-counted courses are completed. To remain in the program, the student must maintain good standing within the undergraduate EE or CpE program and must maintain continuous enrollment at Missouri S&T. If the student exits the program before completion of the MS degree requirements or fails to maintain continuous enrollment at Missouri S&T, the dual-counted courses may not apply toward graduate requirements in the event of future readmission. The student is responsible for checking on how dual-enrollment status and graduate coursework will affect scholarships and other financial aid.

(The BS EE, BS CpE, MS EE, and MS CpE program documents will be updated to reflect this option.)

Rationale for Change

This curriculum change encourages Missouri S&T students to obtain both BS and MS degrees at Missouri S&T. A major financial and time-to-completion incentive is the use of six hours of ECE coursework to satisfy both BS and MS requirements. Also, the graduate research can begin sooner and greater flexibility in course selection is provided. The program option is a benefit for existing Missouri S&T undergraduates and is a recruiting tool for both the undergraduate and masters ECE programs.

Similar programs for simultaneous work on BS and MS degrees for EE and CpE majors are available at peer institutions and other prominent institutions including Georgia Tech, Worcester, Carnegie Mellon, The University of Texas at Austin, University of Illinois, and University of Florida.

Program Change Request

Date Submitted: 04/03/18 1:12 pm

Viewing: EL ENG-BS : Electrical Engineering BS

File: 155.40

Last approved: 04/25/16 2:12 pm

Last edit: 04/13/18 12:39 pm

Changes proposed by: watkins

Catalog Pages Using this Program

Electrical Engineering

Start Term

Fall **2018** ~~2016~~

Program Code

EL ENG-BS

Department

Electrical and Computer Engineering

Title

Electrical Engineering BS

Program Requirements and Description

In Workflow

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

Approval Path

1. 01/24/18 12:42 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 01/29/18 9:46 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 03/28/18 12:12 pm sraper: Rollback to RELECENG Chair for Engineering DSCC Chair
4. 04/03/18 10:57 am Daryl Beetner (daryl): Rollback to Initiator
5. 04/03/18 8:36 pm Daryl Beetner (daryl): Approved for RELECENG Chair
6. 04/04/18 9:26 am Brittany Parnell (ershenb): Approved for CCC Secretary

7. 04/13/18 12:39 pm sraper: Approved for Engineering DSCC Chair
8. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 6, 2014 by Watkins (watkins)
2. Aug 13, 2014 by pantaleoa
3. Apr 25, 2016 by Watkins (watkins)

Bachelor of Science Electrical Engineering[1]

Entering freshmen desiring to study Electrical Engineering will be admitted to the Freshman Engineering Program. They will be permitted to state a Electrical Engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Freshman Engineering 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 Electrical 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 Electrical Engineering.

Electrical and Computer Engineering degree programs will require ~~Each student's program of study must contain~~ a minimum of **24** ~~21~~ credit hours of **humanities/social-sciences as specified below:** ~~course work in general education and must be chosen according to the following rules:~~

- **ENGLISH 1120**
- **HISTORY 1200 or HISTORY 1300 or HISTORY 1310 or POL SCI 1200**
- **ECON 1100 or ECON 1200**
- **Technical Communication Elective: ENGL 1160 or ENGL 3560**
- **SP&M 1185**
- ~~All students are required to take one American history course, one economics course, one humanities or social sciences 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 or social sciences course must be selected from the approved lists for art, English, foreign languages, music, philosophy, speech and media studies, or theater.Depth requirement.~~ **The remaining minimum of 9 additional** ~~Three~~ credit hours must be **three-credit hour lecture courses offered** ~~taken~~ in **disciplines in** ~~humanities or social sciences at~~ the **humanities** ~~2000-level or above~~ and **social sciences.** ~~must be selected from the approved list.~~ **Humanities courses are defined as those in: Art, English and Technical Communication, Etymology, Foreign Languages, Music, Philosophy, Speech and Media Studies, and Theatre. Social Sciences courses are defined as those in: Economics, History, Political Science, and Psychology. At least** ~~This course~~

~~must have as a prerequisite~~ one of the ~~humanities or social sciences~~ courses **must be at the upper level.** ~~already taken.~~ **Upper-level H/SS courses are defined as those at the 2000-level or above, and that require as a prerequisite the successful completion of a lower-level H/SS course. Study abroad courses may count as upper-level H/SS courses, even if they do not have a prerequisite. H/SS courses numbered 2001, 3001, and 4001 (experimental courses) may also be used to complete these elective requirements.**

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

~~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.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.Any specific departmental requirements in the general studies area must be satisfied.Special topics and special problems and honors seminars are allowed only by petition to and approval by the student's department chairman.~~ The Electrical 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.

Free Electives Footnote:

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

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
FR ENG 1100[2]	1	MECH ENG 1720	3
CHEM 1310	4	MATH 1215[3]	4
CHEM 1319	1	PHYSICS 1135[3,4]	4
MATH 1214[3]	4	ECON 1100 or 1200	3
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3	Elective-Hum or Soc Sci (any level)[5]	3
ENGLISH 1120	3		
	16		17
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
ELEC ENG 2100[3,6,7]	3	ELEC ENG 2200[3,6,7,10]	3
ELEC ENG 2101[3,6]	1	ELEC ENG 2201[3,6,7]	1
MATH 2222[3]	4	ELEC ENG 2120[3,7,9]	3
COMP ENG 2210[3,6,8]	3	MATH 3304[3]	3
COMP ENG 2211[3,6]	1	Engineering Science Elective[11]	3
PHYSICS 2135[3,4]	4	COMP SCI 1570	3
		COMP SCI 1580[12]	1
	16		17

Junior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
ELEC ENG 3100[3,6,9,10]	3	ELEC ENG 3600[3,9]	4
ELEC ENG 3101[3,6,9,10]	1	El Eng Elective A[10,14,19]	3
ELEC ENG 3320	3	ELEC ENG 3430	3
ELEC ENG 3321	1	ELEC ENG 3431	1
SP&M S 1185[13]	3	STAT 3117[12]	3
MATH 3108	3	Communication Elective [13]	3
	14		17
Senior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
El Eng Power Elective[3,6,9,15]	3	El Eng Elective C[10,14]	3
El Eng Power Elective Lab[3,6,9,15]	1	El Eng Elective E[17,19]	3
El Eng Elective B[10,14]	3	ELEC ENG 4097	3
El Eng Elective D[10,16,19]	3	Elective-Hum or Soc Sci (upper level)[5]	3
ELEC ENG 4096[3]	1	Free Elective[18]	3
Free Elective[18]	2		
Elective-Hum or Soc Sci (any level)[5]	3		
	16		15
Total Credits: 128			

Note: Student must satisfy the common engineering freshman year requirements and be admitted into the department. See Freshman Engineering.

1	The minimum number of hours required for a degree in Electrical Engineering is 128.
2	Students that transfer after their freshman year are not required to enroll in FR ENG 1100.
3	A minimum grade of "C" must be attained in MATH 1214, MATH 1215, MATH 2222, and MATH 3304, PHYSICS 1135 and PHYSICS 2135 (or their equivalents), ELEC ENG 2100, ELEC ENG 2101, ELEC ENG 2120, ELEC ENG 2200, ELEC ENG 2201, ELEC ENG 3320, ELEC ENG 3321, ELEC ENG 3430, ELEC ENG 3431, ELEC ENG 3100, ELEC ENG 3101, and ELEC ENG 3600, the ELEC ENG power elective (ELEC ENG 3500 and ELEC ENG 3501 or ELEC ENG 3540 and ELEC ENG 3541), ELEC ENG 4096 and COMP ENG 2210 and COMP ENG 2211. Also, students may not enroll in other courses that use these courses as prerequisites until the minimum grade of "C" is attained.
4	Students may take PHYSICS 1111 and PHYSICS 1119 in place of PHYSICS 1135. Students may take PHYSICS 2111 and PHYSICS 2119 in place of PHYSICS 2135.
5	All electives must be approved by the student's advisor. Students must comply with the general education requirements with respect to selection and depth of study. These requirements are specified in the current catalog.
6	Students who drop a lecture course prior to the last week to drop a class must also drop the corequisite lab.
7	Students must earn a passing grade on the ELEC ENG Advancement Exam I (associated with ELEC ENG 2100) before they enroll in ELEC ENG 2120 or ELEC ENG 2200 and ELEC ENG 2201.
8	Students must earn a passing grade on the COMP ENG Advancement Exam (associated with COMP ENG 2210) before they enroll in any course with COMP ENG 2210 and/or COMP ENG 2211 as prerequisites.
9	Students must earn a passing grade on the ELEC ENG Advancement Exam II (associated with ELEC ENG 2120) before they

	enroll in ELEC ENG 3500, ELEC ENG 3540, ELEC ENG 3501, ELEC ENG 3541, ELEC ENG 3320,ELEC ENG 3321, ELEC ENG 3430,ELEC ENG 3431, ELEC ENG 3100, ELEC ENG 3101, or ELEC ENG 3600, or other courses with ELEC ENG 2120 as a prerequisite.
10	Students must earn a passing grade on the ELEC ENG Advancement Exam III (associated with ELEC ENG 2200) before they enroll in ELEC ENG 3100 and ELEC ENG 3101 or other courses with ELEC ENG 2200 as a prerequisite.
11	Students must take MECH ENG 2340, MECH ENG 2519, MECH ENG 2527, PHYSICS 2305, PHYSICS 2311, PHYSICS 2401, NUC ENG 3103, CHEM 2210, BIO SCI 2213, or BIO SCI 2223. The following pairs of course are substitutions: CIV ENG 2200 and MECH ENG 2350 or ENG MGT 2110 and ENG MGT 3310.
12	Students may replace STAT 3117 with STAT 3115 or STAT 5643. Students may replace COMP SCI 1580 with ELEC ENG 3001 Circuits and Systems Laboratory.
13	Students must take English 3560 or English 1160. Students may replace SpMS 1185 with the ROTC sequence of Mil Army 4250 and 4500 or Mil Air 4110 and 4120.
14	ELEC ENG Electives A, B, and C must be chosen from ELEC ENG 56XX, ELEC ENG 3500, ELEC ENG 3540, ELEC ENG 3410, ELEC ENG 3250, ELEC ENG 3340, ELEC ENG 3440, ELEC ENG 3120, and COMP ENG 3150. Only one ELEC ENG 56XX course may be used.
15	The ELEC ENG Power Elective may be satisfied with ELEC ENG 3500 and ELEC ENG 3501 or ELEC ENG 3540 and ELEC ENG 3541.
16	ELEC ENG Elective D must be a 4XXX-level or above ELEC ENG or COMP ENG course with at least a 3-hour lecture component. ELEC ENG 4000 , ELEC ENG 5000, COMP ENG 4000, COMP ENG 5000, ELEC ENG 4099, COMP ENG 4099, ELEC ENG 4096, COMP ENG 4096, ELEC ENG 4097, COMP ENG 4097, ELEC ENG 5070, COMP ENG 5070, ELEC ENG 58XX, and COMP ENG 58XX may not be used for Elective D.
17	ELEC ENG Elective E may be any 3XXX-level or above ELEC ENG or COMP ENG course except ELEC ENG 3002, ELEC ENG 38XX, ELEC ENG 4096, ELEC ENG 4097, and ELEC ENG 5070 and COMP ENG 3002, COMP ENG 38XX, COMP ENG 4000, COMP ENG 4096, COMP ENG 4097, and COMP ENG 5070.
18	Students are required to take five hours of free elective in consultation with their academic advisors. Credits that do not count toward this requirement are deficiency courses (such as algebra and trigonometry) and extra credits from courses meeting other requirements. Any courses outside of engineering and science must be at least three credit hours. ELEC ENG 28XX, ELEC ENG 38XX, ELEC ENG 4096, ELEC ENG 4097, COMP ENG 28XX, COMP ENG 38XX, COMP ENG 4096 and COMP ENG 4097 may not be used for free electives. No more than one credit hour of ELEC ENG 3002 or COMP ENG 3002 may be applied to the BS degree for free electives.
19	Students that pursue an optional degree emphasis area have restricted options for El Eng Electives A, D, and E. Students admitted to the accelerated BS/MS program must satisfy El Eng Electives D and E with 5xxx or 6xxx-level courses and a minimum grade of B.

