Campus Curricula Committee Meeting Agenda
January 9, 2019
9:00am - 10:30am, Bertelsmeyer 110H
(For Faculty Senate Meeting of January 24, 2019)

Review of submitted Course Change forms:

File: 4279.17	CHEM ENG 3111: Numerical Computing in Chemical and Biochemical Engineering
File: 4285.14	CHEM ENG 4091: Chemical Process Design I
File: 862.18	CHEM ENG 4097: Chemical Process Design II
File: 4284.8	CHEM ENG 4201: Biochemical Separations and Control Laboratory
File: 52.1	CHEM ENG 4300: Patent Law
File: 1629.1	CIV ENG 5156: Pavement Design
File: 649.2	COMP ENG 2210: Introduction to Digital Logic
File: 2.1	EDUC 1040: Perspectives In Education
File: 2494.7	EDUC 3203: Introduction to STEM Education
File 1758.5	EDUC 3216: Teaching Reading in Content Area
File: 4517.6	EDUC 3220: Teaching Science in the Elementary Classroom
File: 2541.8	EDUC 3221: Teaching Math in Elementary and Middle Schools
File: 176.1	EDUC 3280: Teaching Methods and Skills in the Content Areas
File: 1839.1	EDUC 3340: Current Issues in Educ: Performance Based Assessment, Intermediate
File: 4519.4	EDUC 3430: Literature for Children
File: 4518.3	EDUC 3530: Integrated Social Studies and Humanities for the Elementary Classroom
File: 1558.1	ELEC ENG 5810: Computational Intelligence
File: 826.1	IS&T 1750: Introduction to Management Information Systems
File: 2225.13	IS&T 3333: Data Networks and Information Security
File: 4407.13	IS&T 5520: Data Science and Machine Learning with Python
File: 1561.1	IS&T 5887: Human-Computer Interaction Evaluation
File: 1596.6	MET ENG 5150: Introduction to Metal Additive Manufacturing
File: 4583	POL SCI 4500: Geopolitics and International Security

Review of submitted Degree Change forms:

File: 150.65	CH ENG-BS: Chemical Engineering BS
File: 153.60	CP ENG-BS: Computer Engineering BS
File: 155.47	EL ENG-BS: Electrical Engineering BS

Review of submitted Experimental Course forms:

File: 4582	ELEC ENG 5001.007: Process Control System Safety, Security and Alarms
File: 4584	HISTORY 3001.007: World History

Continued discussion and presentation of the proposed undergraduate and graduate certificates' policies and procedures as an addendum to the Minor Creation Policy.

Discussion from the Campus Curricula Committee to implement a policy for *admission to a discipline or department* as an appropriate course prerequisite.

Discussion to revise and implement Spring 2019 Curricula meeting dates that are satisfactory to the Campus Curricula Committee.

Course Change Request

Date Submitted: 12/06/18 2:55 pm

Viewing: **CHEM ENG 3111 : Numerical Computing in Chemical and Biochemical Engineering**

File: 4279.17

Last approved: 03/06/17 3:15 am

Last edit: 12/17/18 12:16 pm

Changes proposed by: jcwang

Programs referencing this course	CH ENG-BS: Chemical Engineering BS
Other Courses referencing this course	In The Prerequisites: CHEM ENG 3131 : Separations in Chemical and Biochemical Engineering CHEM ENG 3150 : Chemical Engineering Reactor Design

Requested Effective Change Date	Fall **2019** ~~2017~~
Department	Chemical and Biochemical Engineering
Discipline	Chemical Engineering (CHEM ENG)
Course Number	3111
Title	Numerical Computing in Chemical and Biochemical Engineering
Abbreviated Course Title	Numerical Computing
Catalog Description	~~The students are introduced to the concepts of engineering problem formulation, model building, and multi scale models.~~**Students will add** ~~Matlab, spreadsheet and polymath computing are used~~ to **their programming skills by exploring numerical computational techniques for solving and analyzing** ~~solve chemical engineering problems involving systems of linear and non linear~~ algebraic **and calculus-based equations** ~~equations,~~ and **systems of equations that describe chemical engineering processes.** ~~ordinary and partial differential equations.~~
Prerequisites	Math 3304 and either both Comp Sci **1570** ~~1971~~ and Comp Sci **1580,** ~~1981~~ or both Comp Sci **1971 and Comp Sci 1981, or both Comp Sci** 1972 **and Comp Sci 1982; Admitted to the Chemical Engineering Program.** ~~and Comp Sci 1982.~~ **discuss** ~~Admitted to the Chemical Engineering Program.~~
Field Trip Statement	
Credit Hours	LEC: 2 LAB: 1 IND: 0 RSD: 0 Total: 3
Required for Majors	Yes
Elective for Majors	No

Justification for change:	ChE 3111 is a new course in the new chemical engineering curriculum. Its catalog description is updated based on the instructor's input and suggestion. Its prerequisite is also expanded to include Comp Sci 1570 and Comp Sci 1580 as these two courses have been accepted as equivalent to the other Comp Sci courses by the ChE department in recent years.	2. Mar 6, 2017 by kristyg (4279.14)
Semesters previously offered as an experimental course		
Co-Listed Courses:		

Course Reviewer Comments	**sraper (12/17/18 12:16 pm):** We need to discuss Prereq statement at the CCC meeting that this is discussed. Will bring feedback from Eng DSCC.