All Electrical Engineering students are encouraged to take the fundamentals of Engineering Examination prior to graduation. It is the first step toward becoming a registered professional engineer.

An accelerated BS/MS program and a formal emphasis in circuits and electronics, optics and devices, controls and systems, communications and signal processing, power and energy, electromagnetics, or computer engineering are optional.

Emphasis Areas for Electrical Engineering

Circuits and Electronics, Communications and Signal Processing, Computer Engineering, Controls and Systems, Electromagnetics, Optics and Devices, Power and Energy

A declared emphasis area is not required. A student may choose to obtain an Electrical Engineering degree without a formal emphasis or may choose to obtain an Electrical Engineering degree with a declared emphasis in one or more of the emphasis areas of electrical

engineering. A major change request is required to add the emphasis area option to the degree program.

For students who seek an Electrical Engineering degree without a formal emphasis, these emphasis areas may guide the choice of their ELEC ENG Electives A, B, C, D, and E as well as their free electives. Students should consult with their advisors on such course selections.

For students who seek an Electrical Engineering degree with a declared emphasis, courses in the declared emphasis area will be applied to ELEC ENG Electives A, D, and E in the degree requirements. For students who choose to have multiple emphasis areas, the additional courses will apply to ELEC ENG Elective B or C and free elective requirements. Students should seek guidance from their advisors on emphasis areas and on courses that are relevant to more than one emphasis area. Students may have an emphasis area or emphasis areas listed on their transcript by completing three three-credit-hour courses in electrical and computer engineering from the designated lists with at least one of the courses being at the 4XXX-level or above. This requirement will be satisfied by completing the relevant ABC Elective course, a 4XXX-level or above course for Elective D, and another 3XXX-level or above course for Elective E from the designated listing. The required ELEC ENG courses ELEC ENG 3320, ELEC ENG 3430, ELEC ENG 3100, and ELEC ENG 3600 and the course used to satisfy the power requirement (ELEC ENG 3500 or ELEC ENG 3540) may not be used to meet the three course requirement. Transfer courses do not apply to emphasis areas. A co-listed course may count toward both areas. Experimental courses ELEC ENG 3001, ELEC ENG 4001, ELEC ENG 5001, COMP ENG 3001, COMP ENG 4001, or COMP ENG 5001 require departmental approval to apply toward an emphasis area.

Circuits and Electronics		
ELEC ENG 3120	Electronics II	3
ELEC ENG 41XX and ELEC ENG 51XX Courses		
Communications and Signal Processing		
ELEC ENG 3410	Digital Signal Processing	3
ELEC ENG 3440	Digital Communications II	3
ELEC ENG 44XX and ELEC ENG 54XX Courses		
Computer Engineering		
ELEC ENG 3410, COMP ENG 3XXX-level or above Courses (Excluding COMP ENG 3000, COMP ENG 4000, COMP ENG 5000, COMP ENG 3002, COMP ENG 4096, COMP ENG 4097, and COMP ENG 5070) See the COMP ENG degree program for details on COMP ENG areas.		
Controls and Systems		
ELEC ENG 3340	Basic Programmable Logic Controllers	3
ELEC ENG 43XX and ELEC ENG 53XX Courses		
Electromagnetics		
ELEC ENG 46XX and ELEC ENG 56XX Courses		
Optics and Devices		
ELEC ENG 3250	Electronic And Photonic Devices	3
ELEC ENG 42XX and ELEC ENG 52XX Courses		
Power and Energy		
ELEC ENG 3500	Electromechanics	3
ELEC ENG 3540	Power System Design And Analysis	3
ELEC ENG 5150	Photovoltaic Systems Engineering	3
ELEC ENG 5520	Power Electronics	3
ELEC ENG 5521	Power Electronics Laboratory	2
ELEC ENG 45XX and ELEC ENG 55XX Courses		

Accelerated BS/MS Program Option for EE and CpE Majors

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

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

The BS-degree requirements are modified for admitted students such that EE Electives D and E or CpE Electives B and C will be satisfied by six-credit-hours of 5000-level or above ECE coursework. The courses must be identified as dual-counted courses and must be completed with a B or better. These six hours of coursework will be taken as undergraduate credit, must be approved by the academic advisor, and may not be undergraduate research, special problems, or transfer courses. (A co-listed course can only apply for these undergraduate requirements if it is under an EE or CpE registration. Note that the choice of EE or CpE registration may effect how a course can apply within an MS program.) Other courses for the MS degree program must be identified as graduate credit when taken. All other MS degree requirements are not changed and the MS degree must be for the thesis option. The program may be combined with existing honors research and emphasis area options. Admitted students will have both undergraduate and graduate records in the Registrar's Office. Upon separate completion of requirements, the BS degree would be awarded followed by the MS degree at a later semester, or the BS and MS degrees may be awarded simultaneously at the same semester.

To be eligible for the accelerated BS/MS ECE program, a EE or CpE undergraduate must be at or beyond the junior level with a minimum of 60 credit hours and must have completed 18 credit hours of EE and/or CpE courses at Missouri S&T with at least a 3.50 GPA in the ECE courses. To be admitted, the student must complete the program application and must have the recommendation of an ECE faculty member who agrees to serve as the graduate thesis advisor. The Graduate Form 1 must be completed no later than the beginning of the semester after the dual-counted courses are completed. Until completing their BS degree, students must fill out a form each semester indicating which courses will be completed for graduate credit. To remain in the program, the student must maintain good standing within the undergraduate EE or CpE program and must maintain continuous enrollment at Missouri S&T. If the student exits the program before completion of the MS degree requirements or fails to maintain continuous enrollment at Missouri S&T, the dual-counted courses may not apply toward graduate requirements in the event of future readmission. The student is responsible for checking on how dual-enrollment status and graduate coursework will affect scholarships and other financial aid. International students should check with international affairs during completion of an accelerated BS/MS to ensure immigration status will be maintained throughout the program.

Justification for request
H/SS requirements were modified to reflect the new College of Engineering requirements for H/SS courses.

An accelerated BS/MS program was added to the curriculum. This program encourages Missouri S&T students to obtain both BS and MS degrees at Missouri S&T. A major financial and time-to-completion incentive is the use of six hours of ECE coursework to satisfy both BS and MS requirements. Graduate research can begin sooner and greater flexibility in course selection is provided. Similar programs for

simultaneous work on BS and MS degrees for EE and CpE majors are available at peer institutions and other prominent institutions including Georgia Tech, Worcester, Carnegie Mellon, The University of Texas at Austin, University of Illinois, and University of Florida. UMSL, UMKC, and UMC have similar programs which allow dual counting of credits between BS and MS programs to accelerate time to degree completion. This program change was approved by the ECE faculty. An overview of the program has been reviewed and endorsed by the Graduate Faculty Council.

The proposal should be considered as a group with the companion CpE proposal.
Supporting Documents
Course Reviewer Comments
daryl (01/24/18 12:41 pm): Files summarizing degree change attached.
ershenb (01/26/18 3:34 pm): Attached the supporting documents "ECE Combined BS MS" and "ECE Combined BS MS May 2017" attachment, per the request of Dr. Beetner.
ershenb (01/29/18 9:48 am): updated Start Term to Fall 2018
sraper (03/28/18 12:12 pm): Rollback: to make changes to dual enrollment and HSS.
daryl (04/03/18 10:57 am): Rollback: To make changes
daryl (04/03/18 8:35 pm): Modified humanities requirement and accelerated BS/MS program wording.
sraper (04/13/18 12:39 pm): DSCC members note "effect" should be "affect" but I cannot find it.

Key: 155

Program Change Request

Date Submitted: 04/06/18 5:07 pm

Viewing: ENG MG-BS : Engineering Management BS

File: 44.26

Last approved: 06/27/16 9:25 am

Last edit: 04/16/18 9:40 am

Changes proposed by: sraper

Catalog Pages Using this Program

Engineering Management

Start Term

Fall **2018** ~~2016~~

Program Code

ENG MG-BS

Department

Engineering Management and Systems Engineering

Title

Engineering Management BS

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/06/18 5:16 pm Suzanna Long (longsuz): Approved for RENGMNGT Chair
2. 04/12/18 9:08 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/23/18 1:53 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 8:58 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Sep 24, 2013 by Lahne Black (lahne)
2. Apr 28, 2014 by sraper

3. Jun 12, 2014 by pantaleoa
4. Nov 18, 2014 by kleb6b
5. Jan 30, 2015 by sraper
6. Jul 20, 2015 by pantaleoa
7. Jun 27, 2016 by sraper

Bachelor of Science
Engineering Management

Entering freshmen intending to study engineering management are admitted to the Freshman Engineering Program. They may, however, state an engineering management preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Freshman Engineering 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.