Key: 4279

Preview Bridge

Course Change Request

Date Submitted: 12/06/18 12:57 pm

Viewing: **CHEM ENG 4091 : Chemical Process Design I**

File: 4285.14

Last approved: 03/06/17 3:15 am

Last edit: 12/06/18 12:57 pm

Changes proposed by: jcwang

Programs referencing this course	CH ENG-BS: Chemical Engineering BS
Other Courses referencing this course	In The Prerequisites: CHEM ENG 4097 : Chemical Process Design II

Requested Effective Change Date	Fall **2019** ~~2017~~
Department	Chemical and Biochemical Engineering
Discipline	Chemical Engineering (CHEM ENG)
Course Number	4091
Title	Chemical Process Design I
Abbreviated Course Title	Chem Process Design I
Catalog Description	Economic analysis of a chemical process including capital requirements, operating costs, earnings, and profits. The economic balance is applied to chemical engineering operations and processes. Optimization and scheduling techniques are applied to process evaluation. Preliminary process design and use of simulation software.
Prerequisites	~~Either (Chem Eng 3150,~~ Chem Eng 3131 and Chem Eng **3141;** ~~3141) or (Chem Eng 3150 and~~ preceded or accompanied by **either** Chem Eng **3150 or Chem Eng 5250.** ~~5250).~~
Field Trip Statement	
Credit Hours	LEC: 1　　LAB: 2　　IND: 0　　RSD: 0　　Total: 3
Required for Majors	Yes
Elective for Majors	No
Justification for change:	To update the chain of prerequisites for the new chemical engineering curriculum that will be fully implemented in Fall 2019.
Semesters previously offered as an	

Approval Path

1. 12/11/18 6:04 pm Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
2. 12/12/18 9:51 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/17/18 12:15 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 1:18 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Jan 10, 2017 by Daniel Forciniti (forcinit)

experimental course

Co-Listed Courses:

Course Reviewer Comments

Key: 4285

Preview Bridge

Course Change Request

Date Submitted: 12/06/18 12:56 pm

Viewing: **CHEM ENG 4097 : Chemical Process Design II**

File: 862.18

Last approved: 03/06/17 3:15 am

Last edit: 12/06/18 12:56 pm

Changes proposed by: jcwang

Programs referencing this course	[CH ENG-BS: Chemical Engineering BS](#)

Requested Effective Change Date	Fall **2019** ~~2017~~
Department	Chemical and Biochemical Engineering
Discipline	Chemical Engineering (CHEM ENG)
Course Number	4097
Title	Chemical Process Design II
Abbreviated Course Title	Chem Process Design II

Catalog Description

Engineering principles involved in the design and layout of chemical process equipment. Material and energy balances, equipment selection and design, and preconstruction cost estimation are performed for a capstone design project. Communication emphasized course.

Prerequisites

Chem Eng **3150** ~~3130~~ and Chem Eng **4091;** ~~3150;~~ preceded or accompanied by ~~either~~ Chem Eng **4110.** ~~4091 or both Chem Eng 4110 and Chem Eng 4096.~~

Field Trip Statement

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

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. CAT entry
11. Peoplesoft

Approval Path

1. 12/11/18 6:04 pm Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
2. 12/12/18 9:51 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/17/18 12:17 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 1:18 pm Brittany Parnell (ershenb):

Justification for
change:
   To remove prerequisite courses existing in the old chemical engineering curriculum
   which will be completely phased out in Spring 2019, and to update the chain of
   prerequisites for the new chemical engineering curriculum.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:

Course Reviewer
Comments

History

1. May 4, 2015 by
   luksc (862.1)
2. Mar 6, 2017 by
   forcinit (862.4)

Key: 862

Preview Bridge

Course Change Request

Date Submitted: 12/06/18 2:51 am

Viewing: **CHEM ENG 4201 : Biochemical Separations and Control Laboratory**

File: 4284.8

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

Last edit: 12/06/18 2:51 am

Changes proposed by: jcwang

Programs referencing this course	CH ENG-BS: Chemical Engineering BS

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	Chemical and Biochemical Engineering
Discipline	Chemical Engineering (CHEM ENG)
Course Number	4201
Title	Biochemical Separations and Control Laboratory
Abbreviated Course Title	Biochemical Separations

Catalog Description	Introduction to the unit operations employed in the separation of chemicals and biochemicals. The experiments illustrate the staged and continuous separation systems that are involved. Application of concepts of industrial process dynamics and control. Communications emphasized.
Prerequisites	**Preceded or accompanied by** Chem Eng 5250.
Field Trip Statement	
Credit Hours	LEC: 1 LAB: 2 IND: 0 RSD: 0 Total: 3
Required for Majors	Yes
Elective for Majors	No

Justification for change:	Chem Eng 5250 is changed from a prerequisite to a co-requisite based on the instructor's and the students' experiences for improving the teaching and learning effectiveness. This change will also potentially help reduce the students' time to graduate.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

In Workflow

1. **RCHEMENG Chair**
2. **CCC Secretary**
3. **Engineering DSCC Chair**
4. **Pending CCC Agenda post**
5. **CCC Meeting Agenda**
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9. Registrar
10. CAT entry
11. Peoplesoft

Approval Path

1. 12/11/18 6:04 pm Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
2. 12/12/18 9:52 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/17/18 12:15 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 1:18 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. May 24, 2016 by Daniel Forciniti (forcinit)

Course Reviewer
Comments

Key: 4284

Preview Bridge

Course Change Request

Date Submitted: 10/31/18 12:07 pm

Viewing: **CHEM ENG 4300 : Patent Law**

File: 52.1

Last edit: 11/21/18 9:57 am

Changes proposed by: ershenb

Other Courses referencing this course	In The Catalog Description: ENG MGT 5514 : Patent Law

Requested Effective Change Date	**Summer 2019** ~~08/01/2014~~
Department	Chemical and Biochemical Engineering
Discipline	Chemical Engineering (CHEM ENG)
Course Number	4300
Title	Patent Law
Abbreviated Course Title	Patent Law

Catalog Description

A presentation of the relationship between patent law and technology for students involved with developing and protecting new technology or pursuing a career in patent law. Course includes an intense study of patentability and preparation and prosecution of patent applications.

Prerequisites

Senior or graduate standing.