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

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

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

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

Free Electives Footnote:

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

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
FR ENG 1100	1	MECH ENG 1720	3
CHEM 1310[1]	4	MATH 1215[1]	4
CHEM 1319	1	PHYSICS 1135[1]	4
CHEM 1100	1	ECON 1100 or 1200	3
MATH 1214[1]	4	COMP SCI 1972, or 1570, or 1971[1]	2
ENGLISH 1120	3	COMP SCI 1982 or 1981	1
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3		
	17		17
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
MATH 2222[1]	4	MATH 3304[1]	3
PHYSICS 2135[1]	4	STAT 3115 or 3117[1]	3
CIV ENG 2200[1]	3	ENG MGT 2110[1]	3
ENG MGT 1210[1]	2	ENG MGT 2211[1]	3
ENG MGT 2310[1]	3	MECH ENG 2350	2
		PSYCH 1101	3
	16		17
Junior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
ENG MGT 3310[1]	3	ENG MGT 4710[1]	3
CIV ENG 2210	3	MECH ENG 2527	3
CIV ENG 2211	1	ELEC ENG 2800	3
ENG MGT 3510[1]	3	ENGLISH 3560 or 1160	3
SP&M S 1185	3	ENG MGT 3320[1]	3
Humanities and Social Sciences[2]	3		
	16		15
Senior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
Emphasis Area Required Course	3	ENG MGT Technical Elective	3
Emphasis Area Required Course	3	ENG MGT Technical Elective	3
Emphasis Area Required Course	3	ENG MGT 4907[1]	3
ENG MGT 4110[1]	3	Upper Level Hum/SS[2]	3
ENG MGT Technical Elective	3	Free Elective[3]	3

	15	15
Total Credits: 128		

Example Emphasis Area Programs for Engineering Management Students

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

Management of Technology

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

Industrial Engineering

ENG MGT 4310	Materials Handling and Plant Layout	3
ENG MGT 4330	Human Factors	3
ENG MGT 5410	Industrial System Simulation	3
ENG MGT 5414	Introduction To Operations Research	3
ENG MGT Technical Electives (in consultation with your advisor)		6

General

Engineering Area Courses (Engineering Discipline)	15
ENG MGT-Technical Elective (in consultation with your advisor)	3

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

1	Must have a grade of "C" or better in these courses for graduation. MATH 1208 and MATH 1221 may be substituted for MATH 1214 and MATH 1215, respectively.
2	Humanities and social science electives must be approved by the student's advisor. Students must comply with the general education requirements with respect to selection and depth of study. These requirements are specified in the current catalog.
3	Each student is required to take three hours of free electives in consultation with his/her academic advisor. Credits which do not count towards this requirement are deficiency courses (such as algebra and trigonometry), and extra credits in required courses. Any courses outside of engineering and science must be at least three credit hours.
4	Students are required to select an emphasis area and maintain a minimum 2.0 GPA for these courses.
5	All engineering management students must take the fundamentals of engineering (FE) exam prior to graduation. A passing grade on this examination is not required to earn a B.S. degree. This requirement is part of the Missouri S&T assessment process as described in assessment requirements found elsewhere in this catalog.

Justification for request

Changes based on faculty vote 04/06/2018.

Supporting Documents

Course Reviewer Comments

ershenb (04/12/18 9:06 am): Fixed technical error on Freshman Year, 2nd semester: Comp Sci 1570 and 1971 were listed as plain text and not hyperlinked.

ershenb (04/12/18 9:08 am): updated Start Term to Fall 2018

sraper (04/16/18 9:40 am): grammar edits.

Key: 44

Program Change Request

Date Submitted: 04/06/18 3:13 pm

Viewing: ENG MG-MS : Engineering Management MS

File: 46.9

Last approved: 04/19/16 3:53 pm

Last edit: 04/11/18 3:21 pm

Changes proposed by: johsarah

Catalog Pages Using this Program

Engineering Management

Start Term

Fall **2018** ~~2016~~

Program Code

ENG MG-MS

Department

Engineering Management and Systems Engineering

Title

Engineering Management MS

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/06/18 5:16 pm Suzanna Long (longsuz): Approved for RENGMNGT Chair
2. 04/11/18 3:21 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/23/18 1:53 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 9:02 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Jun 12, 2014 by pantaleoa
2. Jun 19, 2015 by sraper

3. Jul 23, 2015 by pantaleoa
4. Apr 19, 2016 by pantaleoa

The M.S. degree program is offered on the Rolla campus and several locations including the Missouri S&T Global - St. Louis, Fort Leonard Wood (restricted to Engineer Captain's Career Course), and by distance education throughout the United States and selected international locations. Distance course lectures are archived upon completion of the lecture and all lectures are available to students through streaming video during the semester for review. These courses can be reached from anywhere at any time. It is feasible to obtain a Missouri S&T non-thesis M.S. degree regardless of your location.

The M.S. non-thesis program requires completion of at least 10 three-credit hour courses approved by the academic advisor. The M.S. with thesis option requires thirty credit hours including the thesis. All students are required to take the following:

Core Courses

ENG MGT 5111	Management for Engineers and Scientists
ENG MGT 5320	Project Management
ENG MGT 5412	Operations Management Science
ENG MGT 6211	Advanced Financial Management

Students are then encouraged to identify an emphasis area depending on their interests and to choose available courses from the selected area. However, courses can be chosen from more than one emphasis area. Students have the option to take up to two out-of-department elective courses.

Students must submit a typed Form I to the EMSE graduate office by the beginning of the semester of their 15th credit hour. Links to forms are available at: http://emgt.mst.edu/currentstudents/formsdeadlines.html. Thesis students cannot register for Graduate Research (**ENG MGT 6099**) ~~ENG MGT 6099)~~ until their Form I is on file. If students vary from Form I, they must file a Form I-A. Non-thesis students must take three 6000-level courses. Thesis students must take two 6000-level courses (in addition to **ENG MGT 6099**). ~~ENG MGT 6099).~~ Students must meet all requirements for graduation as specified in the Graduate Catalog for engineering management. A graduate student already holding or completing a master's degree may obtain a second M.S. in engineering management by completing at least an additional 24 **credit hours** ~~credits~~ of work.

Some recent master thesis titles include:

- Impacting Co-Worker Trust Toward Persons with Disabilities
- Intelligent Technical Analysis Using Neural Networks and Fuzzy Logic
- Applying the Six Sigma Methodology to Improve the Admissions Process at Missouri S&T
- Strategic Inventory Allocation for Vehicle Rental Agencies
- Design and Development of an Interactive Web-Integrated Flexible Manufacturing Cell Control System
- Investigations in the Design of Products and Factories for End-of-Life Disassembly
- Warranty Cost Prediction Using Mahalanobis Distance
- Automotive Braking System Simulation and Optimization

Justification for request

Supporting Documents

Course Reviewer Comments

ershenb (04/11/18 3:21 pm): Updated Start Term to Fall 2018.

Key: 46

Program Change Request

Date Submitted: 04/06/18 4:55 pm

Viewing: ENG MGT-MI : Engineering Management Minor

File: 45.8

Last approved: 07/20/15 1:51 pm

Last edit: 04/10/18 4:30 pm

Changes proposed by: sraper

Catalog Pages Using this Program

Engineering Management

Start Term

Fall **2018** ~~2015~~

Program Code

ENG MGT-MI

Department

Engineering Management and Systems Engineering

Title

Engineering Management Minor

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/06/18 5:16 pm Suzanna Long (longsuz): Approved for RENGMNGT Chair
2. 04/10/18 4:30 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/23/18 1:53 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 9:04 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by sraper
2. Jul 20, 2015 by pantaleoa

Minor in Engineering Management

A student who receives a bachelor of science degree in an accredited engineering program **or Computer Science** from Missouri S&T may receive a minor in engineering management by completing 15 hours of the courses listed below.

ENG MGT 2110	Managing Engineering And Technology	3
ENG MGT 2211	Engineering Accounting and Finance	3
ENG MGT 3310	Operations and Production Management	3
Eng Mgt 3000, 4000, or 5000-level course work chosen in consultation with minor advisor.		6
Total Credits		15

Justification for request

Included Computer Science as eligible S&T Program that could receive the minor in Engineering Management. Approved by EMSE Faculty 04/06/2018

Supporting Documents

Course Reviewer Comments

ershenb (04/10/18 4:30 pm): updated Start Term to Fall 2018

Key: 45

Program Change Request

Date Submitted: 03/23/18 1:07 pm

Viewing: FR ENG-UN : Freshman Engineering Program

File: 261.1

Last edit: 03/23/18 1:07 pm

Changes proposed by: dludlow

Catalog Pages Using this Program

Freshman Engineering Program

Start Term

Fall 2018

Program Code

FR ENG-UN

Department

Freshman Engineering

Title

Freshman Engineering Program

Program Requirements and Description

In Workflow

1. **FR 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. Kristy Giacomelli

Approval Path

1. 03/19/18 9:32 am cladmin-eatongui: Rollback to Initiator
2. 03/23/18 1:10 pm douglas ludlow (dludlow): Approved for FR ENG Chair
3. 03/23/18 4:04 pm Brittany Parnell (ershenb): Approved for CCC Secretary
4. 04/13/18 12:33 pm sraper: Approved for Engineering DSCC Chair
5. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Entering freshmen desiring to study engineering are admitted to the Freshman Engineering Program. They may state a preference for a major in a particular engineering field if they wish. In the event a preference is stated, it will be used in the consideration for freshmen

scholarships, if available, in the preferred department.

The goals of the Freshman Engineering Program are:

1. to provide high quality advising in order to enhance the likelihood of student academic success, and
2. to provide information about careers in the various engineering fields so that students can make an informed decision regarding an engineering major.

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

Common Engineering Freshman Year

The following courses are common to all the engineering programs offered at Missouri S&T and are normally taken while the student is in the Freshman Engineering Program:

MATH 1214 & MATH 1215	Calculus For Engineers I and Calculus For Engineers II	8
CHEM 1310 & CHEM 1319 & CHEM 1100	General Chemistry I and General Chemistry Laboratory and Introduction To Laboratory Safety & Hazardous Materials	6
ENGLISH 1120	Exposition And Argumentation	3
Humanities/Social Sciences courses [1]		
FR ENG 1100	Study And Careers In Engineering	1
MECH ENG 1720	Introduction to Engineering Design	3
PHYSICS 1135	Engineering Physics I	4

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

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

Students planning to major in ceramic engineering, chemical engineering, environmental engineering, geological engineering, metallurgical engineering or petroleum engineering will require additional chemistry or chemistry/geochemistry electives. It is recommended that, during the freshman year, these students should plan on taking CHEM 1320, ~~MET ENG 1210,~~ GEOLOGY 3410, or other suggested courses as outlined in the curriculum of those specific majors.

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

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

Justification for request

Test

Supporting Documents

Course Reviewer Comments

cladmin-eatongui (03/19/18 9:32 am): Rollback: cl-admin troubleshooting

Key: 261

Program Change Request

Date Submitted: 03/15/18 4:56 pm

Viewing: GE ENG-BS : Geological Engineering BS

File: 156.18

Last approved: 02/27/18 10:03 am

Last edit: 04/25/18 3:38 pm

Changes proposed by: grotekr

Catalog Pages Using this Program

Geological Engineering

Start Term

Fall 2018

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. Sciences DSCC Chair
4. Engineering DSCC Chair
5. Pending CCC Agenda post
6. CCC Meeting Agenda
7. Campus Curricula Committee Chair
8. FS Meeting Agenda
9. Faculty Senate Chair
10. Registrar
11. Kristy Giacomelli

Approval Path

1. 03/19/18 3:29 pm David Borrok (borrokd): Approved for RGEOSENG Chair
2. 03/19/18 3:42 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/20/18 10:08 am Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/25/18 1:14 pm sraper: Approved for Engineering DSCC Chair
5. 04/25/18 3:33 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

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)

Bachelor of Science
Geological Engineering

Entering freshmen desiring to study geological engineering will be admitted to the Freshman Engineering Program. They will, however, be permitted, if they wish, to state a geological engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Freshman Engineering 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 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. 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 geological engineering.

The geological engineering curriculum contains a required number of hours in humanities and social sciences. Each student's program of study must contain a minimum of 18 credit hours of course work from the humanities and the social sciences areas and should be chosen according to the following rules:

1. All students are required to take one American history course and one economics 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. Some disciplines require one humanities course to be selected for art, English, foreign languages, music, philosophy, speech and media studies, or theater.
2. Of the remaining hours, six credit hours must be taken in humanities or social sciences at the 2000 level or above and must meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. Each of these courses must have as a prerequisite one of the humanities or social sciences courses already taken. Foreign language courses numbered 1180 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 3000 level.)
3. Some departments list specific requirements; e.g. a psychology course, a literature course, and /or a second semester of economics. Selections should be made to ensure that these requirements are met.
4. Special topics, special problems courses and honors seminars are allowed only by petition to and approval by the student's program head.

The geological 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	4	MATH 1215	4
CHEM 1310	4	~~Chemistry/Geochemistry Elective[b]~~	~~3~~
CHEM 1100	1	MECH ENG 1720	3
CHEM 1319	1	PHYSICS 1135	4
ENGLISH 1120	3	**GEO ENG 1150**	**3**
FR ENG 1100	1	Humanities/Soc Sci Elective[a]	3
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 1150~~	~~3~~	GEOLOGY 2611	3
~~GEO ENG 1119~~	~~1~~	GEO ENG 3175	3
GEO ENG 3249	**3**	Humanities/Soc Sci Elective[a]	3
	14		16

Junior Year

First Semester	Credits	Second Semester	Credits
MECH ENG 2350	2	CIV ENG 3330	3
CIV ENG 2210	3	~~GEO ENG 4115~~	~~3~~
GEO ENG 5331	**3**	GEO ENG 5443	3
Economics Elective[b]	3	~~Technical Communications Elective[d]~~	~~3~~
GEOLOGY 3310	3	**ENGLISH 3560**	**3**
Humanities/Soc Sci Elective[a]	3	Humanities/Soc Sci Elective[a]	3
~~Technical Elective (Technical Electives)[g]~~	~~3~~	**Chemistry/Geochemistry Elective[c]**	**3**
GEOLOGY 3319	**1**		
	18		15

Senior Year

First Semester	Credits	Second Semester	Credits
Geophysics Elective[d]	3	GEO ENG 5174	3
GEO ENG 4010	0.5	GEO ENG 4010	0.5
~~GEO ENG 5331~~	~~3~~	Earth Mechanics Elective[f]	3
GEO ENG 5441	3	Technical Electives[g]	6
GEO ENG 5090 or 5092[e]	3	Eng Econ Elective[h]	3
CIV ENG 3715 or 4823	3		
GEO ENG 4115	**3**		

15.5	15.5
Total Credits: 128	

a	The sequence of course selection must provide both breadth and depth of content and must meet requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. A total of 18 hours of humanities and social science credit is required.
b	The Economics Elective must be selected from Econ 1100 or Econ 1200.
c	The chemistry/geochemistry elective must be selected from chemistry, geochemistry or biology courses as approved by your advisor.
d	The Geophysics elective can be selected from GEO ENG 5736, GEO ENG 5761, or GEO ENG 5782.
e	Students may take GEO ENG 5090 or GEO ENG 5092 for senior design credit.
f	To be selected from GEO ENG 5471, GEO ENG 5381, GEO ENG 5556, MIN ENG 4823, PET ENG 2510, PET ENG 3520, CIV ENG 3715, CIV ENG 4729, or CIV ENG 5715.
g	To be selected from advanced courses in geological, mining, petroleum or civil engineering, geology or other courses with approval of your advisor. Must contain design content and must be approved by your advisor.
h	To be selected from ENG MGT 5210, MIN ENG 3512, or PET ENG 4590 or both ENG MGT 1100 and ENG MGT 1210.
~~i~~	~~The Economics Elective must be selected from Econ 1100 or Econ 1200.~~

All GE students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade is not required; however, it is the first step toward becoming a registered professional engineer. This requirement is part of the Missouri S&T assessment process.

Geological engineering students must earn the grade of “C” or better in all geological engineering courses to receive credit toward graduation. The total number of credit hours required for a degree in Geological Engineering is 128. The assumption is made that a student admitted to the Department has completed 34 hours toward graduation to fulfill the requirements of the Freshman Engineering program.

Geological Engineering Emphasis Areas

Electives are selected by the student with advisor approval. Some appropriate electives are listed for each emphasis area.

Environmental Protection and Hazardous Waste Management

GEO ENG 5235	Environmental Geological Engineering	3
GEO ENG 5237	Geological Aspects Of Hazardous Waste Management	3
GEO ENG 5381	Intermediate Subsurface Hydrology And Contaminant Transport Mechs	3
GEO ENG 5331	Subsurface Hydrology	3
GEO ENG 4115	Statistical Methods in Geology and Engineering	3
GEO ENG 4276	Environmental Aspects Of Mining	3
GEO ENG 5233	Risk Assessment In Environmental Studies	3
CIV ENG 3715	Fundamentals of Geotechnical Engineering	3

Groundwater Hydrology and Contaminant Transport

GEO ENG 5381	Intermediate Subsurface Hydrology And Contaminant Transport Mechs	3
GEO ENG 5233	Risk Assessment In Environmental Studies	3
GEO ENG 5174	Geological Engineering Field Methods	3

GEO ENG 5331	Subsurface Hydrology	3
GEO ENG 4115	Statistical Methods in Geology and Engineering	3
GEO ENG 5441	Engineering Geology And Geotechnics	3
CIV ENG 3715	Fundamentals of Geotechnical Engineering	3
PET ENG 3330	Well Logging	3

Engineering Geology and Geotechnics

GEO ENG 5471	Rock Engineering	3
CIV ENG 3715	Fundamentals of Geotechnical Engineering	3
MIN ENG 4823	Rock Mechanics	3
CIV ENG 4729	Foundation Engineering	3
GEO ENG 5146	Applications Of Geographic Information Systems	3
GEO ENG 5441	Engineering Geology And Geotechnics	3
GEO ENG 4115	Statistical Methods in Geology and Engineering	3

Petroleum, Energy and Natural Resources

PET ENG 3520	Petroleum Reservoir Engineering	3
MIN ENG 4823	Rock Mechanics	3
GEO ENG 5146	Applications Of Geographic Information Systems	3
GEO ENG 5381	Intermediate Subsurface Hydrology And Contaminant Transport Mechs	3
GEOLOGY 5511	Applied Petroleum Geology	3
PET ENG 2510	Properties Of Hydrocarbon Fluids	3
PET ENG 1110	Introduction to Petroleum Engineering	1
PET ENG 3330	Well Logging	3
PET ENG 4520	Well Test Analysis	3

Quarry Engineering

MIN ENG 4823	Rock Mechanics	3
GEO ENG 5575	Aggregates And Quarrying	3
CIV ENG 3116	Construction Materials, Properties And Testing	3
GEO ENG 5471	Rock Engineering	3
GEO ENG 4276	Environmental Aspects Of Mining	3
MIN ENG 3913	Mineral Identification and Exploration	3
MIN ENG 5612	Principles of Explosives Engineering	3
MIN ENG 5822	Strata Control	3

Justification for request

Please see attached document

Supporting Documents

curriculum changes spring 2018.docx

Course Reviewer Comments

sraper (04/25/18 12:51 pm): add 1 hour course to bring total to 128 credit hours. Email from Katherine Grote. Shows as non-existing??

sraper (04/25/18 1:14 pm): put 1 in the credit hour slot.

ershenb (04/25/18 3:38 pm): linked Geology 3319

Key: 156

The Geological Engineering Faculty met in Dec. 2017 and voted to change several things in the GE B.S. curriculum to better prepare our students for their careers: The changes are as follows:

Curriculum changes:

Change	Justification
Change one of the technical elective options (3 hrs) to a required course, GeoE 3249: Fundamentals of Computer Applications in Geological Engineering.	The GeoE B.S. curriculum has 12 credits of technical electives (9 credits of general technical electives, 3 credits of Earth Mechanics Elective). We feel the students need stronger skills in computer applications and programming, so want to make Geo E 3249 a required course in lieu of one of the general tech elective courses. Students should take this course in their sophomore year, which will help them to more effectively use computational methods in their upper-division courses. This will improve the learning process in these courses and better prepare them for their future careers.
Remove Geo E 1119: Physical and Environmental Geology Laboratory	Geo E 1119 was the lab that accompanied Geo E 1150 when Geo E 1150 had as optional lab that was not part of the lecture course. Starting Fall 2018, Geo E 1150 includes the lab as part of the lecture course, so a separate lab course is not needed.
Replace "Technical Communications Elective" with English 3560: Technical Writing	The "Technical Communications Elective" allowed students to take a variety of courses; the faculty feel that Technical Writing will be more beneficial to the students than the other choices that were offered.
Add Geo E 5556: Renewable Energy Systems as an option for the Earth Mechanics Elective Requirement	Faculty feel that this course meets the requirements for an Earth Mechanics Elective.

Scheduling changes:

Change	Justification
Move Geo E 1150: Physical and Environmental Geology from the sophomore year to the freshman year	Geo E 1150 is a fundamental course for geological engineers. Moving it to the freshman year allows students who are majoring in geological engineering to become connected to the geological engineering program and to start to participate in department activities at an earlier stage of their academic career.
Move the Chemistry/Geochemistry Elective from the freshman year to the junior year	Chemistry/geochemistry can be taken at any time after an initial chemistry course. Geochemistry (the most commonly recommended option to fulfill the requirement) is a challenging course, and students often perform better as juniors than as freshman. This move also makes space in the schedule to allow Geo E 1150 to fit into the freshman year.
Move Geo E 4115: Statistical Methods in Geology and Engineering from Spring semester of	This move creates space in the student schedules for the Chemistry/Geochemistry elective during the spring semester, which is when Geochemistry is currently offered.

the junior year to the Fall semester of the Senior Year	
Move Geo E 5331: Subsurface Hydrology from fall semester of the Senior year to the Fall semester of the Junior Year	Students have had sufficient background courses to take Geo E 5331 in their junior year, and taking this course earlier allows them more opportunities to take advanced hydrology courses for which Geo E 5331 is a prerequisite.