Field Trip Statement

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

In Workflow

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

Approval Path

1. 10/30/18 2:14 am Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
2. 10/30/18 8:38 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 10/31/18 11:41 am Brittany Parnell (ershenb): Rollback to Initiator
4. 11/15/18 4:37 am Muthanna Al-

Justification for change:

  This course form will serve two purposes due to a CourseLeaf technicality:

  1. This form is being submitted as a course change form to remove the co-list ENG MGT 5514 Patent Law which will remain an active course (per Steve Raper).

  2. Per the justification below (Jee-Ching Wang), this form will also serve as a proposal to deactivate CHEM ENG 4300 Patent Law.
  This course has been stopped by the ChE department being accepted as a ChE Tech. Elect. courses many years ago, but somehow still remains in the list of ChE courses. ChE faculty and students have suggested to remove it in order to avoid possible confusion.

Semesters previously offered as an experimental course

Co-Listed Courses:
  ENG MGT 5514 - Patent Law

Course Reviewer Comments

  ershenb (10/31/18 11:41 am): Rollback: Rollback per email with Dr. Raper. The co-list ENG MGT 5514 needs to remain an active course.
  ershenb (10/31/18 12:09 pm): removed the ENG MGT 5514 co-list

Dahhan (aldahhanm): Approved for RCHEMENG Chair

5. 11/15/18 7:53 am Suzanna Long (longsuz): Approved for RENGMNGT Chair

6. 11/15/18 10:20 am Brittany Parnell (ershenb): Approved for CCC Secretary

7. 11/21/18 9:51 am Stephen Raper (sraper): Approved for Engineering DSCC Chair

8. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Key: 52

Preview Bridge

Course Change Request

Date Submitted: 09/18/18 11:01 pm

Viewing: **CIV ENG 5156 : ~~Concrete~~ Pavement Design**

File: 1629.1

Last edit: 11/16/18 10:24 am

Changes proposed by: liujuan

Programs referencing this course	ARC ENG-BS: Architectural Engineering BS

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	Civil, Architectural, and Environmental Engineering
Discipline	Civil Engineering (CIV ENG)
Course Number	5156
Title	~~Concrete~~ Pavement Design
Abbreviated Course Title	~~Concrete~~ Pavement Design
Catalog Description	**Principles** ~~Design~~ of **flexible and rigid pavement design** ~~rigid pavements~~ including ~~loading characteristics, properties of pavement components,~~ stress **analysis, load and environmental** ~~distribution, and the~~ effects **and material characteristics; Introduction to AASHTO, PCA, AI, FAA, MEPDG, and other design methods; design of overlays and drainage system; pavement performance evaluation and rehabilitation techniques.** ~~of climatic variables on design criteria.~~
Prerequisites	Civ Eng 3116 with a grade of "C" or better.
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:	There are overlaps in concrete and asphalt pavement designs such as loading characteristics (traffic consideration), climatic variables, properties of other pavement components (layers beneath), etc. It will be more beneficial to provide senior undergraduate and graduate students an overview of pavement system and fundamentals of pavement design through one course.
Semesters previously offered as an experimental course	**N/A**

Co-Listed
Courses:

Course Reviewer Comments	**sraper (11/16/18 10:24 am):** checked elective for majors.

Key: 1629

Course Change Request

Date Submitted: 11/29/18 9:25 am

Viewing: **COMP ENG 2210 : Introduction to Digital Logic**

File: 649.2

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

Last edit: 11/29/18 9:27 am

Changes proposed by: ershenb

Programs referencing this course	ARC ENG-BS: Architectural Engineering BS CP ENG-BS: Computer Engineering BS EL ENG-BS: Electrical Engineering BS CMP SC-BS: Computer Science BS
Other Courses referencing this course	**In The Prerequisites:** COMP ENG 2211 : Computer Engineering Laboratory COMP ENG 3110 : Computer Organization and Design COMP ENG 3150 : Introduction to Microcontrollers and Embedded System Design COMP ENG 3151 : Digital Engineering Lab II COMP ENG 4096 : Computer Engineering Senior Project I COMP ENG 5210 : Introduction To VLSI Design COMP ENG 5220 : Digital System Modeling COMP ENG 5230 : Optical Computing COMP ENG 5510 : Fault-Tolerant Digital Systems COMP ENG 5803 : Mathematical Logic I COMP ENG 6210 : Digital Logic COMP SCI 3803 : Computer Organization COMP SCI 5203 : Mathematical Logic I ELEC ENG 3100 : Electronics I ELEC ENG 3101 : Electronics I Laboratory ELEC ENG 4096 : Electrical Engineering Senior Project I ELEC ENG 5250 : Optical Computing MATH 5154 : Mathematical Logic I PHILOS 3254 : Symbolic Logic in Argumentation PHILOS 4354 : Mathematical Logic I

Requested Effective Change Date	Fall **2019** ~~2015~~
Department	Electrical and Computer Engineering
Discipline	Computer Engineering (COMP ENG)
Course Number	2210
Title	Introduction to Digital Logic
Abbreviated Course Title	Intro to Digital Logic
Catalog Description	**Examines the core components from which digital systems are designed, constructed, and analyzed. Topics include binary numbers, truth tables, Boolean algebra, Karnaugh maps, combinational logic, digital components, CMOS,**

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. 11/29/18 12:11 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 11/30/18 2:45 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/13/18 3:02 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Feb 9, 2015 by stanleyj (649.1)

	programmable logic devices, and sequential circuits. ~~Binary arithmetic, Boolean~~ ~~algebra, logic and memory elements, computer organization.~~
Prerequisites	~~Sophomore standing.~~Comp Eng 2211 is ~~also~~ a co-requisite for Comp Eng and Elec Eng **majors, but it is not required for other** majors.
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:	The current course description does not adequately present the topics covered in Comp Eng 2210. A large number of out-of-department students take Comp Eng 2210. The updated course description provides more details for faculty, Missouri S&T students, transfer students, and prospective students for the required topics covered in this core course. The sophomore standing requirement is being waived because there is no fundamental computer engineering background necessary for this course. The sophomore standing prerequisite has been waived for numerous students. The Comp Eng faculty unanimously approved the course description change on November 15, 2018.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

Course Reviewer Comments	**ershenb (11/29/18 9:27 am):** Submitted the proposed changes per the request of Dr. Stanley (CourseLeaf technical difficulties).