Program Change Request

Date Submitted: 01/26/18 9:57 am

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

File: 64.23

Last approved: 03/27/17 2:47 pm

Last edit: 01/29/18 10:02 am

Changes proposed by: liukh

Catalog Pages Using this Program

Geology and Geophysics

Start Term

Fall **2018** ~~2017~~

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. **Engineering DSCC Chair**
5. **Pending CCC Agenda post**
6. **CCC Meeting Agenda**
7. Campus Curricula Committee Chair
8. FS Meeting Agenda
9. Faculty Senate Chair
10. Registrar
11. Kristy Giacomelli

Approval Path

1. 01/26/18 11:16 am David Borrok (borrokd): Approved for RGEOSENG Chair
2. 01/29/18 10:53 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 03/20/18 10:37 am Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/13/18 12:33 pm sraper: Approved for Engineering DSCC Chair
5. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. May 6, 2014 by Francisca Oboh-Ikuenobe (ikuenobe)
2. Apr 24, 2015 by wronk
3. Mar 27, 2017 by Kelly Liu (liukh)

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	3	GEOLOGY 1120[1]	3		
GEOLOGY 1119	1	GEOLOGY 1129[1]	1		
ENGLISH 1120	3	MATH 1208[2]	5		
CHEM 1310	4	Elective (Science & Eng)[3]	3		
CHEM 1319	1	Humanities/Social Science Elective	3		
CHEM 1100	1				
	13		15		
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 1221[2]	5	ENGLISH 1160 or 3560	3		
COMP SCI 1970 & COMP SCI 1980 (or COMP SCI 1971 & COMP SCI 1981)	3	ECON 1100 or 1200	3		
		HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3		
	15		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	1	~~GEOLOGY 4310~~	~~3~~
Humanities/Social Sciences Elective	3	GEOPHYS 5096	3
Elective (Science & Eng)[3]	6	Elective (Science & Eng)[3]	9
Elective (Geo & Geop)[5]	6	Free Elective[6]	3
	16		15
Total Credits: 127			

1	Communications Emphasized (CE) courses
2	Students may substitute MATH 1214 for MATH 1208; MATH 1215 for MATH 1221.
3	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.
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 15 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 1119	Physical and Environmental Geology Laboratory	1
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	1
~~GEOLOGY 4310~~	~~Remote Sensing Technology~~	~~3~~
GEOLOGY 2096	Field Geology	3
GEOLOGY 4097	Advanced Field Geology	3
GEOPHYS 3210	Introduction to Geophysics	3
GEOPHYS 5096	Global Tectonics	3
Total Credits		40

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 3631	Systematic Paleontology	3
GEOLOGY 3811	Fundamentals Of Geographic Information Systems	3
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 with Analytic Geometry 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
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 4411	Hydrogeology	3
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
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

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 3631	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

Justification for request

The faculty of the Geology & Geophysics program decided to drop Geology 4310: Remote Sensing Technology as a major requirement as results of recent changes in student demands and job market. This course has been added to the Geophysics and Petroleum Geology focus areas.

Supporting Documents

Course Reviewer Comments

ershenb (01/29/18 10:02 am): updated Start Term to Fall 2018

Key: 64

Program Change Request

Date Submitted: 04/12/18 10:01 am

Viewing: HIST-BA : History BA

File: 157.18

Last approved: 03/27/17 2:47 pm

Last edit: 04/12/18 10:01 am

Changes proposed by: sfogg

Catalog Pages Using this Program

History

Start Term

Fall **2018** ~~2017~~

Program Code

HIST-BA

Department

History and Political Science

Title

History BA

Program Requirements and 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. Kristy Giacomelli

Approval Path

1. 04/12/18 10:03 am sfogg: Approved for RHISTORY Chair
2. 04/12/18 11:41 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/12/18 12:29 pm Petra Dewitt (dewittp): Approved for Arts & Humanities DSCC Chair
4. 04/17/18 10:14 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 6, 2014 by Lahne Black (lahne)
2. Jul 21, 2015 by pantaleoa

3. Jun 27, 2016 by Petra Dewitt (dewittp)
4. Mar 27, 2017 by Petra Dewitt (dewittp)

Bachelor of Arts
History

(In addition to general requirements for bachelor of arts degree.)

HISTORY 1790	Introduction to History	1
HISTORY 1300	American History To 1877	3
HISTORY 1310	American History Since 1877	3
HISTORY 2790	Historiography	3
2 American History Electives		6
2 European History Electives		6
3 History Electives		9
Total Credits		31

Note: History majors are also required to complete HISTORY 1100 and HISTORY 1200 as part of the general education requirements for the B.A. In addition, 9 hours of the 31 major hours must be taken at the 3000 or 4000 level.

Note: History majors interested in graduate or professional school should take HISTORY 4097 as independent research under the guidance of a faculty member in a short period (one semester).

Note: History majors must complete an experiential learning requirement. They can meet this requirement by taking HISTORY 4085 or HISTORY 4097 or study abroad, among other options, in consultation with their advisor.

Note: Entering students will normally take ENGLISH 1120 either semester of the first year.

Secondary Education Emphasis Area

You may earn a B.A. degree in history from Missouri S&T and certification to teach in the schools of Missouri. This program may be completed in four academic years and student teaching is arranged with public schools within 30 miles of the Rolla campus.

Students interested in the certification program should consult with the advisor for history/education majors in the department of history and political science for requirements particular to those interested in this degree. Students should process a change of major form to designate history with an emphasis area of secondary education.

History students must complete 128 credit hours, including ~~the~~ requirements **for** ~~of the~~ teacher **education** ~~education program~~ listed in this catalog. A minimum grade of “C” is required by the department in all history and political science courses counted towards this degree. Students must take the following courses:

Communication Skills: 9 hours		
ENGLISH 1120	Exposition And Argumentation	3

ENGLISH 1160	Writing And Research	3
SP&M S 1185	Principles Of Speech	3
Humanities: 12 hours with at least one course from the first three areas		
Art or Music or Theater Appreciation		
Philosophy		
Literature		
Foreign Language		
ETYM 4306	Introduction To Etymology	3
Social Sciences: 18 hours		
POL SCI 1200	American Government	3
~~POL SCI 3763~~	~~Contemporary Political Thought~~	~~3~~
~~or POL SCI 3211~~	~~American Political Parties~~	
Political Science Elective **Must be 2XXX or above**		**3**
ECON 1100	Principles Of Microeconomics	3
or ECON 1200	Principles Of Macroeconomics	
PSYCH 1101	General Psychology	3
PSYCH 4600	Social Psychology	3
HISTORY 2110	World Regional Geography	3
Natural Sciences: 7 hours = 2 courses and 1 lab		
One course in Physics or Chemistry or Geology and one course in Biology		
One laboratory in any of the above science courses		
Mathematics: 3 hours		
MATH 1120	College Algebra (or higher)	3-5
or MATH 1103	Fundamentals Of Algebra	
or MATH 1140	College Algebra	
Clinical Experience: 16 hours		
EDUC 1104	Teacher Field Experience	2
EDUC 1164	Aiding Elementary, Middle And Secondary Schools	2
EDUC 4299	Student Teaching	12
Professional Requirements: 26 hours		
EDUC 1040	Perspectives In Education	2
EDUC 1174	School Organization & Adm For Elementary & Secondary Teachers	2
ENGLISH 3170	Teaching And Supervising Reading and Writing	3
EDUC 3216	Teaching Reading in Content Area	3
EDUC 3280	Teaching Methods And Skills In The Content Areas	6
EDUC 4298	Student Teaching Seminar	1
PSYCH 2300/EDUC 2102	Educational Psychology	3
PSYCH 4310/EDUC 4310	Psychology Of The Exceptional Child	3
PSYCH 3310	Developmental Psychology	3

History Requirements: 37 hours		
HISTORY 1790	Introduction to History	1
HISTORY 1100	Early Western Civilization	3
HISTORY 1200	Modern Western Civilization	3
HISTORY 1300	American History To 1877	3
HISTORY 1310	American History Since 1877	3
HISTORY 2790	Historiography	3
American History Electives		6
European History Electives		6
History Electives		9

Justification for request

Updating Political Science elective for Teacher Education and Certification due to DESE requirements.

Supporting Documents

Course Reviewer Comments

Key: 157

Program Change Request

Date Submitted: 03/24/18 8:21 am

Viewing: IST-BS : Information Science and Tch BS

File: 75.23

Last approved: 04/21/17 1:34 pm

Last edit: 03/29/18 7:52 pm

Changes proposed by: barryf

Catalog Pages Using this Program

Information Science and Technology

Start Term

Fall 2018 ~~08/22/2016~~

Program Code

IST-BS

Department

Business and Information Technology

Title

Information Science and Tch BS

Program Requirements and Description

In Workflow

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

Approval Path

1. 03/28/18 6:00 pm siauk: Approved for RINFSCTE Chair
2. 03/29/18 9:58 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 03/29/18 7:52 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 04/17/18 10:15 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Apr 28, 2014 by Barry Flachsbart (barryf)
2. Jan 30, 2015 by Barry Flachsbart (barryf)

3. Jul 21, 2015 by pantaleoa
4. Jul 21, 2015 by pantaleoa
5. Jul 28, 2015 by kleb6b
6. Mar 7, 2016 by Barry Flachsbart (barryf)
7. Apr 21, 2017 by Crystal Wilson (wilsoncry)

Bachelor of Science
Information Science and Technology

In Information Science and Technology, the Bachelor of Science degree consists of 120 credit hours. All undergraduate students in Business and Management Systems are required to complete a General Education Requirements Core, including courses in Humanities, Social Sciences, Mathematics, Science, and Communication Skills.

A common departmental core of courses in Management and Information Technology helps provide students with skills to succeed in a fast-changing and globalized environment. Information Science and Technology (IST) Core courses and IST Electives provide students with comprehensive knowledge of information technology utilization in businesses. These courses include business analytics & data science, database management, systems analysis, introduction to data science and management, computing internals, networks and communications, and electronic and mobile commerce. The electives for this degree consist of advanced coursework in the areas introduced by the required courses.

A minimum grade of "C" is required in the IST Core, IST Electives, Management, and Information Technology courses. Students have 9 credit hours for free electives.

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
BUS 1810[1]	1	PSYCH 1101	3
ENGLISH 1120	3	MATH 1212	4
MATH 1140[5]	3	IS&T 1551	3
Science Elective[2]	3	BUS 1110	3
IS&T 1750	3	BUS 1210	3
Laboratory w/Science Elective	1		
	14		16
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
ECON 1200	3	IS&T 3131	3
SP&M S 1185	3	Science Elective[2]	3
IS&T 1552	3	IS&T Elective [4]	3
ENGLISH 1600 or TCH COM 1600	3	STAT 3111	3

ERP 2110	3	ECON 1100	3
	15		15

Junior Year

First Semester	Credits	Second Semester	Credits
IS&T 4654	3	IS&T 3343	3
FINANCE 2150	3	MKT 3110	3
IS&T 3423	3	IS&T 3420	3
IS&T 3333	3	IS&T 4641	3
IS&T Elective [4]	3	ENGLISH 2560 or TCH COM 2560	3
	15		15

Senior Year

First Semester	Credits	Second Semester	Credits
Free Elective	3	BUS 5980	3
Fine Art, Social Science, or Humanities Elective[3]	3	POL SCI 1200	3
IS&T Electives [4]	6	IS&T Elective[4]	3
History Elective	3	Free Electives	6
	15		15
Total Credits: 120			

A grade of "C" or better is required in the following courses for graduation; **BUS 1110** ~~BUS 1110~~, **BUS 1210** ~~BUS 1210~~, **BUS 1810** ~~BUS 1810~~, **BUS 5980** ~~BUS 5980~~, **ECON 1100** ~~ECON 1100~~, **ECON 1200** ~~ECON 1200~~, **ERP 2110** ~~ERP 2110~~, FINANCE 2150 , **MKT 3110** ~~MKT 3110~~, **IS&T 1551** ~~IS&T 1551~~, **IS&T 1552** ~~IS&T 1552~~, **IS&T 1750** ~~IS&T 1750~~, IS&T 3131 , IS&T 3333 , **IS&T 3343** ~~IS&T 3343~~, **IS&T 3420** ~~IS&T 3420~~, IS&T 3423, IS&T 4641, IS&T 4654, and all **IS&T** ~~IST~~ Electives.

1	Writing intensive course
2	Any course in the following areas: biology, chemistry, geology, geological engineering, physics.
3	Any course in the following areas not used for other degree requirements: art, economics, English, foreign language, history, literature, music, philosophy, political science, psychology, sociology, theater.
4	A grade of "C" or better is required in IS&T elective courses for graduation. Electives may be any IS&T or ERP designated course at the 3000-level or above or COMP SCI 4700 or COMP SCI 5601.
5	MATH 1120 may be subsituted for MATH 1140.

~~Emphasis Areas Two emphasis areas may be taken to specialize if the student wishes to do so.The first, human-computer interaction, consists of three courses: The second emphasis area, enterprise resource planning, consists of any 9 hours of ERP-designated courses at the 4000-level or above.~~

~~IS&T 5885~~	~~Human-Computer Interaction~~	~~3~~
~~IS&T 5886~~	~~Prototyping Human-Computer Interactions~~	~~3~~
~~IS&T 5887~~	~~Human-Computer Interaction Evaluation~~	~~3~~

Justification for request

Remove Emphasis Areas. Minors exists for each of the existing Emphasis Areas and provide a better focus for students.

Clarify that IS&T electives may include courses at the 3000 level.

Supporting Documents

Course Reviewer Comments

ershenb (03/29/18 9:58 am): Updated Start Term to Fall 2018

barryf (03/29/18 7:52 pm): Clarify that IS&T electives may include IS&T or ERP designated courses at the 3000 level or above, as well as two specific COMP SCI courses.

Key: 75

Program Change Request

Date Submitted: 04/06/18 10:05 am

Viewing: PE ENG-BS : Petroleum Engineering BS

File: 108.17

Last approved: 09/21/15 10:17 am

Last edit: 04/26/18 1:52 pm

Changes proposed by: caolila

Catalog Pages Using this Program

Petroleum Engineering

Start Term

Fall 2018 ~~08/22/2016~~

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. **Sciences DSCC Chair**
4. **Engineering DSCC Chair**
5. **Pending CCC Agenda post**
6. **CCC Meeting Agenda**
7. Campus Curricula Committee Chair
8. FS Meeting Agenda
9. Faculty Senate Chair
10. Registrar
11. Kristy Giacomelli

Approval Path

1. 04/06/18 10:46 am David Borrok (borrokd): Approved for RGEOSENG Chair
2. 04/11/18 3:54 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/11/18 4:14 pm Brittany Parnell (ershenb): Rollback to CCC Secretary for Sciences DSCC Chair
4. 04/12/18 10:11 am Brittany Parnell (ershenb): Approved for CCC Secretary
5. 04/20/18 10:09 am Katie Shannon (shannonk): Approved for Sciences DSCC Chair

6. 04/25/18 8:23 am sraper: Approved for Engineering DSCC Chair
7. 04/25/18 10:06 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Sep 21, 2015 by reflori

Bachelor of Science
Petroleum Engineering

Entering freshmen desiring to study Petroleum Engineering will be admitted to the Freshman Engineering 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 Freshman Engineering 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 Freshman Engineering Program.

For the Bachelor of Science degree in Petroleum Engineering a minimum of 129 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 (preferred) or ENGLISH 1160 or 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**, ~~HISTORY 1200, HISTORY 1300, HISTORY 1310,~~ or **POL SCI 1200**. ~~POL SCI 1200.~~ The economics course may be either **ECON 1100** ~~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. ~~The humanities course must be selected from "The Approved List of Humanities and Social Science Courses for Engineering Degrees" maintained by the Office of Undergraduate Studies.~~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** ~~must be selected from~~ the **current undergraduate catalog.** ~~approved list.~~ This course must have as a prerequisite one of the humanities or social sciences courses already taken. Foreign language courses numbered 1180 will be considered to satisfy this requirement. Students may receive humanities credit for foreign language courses in their native tongue only if the course is at the 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** ~~from~~ the **current undergraduate catalog..** ~~approved list.~~

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	4
CHEM 1310	4	PHYSICS 1135	4
CHEM 1319	1	MECH ENG 1720	3
MATH 1214	4	GEO ENG 1150 or GEOLOGY 1110	3
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3	~~GEO ENG 1119~~	~~1~~
ENGLISH 1120	3	**GEO ENG 1159 or GEOLOGY 1119**	**0-1**
		PET ENG 2510	3
	16		17-18
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[7]	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 Reservoir Engineering Elective[4]	3	PET ENG 4710	3
PET ENG 4210	3	Humanities/Social Sci Elective[2]	3
	15		15
Senior Year			
First Semester	**Credits**	**Second Semester**	**Credits**
PET ENG 4010[3]	1	PET ENG 4097[7]	3
MECH ENG 2527	3	GEO ENG 4115	3
PET ENG 4520	3	Hum/Soc Sci Elective[2]	3

PET ENG 4720	3	PET ENG Elective[5]	3
PET ENG Elective[5]	3	ENGLISH 3560[6]	3
Humanities/Social Sci Elective[2]	3		
	16		15
Total Credits: 128-129			

1	All freshmen Petroleum Engineering students must enroll in CHEM 1100.
2	Humanities/Social Science electives are to be selected from a list of approved courses as published by the department. Petroleum Engineering students are especially encouraged to study foreign languages
3	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.
4	This is a reservoir engineering elective. Students should choose from PET ENG 4511, PET ENG 4531, PET ENG 4611, PET ENG 4311, or PET ENG 4621.
5	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.
6	Students may also select ENGLISH 1160 or ENGLISH 1600.
7	**Communications emphasis courses.**

The total number of credit hours required for a degree in Petroleum Engineering is 129.

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

Justification for request

Requesting footnote 7 added to comments of current curriculum as shown in attachment. Prior to 2015 change the curriculum had Pet Eng 1110 (1 hr introduction to Pet Eng) and Pet Eng 3529 (1 hr lab) as communication emphasis. Pet Eng 1110 was dropped in 2015 and Pet Eng 3529 was rolled into the new petrophsyics course, Pet Eng 3320. Pet Eng 3320 should replace the two previous courses under the communications requirement in DAR. Senior capstone Pet Eng 4097 continues to be communications emphasis. I couldn't figure out the online editing but the attached document shows the changes requested.

Supporting Documents

Curriculum Petroleum(2018-19) for comm emphasis.xls

Course Reviewer Comments

lahne (04/17/17 12:29 pm): Rollback: rollback to correct workflow, PE ENG-BS should not go through Sciences DSCC

sraper (04/18/17 8:25 am): Rollback: Replace ME 1720 with Cs course. Needs further discussion at CEC level.

lahne (04/19/17 9:39 am): Rollback: sraper (04/18/17 8:25 am): Rollback: Replace ME 1720 with CS

course. Needs further discussion at CEC level.
ershenb (08/22/17 9:11 pm): updated start term to Fall 2018
sraper (09/19/17 2:24 pm): Rollback: I talked to Ralph Flori today and he did not know the DC was put through again. They do not intend to make the change shown (CSC for ME 1720).
ershenb (09/19/17 3:01 pm): Rollback: Please update MECH ENG 1720 requirement.
ershenb (04/06/18 10:29 am): Attaching curriculum petroleum-communication emphasis per the request of Dr. Shari Dunn-Norman.
ershenb (04/06/18 11:00 am): Per the request of Dr. Shari Dunn-Norman, added footnote 7 Communications emphasis courses
ershenb (04/06/18 11:07 am): Per the request of Dr. Shari-Dunn Norman, added footnote 7 to Pet Eng 4097 and Pet Eng 3320.
ershenb (04/11/18 4:14 pm): Rollback: Pet Eng-BS should not go through Sciences DSCC. Workflow needs adjusted.
ershenb (04/12/18 10:09 am): Any degree forms under the GGPE are approved through both the Sciences and Engineering DSCC.
sraper (04/25/18 8:23 am): Made edits to remove references to "Approved List". Removed Comp Sci programing classes and put Me 1720 back in. Removed requirement to sign release of FE results.
ershenb (04/26/18 1:52 pm): formatting

Key: 108

Petroleum Engineering Curriculum (Fall 2015)

FRESHMAN YEAR

First Semester	Hrs	Second Semester	Hrs
Fr Eng 1100 -Study and Careers in Engineering	1	Math 1215 - Calculus for Engineers II	4
Chem 1310 - General Chemistry I	4	Physics 1135 - Engineering Physics I	4
Chem 1319 - General Chemistry Laboratory[1]	1	Mech Eng 1720 - Engineering Design with Computer Applications	3
Math 1214 - Calculus for Engineers I	4	Geo Eng 1150 or Geol 1110 - Geol for Engrs or Phys Geology	3
History 1200, Hist 1300, Hist 1310 or Pol Sci 1200	3	Geo Eng 1159 or Geol 1119 - Lab Geol for Engrs or Phys Geol	1
English 1120 - Exposition and Argumentation	3	Pet Eng 2510 - Properties of Petroleum Fluids	3
	16		**18**