Key: 649

Preview Bridge

Course Change Request

Date Submitted: 11/30/18 12:22 pm

Viewing: **EDUC 1040 : Perspectives In Education**

File: 2.1

Last edit: 12/07/18 3:49 pm

Changes proposed by: carterke

Catalog Pages referencing this course	Teacher Education and Certification
Programs referencing this course	BUS&MS-BS: Business and Mgmt Systems BS
Other Courses referencing this course	In The Prerequisites: ART 3219 : Art For Elementary Teachers EDUC 1104 : Teacher Field Experience EDUC 1164 : Aiding Elementary, Middle And Secondary Schools EDUC 1174 : School Organization & Adm For Elementary & Secondary Teachers EDUC 2219 : Art For Elementary Teachers EDUC 2251 : Historical Foundation Of American Education EDUC 3211 : Child Psychology EDUC 3215 : Teaching of Reading in Elementary and Middle School EDUC 3218 : Language Arts for Elementary Teachers EDUC 3280 : Teaching Methods And Skills In The Content Areas EDUC 3290 : Coordination of Cooperative Education

Requested Effective Change Date	**Fall 2019** ~~08/01/2014~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	1040
Title	Perspectives In Education Perspectives In Educ

In Workflow

1. **RPHILOSO Chair**
2. **REDUCATION Chair**
3. **CCC Secretary**
4. **Social Sciences 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. CAT entry
12. Peoplesoft

Approval Path

1. 12/06/18 3:33 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:09 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 11:16 am Brittany Parnell (ershenb): Approved for CCC Secretary

Abbreviated Course Title					

Catalog Description

This course is an introduction course which will assist students planning to enter the teacher-education program in assessing their personal and professional characteristics required for the teaching profession. It is an overview of the teacher education profession for elementary, middle and secondary.

Prerequisites

Education emphasis declared.

Field Trip Statement

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

4. 12/14/18 3:10 pm
Barry Flachsbart (barryf):
Approved for Social Sciences DSCC Chair

5. 12/17/18 10:24 am
Brittany Parnell (ershenb):
Approved for Pending CCC Agenda post

Justification for change:	This course is specifically geared to those that intend to teach.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

Course Reviewer Comments

Key: 2

Course Change Request

Date Submitted: 12/06/18 3:21 pm

Viewing: **EDUC 3203 : Introduction to STEM Education**

File: 2494.7

Last approved: 03/26/18 3:33 am

Last edit: 12/11/18 11:20 am

Changes proposed by: carterke

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3203
Title	Introduction to STEM Education
Abbreviated Course Title	Intro to STEM Education

Catalog Description	A study of current methodologies for teaching in area of specialization. Students are introduced to a variety of instructional programs including Project Lead the Way.
Prerequisites	**Educ 3220.**
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:	Much of the material from 3220 is applied in 3203.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

Course Reviewer Comments

Key: 2494

In Workflow

1. **RPHILOSO Chair**
2. **REDUCATION Chair**
3. **CCC Secretary**
4. **Social Sciences 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. CAT entry
12. Peoplesoft

Approval Path

1. 12/06/18 3:33 pm
   Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:10 pm
   Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 11:20 am
   Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/14/18 3:10 pm
   Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
5. 12/17/18 10:24 am
   Brittany Parnell (ershenb):

Approved for Pending CCC Agenda post

History

1. Mar 6, 2017 by dewittp (2494.1)
2. Mar 26, 2018 by schwartzem (2494.2)

Preview Bridge

Course Change Request

Date Submitted: 11/30/18 12:28 pm

Viewing: **EDUC 3216 : Teaching Reading in Content Area**

File: 1758.5

Last approved: 10/31/16 3:10 am

Last edit: 12/11/18 11:55 am

Changes proposed by: carterke

Catalog Pages referencing this course	Teacher Education and Certification
Programs referencing this course	BUS&MS-BS: Business and Mgmt Systems BS

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3216
Title	Teaching Reading in Content Area
Abbreviated Course Title	Teach Read in Cont Area

Catalog Description	For elementary, middle and secondary school teachers. Specific ways teachers can help students improve reading skills in content areas and ways reading can be taught in reading classes.
Prerequisites	**Educ 1040.**
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:	This course is specific to teaching and learning strategies to assist with reading comprehension using content area resources. Having taken 1040, students have the background knowledge necessary and are committed to becoming a teacher.
Semesters previously offered as an experimental course	

In Workflow

1. **RPHILOSO Chair**
2. **REDUCATION Chair**
3. **CCC Secretary**
4. **Social Sciences 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. CAT entry
12. Peoplesoft

Approval Path

1. 12/06/18 3:34 pm
   Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:10 pm
   Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 11:56 am
   Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/14/18 3:10 pm
   Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
5. 12/17/18 10:24 am
   Brittany Parnell (ershenb):

Co-Listed Courses:		Approved for Pending CCC Agenda post

Course Reviewer Comments	

Key: 1758

History

1. Oct 31, 2016 by dewittp (1758.1)

Course Change Request

Date Submitted: 12/06/18 3:22 pm

Viewing: **EDUC 3220 : Teaching Science in the Elementary Classroom**

File: 4517.6

Last approved: 07/03/18 3:40 am

Last edit: 12/11/18 11:59 am

Changes proposed by: carterke

Requested Effective Change Date	**Fall 2019** 08/14/2018
Department	**Teacher Education and Certification** Arts, Languages, & Philosophy
Discipline	Education (EDUC)
Course Number	3220
Title	Teaching Science in the Elementary Classroom
Abbreviated Course Title	Teaching Science

Catalog Description

A study in methods and materials for teaching science. This course will cultivate students' understanding of Science, Technology, Engineering and Mathematics (STEM) education with a focus on implications for teaching and learning.

Prerequisites
Educ 1040.

Field Trip Statement

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

Approval Path

1. 12/06/18 3:34 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:10 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 12:00 pm Brittany Parnell (ershenb): Approved for CCC Secretary

Justification for change:

Students need a general understanding of the teaching profession before taking a methods course.

Semesters previously offered as an experimental course

  Fall 2015
  Fall 2017

  Fall 2015 enrollment- 10
  Fall 2017 enrollment- 15

Co-Listed Courses:

Course Reviewer Comments

Key: 4517

4. 12/14/18 3:10 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair

5. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Jul 3, 2018 by Michelle Schwartze (schwartzem)

Course Change Request

Date Submitted: 12/06/18 3:25 pm

Viewing: **EDUC 3221 : Teaching Math in Elementary and Middle Schools**

File: 2541.8

Last approved: 12/14/16 3:14 am

Last edit: 12/11/18 12:01 pm

Changes proposed by: carterke

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3221
Title	Teaching Math in Elementary and Middle Schools
Abbreviated Course Title	Tch Math Elem & Mid Sch

Catalog Description

The course presents an overview of how children learn mathematics, various techniques in teaching mathematics, and examples of applying these techniques to specific mathematical concepts (such as geometry, measurement, basic operations, statistics and probability, etc.).

Prerequisites

Math 1120 or Math **1140; Educ 1040.** ~~1140.~~

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:

Approval Path

1. 12/06/18 3:34 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:10 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 12:15 pm Brittany Parnell (ershenb): Approved for CCC Secretary

As a methods course, students need background knowledge in education before attempting this course.

Semesters
previously
offered as an
experimental
course

Co-Listed
Courses:
MATH 3921 - Teaching Math in Elementary and Middle Schools

Course Reviewer
Comments

Key: 2541

4. 12/14/18 3:10 pm
   Barry Flachsbart
   (barryf):
   Approved for
   Social Sciences
   DSCC Chair
5. 12/17/18 10:24
   am
   Brittany Parnell
   (ershenb):
   Approved for
   Pending CCC
   Agenda post

History

1. May 6, 2016 by
   welchms (2541.1)
2. Dec 14, 2016 by
   dewittp (2541.5)

Preview Bridge

Course Change Request

Date Submitted: 11/30/18 4:30 pm

Viewing: **EDUC 3280 : Teaching Methods and ~~And~~ Skills in the ~~In The~~ Content Areas**

File: 176.1

Last edit: 12/17/18 9:26 am

Changes proposed by: carterke

Catalog Pages referencing this course	Teacher Education and Certification
Programs referencing this course	BUS&MS-BS: Business and Mgmt Systems BS

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3280
Title	Teaching Methods **and** ~~And~~ Skills **in the** ~~In The~~ Content Areas
Abbreviated Course Title	Tchg **Mth** ~~Meth~~ Content Areas
Catalog Description	Series of weekly experiences, demonstrations, observations, micro teaching, small group discussions to develop concepts of and skills in a variety of basic teaching tasks. Also, demonstration and lecture exercises in the preparation and use of audio visual materials for teaching.
Prerequisites	Educ **3216** ~~1040~~ and **English 3170.** ~~1104.~~
Field Trip Statement	
Credit Hours	LEC: 6 LAB: 0 IND: 0 RSD: 0 Total: 6
Required for Majors	No
Elective for Majors	No
Justification for change:	3280 is the culminating course in preparation for student teaching. 3216 and 3170 include strategies, methods and skills needed to succeed in 3280.
Semesters previously offered as an experimental course	

In Workflow

1. **RPHILOSO Chair**
2. **REDUCATION Chair**
3. **CCC Secretary**
4. **Social Sciences 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. CAT entry
12. Peoplesoft

Approval Path

1. 12/06/18 3:34 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:11 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 12:20 pm Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/14/18 3:10 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
5. 12/17/18 10:24 am Brittany Parnell (ershenb):

Co-Listed Courses:		Approved for Pending CCC Agenda post
Course Reviewer Comments		

Key: 176

Preview Bridge

Course Change Request

Date Submitted: 11/30/18 4:34 pm

Viewing: **EDUC 3340 : Current Issues In Educ:Performance Based Assessment, Intermediate**

File: 1839.1

Last edit: 12/11/18 12:30 pm

Changes proposed by: carterke

Requested Effective Change Date	**Fall 2019** ~~08/01/2014~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3340
Title	Current Issues In Educ:Performance Based Assessment, Intermediate
Abbreviated Course Title	Perform Base Assess Inte

Catalog Description	This course will provide participants with an understanding of performance-based assessments, how to construct performance tasks and how to construct scoring guides.
Prerequisites	**Educ 1040.**
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:	This course is a requirement for DESE to become certified. It is geared toward assessing student performance in the classroom, so it is designed for education emphasis students.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

Course Reviewer Comments

Key: 1839

In Workflow

1. **RPHILOSO Chair**
2. **REDUCATION Chair**
3. **CCC Secretary**
4. **Social Sciences 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. CAT entry
12. Peoplesoft

Approval Path

1. 12/06/18 3:34 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:11 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 1:12 pm Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/14/18 3:10 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
5. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for

Pending CCC
Agenda post

Preview Bridge

Course Change Request

Date Submitted: 11/30/18 4:36 pm

Viewing: **EDUC 3430 : Literature for Children**

File: 4519.4

Last approved: 03/26/18 3:33 am

Last edit: 12/11/18 1:14 pm

Changes proposed by: carterke

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3430
Title	Literature for Children
Abbreviated Course Title	Literature for Children