SOPHMORE YEAR

First Semester	Hrs	Second Semester	Hrs
Math 2222 - Calculus w/Analytic Geometry III	4	Math 3304 - Elementary Differential Equations	3
Physics 2135 - Engineering Physics II	4	Pet Eng 3520 - Petroleum Reservoir Engineering	3
Geology 3310 - Structural Geology (Geol 3319 Lab optional)	3	Mech Eng 2350 - Dynamics	2
Pet Eng 3320 - Petrophysics[7]	3	Civ Eng 2210 - Mechanics of Materials	3
Civ Eng 2200 - Statics	3	Geology 3620 - Stratigraphy and Sedimentation	3
		Econ 1100 or 1200 - Principles of Economics (Micro or Macro)	3
	17		**17**

JUNIOR YEAR

First Semester	Hrs	Second Semester	Hrs
Geology 5513 - Petroleum Geology	3	Pet Eng 3330 - Well Logging	3
Geophysics 4231 - Seismic Interpretation (3D Seismic)	3	Pet Eng 4410 - Well Performance and Production Systems	3
Pet Eng 4210 - Drilling and Well Design	3	Pet Eng 4590 - Petroleum Economics and Asset Valuation	3
Civ Eng 3330 - Fluid Mechanics	3	Humanities/Social Sci Elective[2]	3
Pet Eng Reservoir Engineering Elective[4]	3	Pet Eng 4710 - Finite Element Analysis	
		with Applications in Petroleum Engineering	3
	15		**15**

SENIOR YEAR

First Semester	Hrs	Second Semester	Hrs
Pet Eng 4010 - Seminar[3]	1	Pet Eng 4097 - Petroleum Engineering Design[7]	3
Mech Eng 2527 - Thermal Analysis	3	Geo Eng 4115 - Geostatistical Methods in Eng and Geology	3
Pet Eng 4520 - Well Testing	3	Pet Eng Elective[5]	3
Pet Eng Elective[5]	3	Humanities/Social Sci Elective[2]	3
Humanities/Social Sci Elective[2]	3	English 1600 - Intro to Technical Communication[6]	3
Pet Eng 4720 - Mechanical Earth Modeling	3		
	16		**15**

Note: By taking one more class (Geol 2611 Physical Mineralogy and Petrology), Pet Eng students can earn a Geology Minor.

1) All freshmen Petroleum Engineering students must enroll for Chem 1100 (Intro to Lab Safety and Haz Mat)

2) 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.

3) 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 the Mo S&T assessment process as described in the Assessment Requirements found elsewhere in this catalogue. Students must sign a release form giving the University access to their Fundamentals of Engineering Examination score.

4) This is a reservoir engineering elective. Students should choose from Pet Eng 4511, 4531, 4611, 4311 or 4621.

5) 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.

6) Students may also select Engl 1160 or Engl 3560

7) Communications emphsis courses.

The total number of credit hours required for a degree in Petroleum Engineering is 129.

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

Program Change Request

Date Submitted: 04/25/18 1:21 pm

Viewing: PHYSIC-BS : Physics BS

File: 115.24

Last approved: 06/27/16 9:25 am

Last edit: 04/25/18 4:03 pm

Changes proposed by: crabtree

Catalog Pages Using this Program

Physics

Start Term

Fall **2018** ~~2016~~

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

Approval Path

1. 04/25/18 1:32 pm Thomas Vojta (vojtat): Approved for RPHYSICS Chair
2. 04/25/18 2:46 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/25/18 4:12 pm Katie Shannon (shannonk): Approved for Sciences DSCC Chair
4. 04/26/18 8:46 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. May 6, 2014 by waddill

2. Jul 21, 2015 by pantaleoa
3. Jun 27, 2016 by waddill

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	MATH 1221[6]	5
ENGLISH 1120	3	PHYSICS 1111 & PHYSICS 1119[7]	5
MATH 1208[5]	5		
PHYSICS 1101	1		
	15		16
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
ENGLISH 1160	3	MATH 3304	3
MATH 2222	4	PHYSICS 2311	3
PHYSICS 2111 & PHYSICS 2119[8]	5	PHYSICS 2129	3
COMP SCI 1570 & COMP SCI 1580[4]	4	PHYSICS 2401	3
Elective[1]	3	Elective[1]	3
	19		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]	6

Electives[1]	6		
	18		15

Senior Year

First Semester	Credits	Second Semester	Credits
PHYSICS 4211	3	PHYSICS 4311	3
PHYSICS 4301	3	Elective-Humanities (300 level)[1]	3
Physics Elective[3]	3	Physics Elective[3]	3
Electives[1]	6	Electives[1]	6
	15		15
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.
4	Alternatively COMP SCI 1971 and COMP SCI 1981; note that this will require one less credit hour than the option listed in the sample schedule.
5	Alternatively students may substitute Math 1214 for Math 1208. Note that this is one less credit hour than Math 1208.
6	Alternatively students may substitute Math 1215 for Math 1221. Note that this is one less credit hour than Math 1221.
7	Alternatively students may substitute Physics 1135 for the combination of Physics 1111 and 1119. Note that this is one less credit hour than Physics 1111/1119.
8	Alternatively students may substitute Physics 2135 for the combination of Physics 2111 and 2119. Note that this is one less credit hour than Physics 2111/2119.

EMPHASIS in SECONDARY EDUCATION

Students may develop an emphasis area **in** ~~in~~ secondary education **that will allow them to teach** ~~by satisfying the requirements for a bachelor of science in~~ physics **in grades 9-12 in Missouri. Please contact the Department of Teacher Education for a complete list of requirements.** ~~and by completing the following additional requirements:~~

a. **Professional** ~~Take the education professional~~ requirements courses:

EDUC 1040	Perspectives In Education	2
EDUC 1174	School Organization & Adm For Elementary & Secondary Teachers	2
~~EDUC 2216~~	~~Course EDUC 2216 Not Found~~	~~3~~
~~EDUC 2251~~	~~Historical Foundation Of American Education~~	~~3~~

EDUC 3216	**Teaching Reading in Content Area**	**3**
ENGLISH 3170	**Teaching And Supervising Reading and Writing**	**3**
EDUC 3280	Teaching Methods And Skills In The Content Areas	6
EDUC 4298	Student Teaching Seminar	1
PSYCH 2300	Educational Psychology	3
or EDUC 2102	Educational Psychology	
~~PSYCH 3311~~	~~Psychological & Educational Development Of The Adolescent~~	~~3~~
PSYCH 3310	**Developmental Psychology**	**3**
PSYCH 4310	Psychology Of The Exceptional Child	3
or EDUC 4310	Psychology Of The Exceptional Child	
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** ~~Take the education clinical~~ experience courses:

EDUC 1104	Teacher Field Experience	2
EDUC 1164	Aiding Elementary, Middle And Secondary Schools	2
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

Supporting Documents

Course Reviewer Comments

ershenb (04/25/18 2:45 pm): formatting

ershenb (04/25/18 2:46 pm): changed start term to Fall 18

ershenb (04/25/18 4:03 pm): Formatted course list for section "a" in "emphasis in secondary education" section.

Key: 115

Program Change Request

Date Submitted: 04/06/18 9:22 am

Viewing: SYS EN-PHD : Systems Engineering PhD

File: 131.9

Last approved: 04/19/16 3:43 pm

Last edit: 04/24/18 10:49 am

Changes proposed by: johsarah

Catalog Pages Using this Program
Systems Engineering

Start Term
Fall **2018** ~~2016~~
Program Code
SYS EN-PHD
Department
Engineering Management and Systems Engineering
Title
Systems Engineering PhD

Program Requirements and Description

In Workflow

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

Approval Path

1. 04/06/18 9:40 am Suzanna Long (longsuz): Approved for RENGMNGT Chair
2. 04/11/18 4:12 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/23/18 1:53 pm sraper: Approved for Engineering DSCC Chair
4. 04/24/18 10:49 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Jun 12, 2014 by pantaleoa
2. Mar 13, 2015 by pantaleoa
3. Jun 19, 2015 by sraper

4. Jul 24, 2015 by pantaleoa
5. Apr 19, 2016 by pantaleoa
6. Apr 19, 2016 by pantaleoa

Doctor of Philosophy Admission Standards

- B.S. in engineering, or a physical science
- Undergraduate courses: Calculus Series (I, II, III), Differential Equations, Statistics, Physics (I, II) or Chemistry, Engineering Economy
- GPA: M.S. GPA = 3.5
- Graduate Record Exam (GRE): All students must submit current GRE scores. V+Q≥ 1100, A≥ 4.0 (former scoring) or V≥ 155, Q≥ 148, A≥ 4.0
- TOEFL: All international applicants must submit a current TOEFL score, regardless of prior academic experience or place of study.
- Regular status: 580/237/92 **(TOEFL)**
- Statement of Purpose: All applicants must submit a statement of purpose.
- Three reference letters

A candidate for the Ph.D. in systems engineering must complete the equivalent of at least three years of full time work beyond the bachelor's degree. The content of all Ph.D. programs are individually structured by the student in consultation with and approved by the student's advisory committee. All requirements for the degree must normally be completed within an eight year period. At appropriate points in their program, Ph.D. students must pass both a Qualifying Exam and Comprehensive Exam. Off-campus students are expected to complete all requirements listed in the Missouri S&T Graduate Catalog under the section entitled Doctor of Philosophy Degree and follow all procedures listed under the Procedures for Ph.D. Candidates.

The total credit requirements for graduation are a minimum of 60 credit hours after the successful completion of M.S. degree in systems engineering. Actual courses taken will be determined by the candidate's committee and his/her plan of study. The student is expected to complete all requirements.

Residency Requirements

All students are expected to follow the Missouri S&T graduate student residency requirements. Off campus students can meet the 2 year residency requirement with the following requirements: the qualifying exam must be taken on campus within the first 5 semesters of enrollment; the student will have at minimum two video conferences per month with his/her research advisor; the Ph.D. committee will include one person from the student's professional work location, the appointment committee member must have a Ph.D. and be familiar with the chosen research; the student is expected to meet with the Ph.D. committee on a regular basis with at least two meetings per semester; the ~~student is expected to be on campus a minimum of 16 days per year, visits may be spread over 4 campus visits; the~~ Ph.D. comprehensive exam must be taken on campus; the student has the option of conducting research that is beneficial to the student's professional work; and the defense of dissertation must take place on campus.