Catalog Description	A study of children's literary works, authors, genres, and illustrators appropriate for the elementary classroom.
Prerequisites	**Educ 1040.**
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:	This course includes pedagogy and methodology or the use of children's literature in the classroom for instruction. It is appropriate for education emphasis students.
Semesters previously offered as an experimental course	Spring 2016 Spring 2018 Spring 2016 enrollment -11 Spring 2018 enrollment - 9
Co-Listed Courses:	

Course Reviewer Comments

Key: 4519

In Workflow

1. **RPHILOSO Chair**
2. **REDUCATION Chair**
3. **CCC Secretary**
4. **Social Sciences 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. CAT entry
12. Peoplesoft

Approval Path

1. 12/06/18 3:34 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:12 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 1:14 pm Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/14/18 3:10 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
5. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for

Pending CCC
Agenda post

History

1. Mar 26, 2018 by
   Michelle
   Schwartze
   (schwartzem)

Preview Bridge

Course Change Request

Date Submitted: 12/06/18 3:29 pm

Viewing: **EDUC 3530 : Integrated Social Studies and Humanities for the Elementary Classroom**

File: 4518.3

Last approved: 03/26/18 3:33 am

Last edit: 12/11/18 1:15 pm

Changes proposed by: carterke

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	**Teacher Education and Certification** ~~Arts, Languages, & Philosophy~~
Discipline	Education (EDUC)
Course Number	3530
Title	Integrated Social Studies and Humanities for the Elementary Classroom
Abbreviated Course Title	Teaching Social Studies

Catalog Description	The course will focus on the methodology and materials needed to facilitate elementary students' development in social studies. This course will integrate the curriculum and teaching strategies in social studies with music, physical education, and art.
Prerequisites	**Educ 1040.**
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:	Students need background knowledge in education before taking a methods course.
Semesters previously offered as an experimental course	Spring 2016 Spring 2018 Spring 2016 enrollment- 11 Spring 2018 enrollment- 12
Co-Listed Courses:	

Course Reviewer Comments

Key: 4518

Approval Path

1. 12/06/18 3:34 pm Audra Merfeld-Langston (audram): Approved for RPHILOSO Chair
2. 12/10/18 4:12 pm Kelly Carter (carterke): Approved for REDUCATION Chair
3. 12/11/18 1:17 pm Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/14/18 3:10 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
5. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for

Pending CCC
Agenda post

History

1. Mar 26, 2018 by
   Michelle
   Schwartze
   (schwartzem)

Preview Bridge

Course Change Request

Date Submitted: 11/29/18 11:13 am

Viewing: **ELEC ENG 5810** ~~5310~~ **: Computational Intelligence**

File: 1558.1

Last edit: 11/29/18 11:13 am

Changes proposed by: kte

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	Electrical and Computer Engineering
Discipline	Electrical Engineering (ELEC ENG)
Course Number	**5810** ~~5310~~
Title	Computational Intelligence
Abbreviated Course Title	Computational Intelligence

Catalog Description

Introduction to Computational Intelligence (CI), Biological and Artificial Neuron, Neural Networks, Evolutionary Computing, Swarm Intelligence, Artificial Immune Systems, Fuzzy Systems, and Hybrid Systems. CI application case studies covered include digital systems, control, power systems, forecasting, and time-series predictions.

Prerequisites

Graduate Standing.

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:

In ECE, the second digit in a course number represents an area. A digit of "3" should be a control systems course and this is not a controls course. The second digit changed to "8" which is the correct one for areas outside of EE.

In Workflow

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

Approval Path

1. 11/29/18 12:11 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 11/29/18 12:16 pm Suzanna Long (longsuz): Approved for RENGMNGT Chair
3. 11/30/18 2:45 pm Brittany Parnell (ershenb): Approved for CCC Secretary
4. 12/13/18 3:02 pm Stephen Raper

Semesters previously offered as an experimental course

Co-Listed Courses:
  COMP ENG 5310 - Computational Intelligence
  SYS ENG 5211 - Computational Intelligence

Course Reviewer Comments

(sraper): Approved for Engineering DSCC Chair

5. 12/17/18 10:25 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Key: 1558

Preview Bridge

Course Change Request

Date Submitted: 12/13/18 9:13 am

Viewing: **IS&T 1750 : Introduction to Management Information Systems**

File: 826.1

Last edit: 12/13/18 9:13 am

Changes proposed by: barryf

Programs referencing this course	BUS&MS-BS: Business and Mgmt Systems BS
Other Courses referencing this course	In The Prerequisites:
	BUS 5730 : Machine Learning and Artificial Intelligence for Business
	ERP 2110 : Introduction to Enterprise Resource Planning
	ERP 4220 : Introduction to Enterprise Decision Dashboard Prototyping
	ERP 5410 : Use of Business Intelligence
	IS&T 3333 : Data Networks and Information Security
	IS&T 3423 : Database Management
	IS&T 4641 : Digital Commerce and the Internet of Things

Requested Effective Change Date	**Fall 2019** ~~08/01/2014~~
Department	Business and Information Technology
Discipline	Info Science & Technology (IS&T)
Course Number	1750
Title	Introduction to Management Information Systems
Abbreviated Course Title	Intro to MIS
Catalog Description	This course familiarizes the students with the fundamental concepts and principles of management information systems. Topics covered include the strategic role of IT, decision support systems, database and datawarehouse, enterprise applications, mobile applications, and social and ethical issues related to information systems.
Prerequisites	
Field Trip Statement	
Credit Hours	LEC: **3** ~~2~~ LAB: **0** ~~1~~ IND: 0 RSD: 0 Total: 3
Required for Majors	**Yes** ~~No~~
Elective for Majors	No
Justification for change:	Revise to be 3 hours of lecture rather than a mix of lecture and lab.

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. 12/14/18 2:20 am siauk: Approved for RINFSCTE Chair
2. 12/14/18 1:07 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/14/18 3:13 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 12/17/18 10:26 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Semesters previously offered as an experimental course

Co-Listed Courses:

Course Reviewer Comments

Preview Bridge

Course Change Request

Date Submitted: 11/14/18 1:46 pm

Viewing: **IS&T 3333 : Data Networks and Information Security**

File: 2225.13

Last approved: 10/29/18 5:56 am

Last edit: 11/20/18 9:20 am

Changes proposed by: barryf

Other Courses referencing this course	In The Prerequisites:
	IS&T 3321 : Network Performance Design And Management
	IS&T 4642 : E-Commerce Architecture
	IS&T 6780 : Adv Human and Organizational Factors in Cybersecurity

Requested Effective Change Date	**Fall** ~~Spring~~ 2019
Department	Business and Information Technology
Discipline	Info Science & Technology (IS&T)
Course Number	3333
Title	Data Networks and Information Security
Abbreviated Course Title	Netwk and Info Security
Catalog Description	The course provides an overview of current and evolving networking and information security principles. Concepts include network standards and protocols; operation and management; switching and routing; area networks; wireless network infrastructure; security frameworks, policies, and management.
Prerequisites	**At least Sophomore standing.** ~~IS&T 1750; IS&T 1562 or IS&T 1552 or Comp Sci 1575.~~
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:	Professor deems the specific courses not essential; but believes that this course should not be taken in the first year.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

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. 11/18/18 4:04 pm siauk: Approved for RINFSCTE Chair
2. 11/20/18 9:20 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 11/27/18 6:11 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 12/17/18 10:26 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Feb 9, 2015 by barryf (2225.1)
2. Jun 29, 2015 by barryf (2225.4)
3. Aug 24, 2018 by ershenb (2225.7)

| Course Reviewer Comments | 4. Oct 29, 2018 by barryf (2225.8) |

Key: 2225

Preview Bridge

Course Change Request

Date Submitted: 11/14/18 1:46 pm

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

File: 4407.13

Last approved: 10/29/18 5:57 am

Last edit: 11/20/18 9:22 am

Changes proposed by: barryf

Catalog Pages referencing this course	Business Administration Information Science and Technology

Requested Effective Change Date	**Fall** ~~Spring~~ 2019
Department	Business and Information Technology
Discipline	Info Science & Technology (IS&T)
Course Number	5520
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, **Matplotlib,** ~~Matplotib,~~ and Scikit-learn are utilized.
Prerequisites	One of Stat 3111, Stat 3113, Stat 3115, or Stat 3117; one of IS&T 1552, IS&T 1562, Comp Sci 1575; for Graduate Students: 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:	Typographical error in description: Matplotib should have been Matplotlib.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

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. 11/18/18 4:04 pm siauk: Approved for RINFSCTE Chair
2. 11/20/18 9:22 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 11/27/18 6:11 pm Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 12/17/18 10:26 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)

Course Reviewer Comments	3. Jun 20, 2018 by barryf (4407.5)
	4. Oct 29, 2018 by barryf (4407.7)

Key: 4407

Preview Bridge

Course Change Request

Date Submitted: 12/14/18 3:50 pm

Viewing: **IS&T 5887 : Human-Computer Interaction Evaluation**

File: 1561.1

Last edit: 12/14/18 3:50 pm

Changes proposed by: barryf

Catalog Pages referencing this course	Engineering Management Information Science and Technology
Programs referencing this course	BUS&MS-BS: Business and Mgmt Systems BS

Requested Effective Change Date	**Fall 2019** ~~08/14/2018~~
Department	Business and Information Technology
Discipline	Info Science & Technology (IS&T)
Course Number	5887
Title	Human-Computer Interaction Evaluation
Abbreviated Course Title	HCI Evaluation

Catalog Description	This course covers research and analysis methods and tools for evaluation of the impact of information technology systems on humans and organizations. The focus will be on practical evaluation with the goal of providing recommendations for improving system functionality and usability.
Prerequisites	Preceded or accompanied by IS&T 5885.
Field Trip Statement	
Credit Hours	LEC: **3** ~~1.5~~ LAB: **0** ~~1.5~~ IND: 0 RSD: 0 Total: 3
Required for Majors	No
Elective for Majors	**Yes** ~~No~~
Justification for change:	Revise to be 3 hours of lecture rather than a mix of lecture and lab.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

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. 12/14/18 5:02 pm siauk: Approved for RINFSCTE Chair
2. 12/17/18 9:14 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/17/18 9:20 am Barry Flachsbart (barryf): Approved for Social Sciences DSCC Chair
4. 12/17/18 10:26 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Course Reviewer
Comments

Key: 1561

Preview Bridge

Course Change Request

Date Submitted: 11/15/18 1:10 pm

Viewing: **MET ENG 5150 : Introduction to Metal Additive Manufacturing** ~~Particulate Materials~~

File: 1596.6

Last approved: 10/31/16 3:11 am

Last edit: 11/16/18 3:42 pm

Changes proposed by: ershenb

Requested Effective Change Date	Fall **2019** ~~2017~~
Department	Materials Science & Engineering
Discipline	Metallurgical Engineering (MET ENG)
Course Number	5150
Title	Introduction to **Metal Additive Manufacturing** ~~Particulate Materials~~
Abbreviated Course Title	**Intro Met Additive Mfg** ~~Intro to Particulate Mat.~~

Catalog Description	**Metal and alloys associated with Additive Manufacturing (AM).** ~~Powder metallurgy and ceramic components, filters, catalysts, nanomaterials, vitamins and more depend strongly on particulate, or powder, characteristics and processing.~~**Issues with powders and wires as starting materials,** ~~Aspects of powder fabrication, characterization,~~ safety, **solidification mechanisms and development of microstructure and defects, AM part performance, and mechanical properties.** ~~handling, component fabrication, secondary processing, and applications will be covered.~~ **Current alloys being utilized and future materials being developed.**
Prerequisites	Met Eng 2110.
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:	Course now has a focus on metal powder as an additive manufacturing component.
Semesters previously offered as an experimental course	
Co-Listed Courses:	

Course Reviewer Comments	**ershenb (11/16/18 3:42 pm):** Made the proposed changes per the request of Dr. Scott Miller (CourseLeaf technical issues).