Major Requirements

May be taken during M.S. degree

Core Curriculum		24
SYS ENG 5101	System Engineering and Analysis	
SYS ENG 6102	Information Based Design	
SYS ENG 6103	Systems Life Cycle Costing	

SYS ENG 6104	Systems Architecting	
~~SYS ENG 6105~~	~~Complex Engineering Systems Project Management~~	
SYS ENG 6196	Systems Engineering Capstone	
SYS ENG 6542	**Model Based Systems Engineering**	
SYS ENG 6239	Smart Engineering System Design	
SYS ENG 6321	Modeling Complex Systems	
or COMP ENG 6410	Modeling Complex Systems	
Research		30
SYS ENG 6099	Research	1-15
Electives		36
Systems Eng Process Tools, Optimization & Statics - 12 credit hours		
Research Specialization Areas - 24 credit hours		

Requirements for Thesis

Students will conduct original research demonstrated by journal or referred proceedings, publication under the supervision of a doctoral advisor, and communicate their findings, write a dissertation on research conducted, and provide satisfactory defense of their dissertation in a final oral examination. Students will be required to sign up for one hour of SYS ENG 6099 under their research advisor and attend systems engineering seminars every fall and spring semester during their study. These courses may be included as fulfilling research credit requirements. Students are required to publish their work in approved journals and referred proceedings. A minimum of three articles is expected.

Qualifying Exam

The objective of the systems engineering Ph.D. qualifying exam is to test the knowledge and understanding of the graduate student on systems engineering fundamentals and assess the student's level of knowledge in engineering statistics and optimization. The qualifying exam is a two day exam consisting of a written and oral part. For more information, contact the department graduate staff.

It is expected that the graduate student has a clear understanding of the research issues in the student's area of interest, its implications in industrial applications primarily in the industrial domain the student is working, possible impact of successful research contributions to systems engineering research and literature and should be able to identify up to five journals in this area. Prior to the oral exam, copies of the written exams prepared by the systems engineering faculty will be provided to all faculty for each student. The oral exam is restricted to the areas of research specialization selected by each student and will continue until there is a consensus not to ask further questions by the faculty.

Comprehensive Exam

The student's advisory committee will administer the comprehensive examination after the student has completed seventy-five percent of the coursework for the Ph.D. program and one published refereed conference proceeding or journal paper. The examination is written and oral. Upon successful completion of the written examination, the student will be orally examined by the advisory committee.

Dissertation

The dissertation, embodying the results of an original investigation, must be written upon a subject mutually agreed upon between the student and the advisor.

Research Areas

Cyber Physical Systems, Modeling and Simulation, Model Based Systems Engineering , System of Systems Architecting, Complex Adaptive Systems, Human System Integration, Infrastructure Systems.

~~Research Areas For the list of Areas of Research Specialization can be found at http://emse.mst.edu/media/academic/emse/documents/graduatedocs/Sys%20Research%20Area%20Page-1.pdf .~~

Justification for request

Core Course Sys Eng 6105 Complex Engineering Systems Project Management is being removed from the core courses and is being included in the list of elective courses for the program. The course is being replaced by SysEng 6542 Model Based Systems Engineering as new core course for the program to reflect current practices of system engineering in practice and research today. This change is approved by the faculty of Engineering management and Systems Engineering.

Supporting Documents

Course Reviewer Comments

sraper (04/16/18 9:20 am): Included (TOEFL) after regular status scores.

ershenb (04/24/18 10:12 am): .

ershenb (04/24/18 10:49 am): changed start term to Fall 2018

Key: 131

Course Change Request

New Experimental Course Proposal

Date Submitted: 03/21/18 5:22 am

Viewing: **CIV ENG 5001.002 : Environmental Water Resources Field Methods**

File: 4535

Last edit: 04/25/18 2:07 pm

Changes proposed by: burken

Requested Effective Change Date	Spring 2019
Department	Civil, Architectural, and Environmental Engineering
Discipline	Civil Engineering (CIV ENG)
Course Number	5001
Topic ID	002
Experimental Title	Environmental Water Resources Field Methods
Experimental Abbreviated Course Title	Environ Field Methods
Instructors	Joel Burken and Robert Holmes

Experimental Catalog 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. CAT entry
8. Registrar

Approval Path

1. 03/22/18 8:48 am
   Joel Burken (burken): Approved for RCIVILEN Chair
2. 03/27/18 10:09 am
   Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/13/18 12:35 pm
   sraper: Approved for Engineering

DSCC Chair

4. 04/17/18 10:14 am
Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

This 3-credit hour course will emphasize the scientific principles behind field measurement techniques and protocols, including field-scale experimental design, used for water-resources and environmental studies. Weekly lectures during the Spring semester will be followed by a 12-day field experience taking place in the intersession before summer semester.

Prerequisites

Stat 3113 and graduate standing or senior standing in an undergraduate curriculum related to the environmental, earth sciences, or engineering.

Field Trip

Statement

The course will include weekly lectures during the Spring semester followed by an intensive 12-day field experience taking place during the intersession between the Spring and Summer Semesters.

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

Justification for new course:

This course will provide a comprehensive experience in the methods utilized for environmental water resources field work related to data collection and assessment. The students in the course will be gain knowledge ad the theoretical level of data collection methods and skills related to practice of environmental and water resources data collection and analysis.

Co-Listed Courses: GEO ENG 5001: Special Topics
ENV ENG 5001: Special Topics

Semester(s) previously taught

NA

Co-Listed Courses:

Course Reviewer Comments

ershenb (03/27/18 10:05 am): Moved Co-Listed Courses " GEO ENG 5001 and ENV ENG 5001" to Justifications section per the EC process in the workflow.

sraper (04/13/18 12:34 pm): will approve but awaiting word to see if Stats 3115 and 3117 can be added to prereq.

sraper (04/13/18 12:35 pm): Removed Course from title.

Key: 4535

Preview Bridge

Course Change Request

New Experimental Course Proposal

Date Submitted: 04/11/18 4:47 pm

Viewing: **HISTORY 3001.004 : World War I: A Global Perspective**

File: 4539

Last edit: 04/17/18 9:58 am

Changes proposed by: dewittp

Requested Effective Change Date	Spring 2019
Department	History and Political Science
Discipline	History (HISTORY)
Course Number	3001
Topic ID	004
Experimental Title	World War I: A Global Perspective
Experimental Abbreviated Course Title	WWI Glob Perspective
Instructors	Petra DeWitt

Experimental 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. CAT entry
8. Registrar

Approval Path

1. 04/12/18 9:43 am sfogg: Approved for RHISTORY Chair
2. 04/12/18 11:37 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/12/18 12:29 pm Petra Dewitt (dewittp):

Approved for Arts & Humanities DSCC Chair

4. 04/17/18 10:14 am
Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

This course traces the social, cultural, economic, and military factors that contributed to the First World War, accounts for why it continued for so long, and explains the aftermath during the 1920s and 1930s from a global, not just a European or American, perspective.

Prerequisites

History 1200 or History 1310.

Field Trip Statement

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

Justification for new course:

Fills a gap in the time frame of military and war related courses offered by the department. Fulfills requests by students and ROTC

Semester(s) previously taught

Co-Listed Courses:

Course Reviewer Comments

Key: 4539

Preview Bridge

Course Change Request

New Experimental Course Proposal

Date Submitted: 04/06/18 2:06 pm

Viewing: **PET ENG 6001.010 : Advanced Applied Reservoir Engineering**

File: 4538

Last edit: 04/24/18 10:06 am

Changes proposed by: reflori

Requested Effective Change Date	Fall 2018
Department	Geosciences and Geological and Petroleum Engineering
Discipline	Petroleum Engineering (PET ENG)
Course Number	6001
Topic ID	010
Experimental Title	Advanced Applied Reservoir Engineering
Experimental Abbreviated Course Title	Advanced Applied Res Eng
Instructors	R. Flori

Experimental Catalog 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. CAT entry
8. Registrar

Approval Path

1. 04/06/18 3:00 pm David Borrok (borrokd): Approved for RGEOSENG Chair
2. 04/11/18 3:56 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/23/18 1:54 pm sraper: Approved for Engineering DSCC Chair

4. 04/24/18 10:07 am
Brittany Parnell (ershenb):
Approved for Pending CCC Agenda post

Advanced methods for analyzing reservoir performance such as material balance, aquifer modeling, coning determination, decline curves, introduction to modern production data analysis, reserves determination methods.

Prerequisites

Pet Eng 3520.

Field Trip Statement

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

Justification for new course:

Need for additional 6xxx offerings in Pet Eng.

Semester(s) previously taught

Co-Listed Courses:

Course Reviewer Comments

Key: 4538

Preview Bridge

Program Change Request

New Program Proposal

Date Submitted: 10/31/17 10:49 am

Viewing: PROPOSED : Undergraduate Certificate in Automation Engineering

File: 254

Last edit: 04/16/18 9:14 am

Changes proposed by: kte

Start Term

Spring 2018

Program Code

PROPOSED

Department

Electrical and Computer Engineering

Title

Undergraduate Certificate in Automation Engineering

Program Requirements and Description

In Workflow

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

Approval Path

1. 11/04/17 3:59 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 04/13/18 10:56 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 04/23/18 1:53 pm sraper: Approved for Engineering DSCC Chair
4. 04/26/18 8:52 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

An undergraduate certificate in Automation Engineering will require the following:

- Pass El Eng 3340 – Controllers for Factory Automation with a C or better
- Pass one of the following courses with a C or better:
    - El Eng 3320 – Control Systems

- Mc Eng 4479 – Automatic Control of Mechanical Systems
- Ch Eng 4110 – Chem Engr Process Dynamics and Control

- Pass 6 additional hours of coursework from the following list. A C or better is required for all 6 hours.

  Ch Eng 5370 – Intermediate Process Dynamics and Control

  Ch Eng 5190/El Eng 5350 – Plantwide Process Control

  Ch Eng 4310/Mc Eng 5644 – Interdisciplinary Problems in Manufacturing Automation

  El Eng 4380 – Practicum in Automation Engineering (no more than one can be applied to the Automation Engineering Minor)

  El Eng 5340 – Advanced PLC

  El Eng 5345 – PLC Motion Control

  El Eng 5870/Mc Eng 5478 – Mechatronics

  Mc Eng 5449 – Robotic Manipulators and Mechanisms

  Mc Eng 5655 – Manufacturing Equipment Automation

Justification for request

Automation engineering is of interest to many employers of our graduates and this certificate provides an alternative to the Minor in Automation Engineering, which requires 15 credit hours. The undergraduate certificate in Automation Engineering is cross-disciplinary between chemical engineering, electrical engineering, and mechanical engineering. This certificate supports the ECE department goal of offering more certificates.

Supporting Documents

Course Reviewer Comments

ershenb (04/13/18 10:56 am): Approving through Curriculum workflow for informational purposes.

sraper (04/16/18 9:14 am): Changed first sentence to reflect undergraduate certificate per email from K. Erickson.

Key: 254