In Workflow

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

Approval Path

1. 11/15/18 7:08 pm Greg Hilmas (ghilmas): Approved for RMATSENG Chair
2. 11/16/18 3:43 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/03/18 8:53 am Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 10:26 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Oct 31, 2016 by smiller (1596.1)

Key: 1596

Course Change Request

New Course Proposal

Date Submitted: 11/26/18 11:05 am

Viewing: **POL SCI 4500 : Geopolitics and International Security**

File: 4583

Last edit: 11/27/18 9:14 am

Changes proposed by: krolikowskia

Requested Effective Change Date	Fall 2019
Department	History and Political Science
Discipline	Political Science (POL SCI)
Course Number	4500
Title	Geopolitics and International Security
Abbreviated Course Title	International Security

Catalog Description	This course surveys seminal scholarship in the field of international security and explores its relevance to contemporary geopolitical issues. Specific topics addressed may include space security, nuclear security, and technological change in military affairs.
Prerequisites	Pol Sci 1200 or History 1200 or History 1310.
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 new course:	This course complements other political-science course offerings by addressing a major field of the discipline that existing courses cannot explore in depth. This course will be of particular relevance to students pursuing degrees, certificates, or career goals related to national security, international affairs, geospatial tools and applications, government relations, the defense industries, or other technology-intensive sectors. The course is being added as part of the new Graduate Certificate in Geoanalytics and Geointelligence.
Semesters previously offered as an experimental course	N/A. Part of new certificate
Co-Listed Courses:	

Course Reviewer Comments

In Workflow

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

Approval Path

1. 11/26/18 11:24 am sfogg: Approved for RHISTORY Chair
2. 11/27/18 9:14 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 11/27/18 9:28 am Petra Dewitt (dewittp): Approved for Arts & Humanities DSCC Chair
4. 12/17/18 10:26 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Key: 4583

Preview Bridge

Program Change Request

Date Submitted: 12/11/18 7:07 pm

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

File: 150.65

Last approved: 11/02/18 11:29 am

Last edit: 12/13/18 10:56 am

Changes proposed by: jcwang

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

Start Term
Fall 2019
Program Code
CH ENG-BS
Department
Chemical and Biochemical Engineering
Title
Chemical Engineering BS

Program Requirements and Description

In Workflow

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

Approval Path

1. 12/11/18 7:37 pm Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
2. 12/13/18 3:10 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/17/18 12:16 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 1:18 pm Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

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

Bachelor of Science
Chemical Engineering

Entering freshmen desiring to study chemical engineering will be admitted to the Freshman Engineering Program. They will be permitted, if they wish, to state a chemical engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the 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 chemical engineering a minimum of 129 credit hours is required. These requirements are in addition to credit received for algebra, trigonometry and basic ROTC courses. An average of at least two grade points per credit hour must be attained. At least two grade points per credit hour must also be attained in all courses taken in chemical engineering.

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

1. All students are required to take one American history course, one economics course, one humanities course, and ENGLISH 1120. The history course is to be selected from HISTORY 1200, HISTORY 1300, HISTORY 1310, or POL SCI 1200. The economics course may be either ECON 1100 or ECON 1200. The humanities course must be selected and meets the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.
2. Depth requirement. Three credit hours must be taken in humanities or social sciences at the 1000 level or above and must be selected from the approved list. This course must have as a prerequisite one of the humanities or social sciences courses already taken. Foreign language courses numbered 1180 will be considered to satisfy this requirement. Students may receive humanities credit for foreign language courses in their native tongue only if the course is at the 3000 level or above. All courses taken to satisfy the depth requirement must be taken after graduating from high school.
3. The remaining two courses are to be chosen and meets the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog and may include one communications course in addition to ENGLISH 1120.
4. Any specific departmental requirements in the general studies area must be satisfied and meets the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog.
5. Special topics and special problems and honors seminars are allowed only by petition to and approval by the student's department chairman.

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

Freshman Year			
First Semester	**Credits**	**Second Semester**	**Credits**
FR ENG 1100	1	MECH ENG 1720	3
CHEM 1310	4	CHEM ENG 1100, or COMP SCI 1972 *and* COMP SCI 1982, or COMP SCI 1971 *and* COMP SCI 1981, or COMP SCI 1570 *and* COMP SCI 1580	3-4
CHEM 1319	1	**COMP SCI 1972, or 1971, or 1570**[7]	**2-3**
ENGLISH 1120	3	**COMP SCI 1982, or 1981, or 1580**[7]	**1**
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3	CHEM 1320	3
MATH 1214	4	MATH 1215	4
CHEM 1100	1	PHYSICS 1135	4
	17		17-18
Sophomore Year			
First Semester	**Credits**	**Second Semester**	**Credits**
CHEM ENG 2100[1]	3	CHEM ENG 2110[1]	3
CHEM ENG 2300	3	CHEM ENG 2310[2]	1
CHEM 2210	4	Science Elective[5]	4
MATH 2222	4	MATH 3304	3
PHYSICS 2135	4	Humanities and Social Sciences Elective[4]	3
		Humanities and Social Sciences Elective[4]	3
	18		17
Junior Year			
First Semester	**Credits**	**Second Semester**	**Credits**

CHEM ENG 3101	4	CHEM ENG 3131	3
CHEM ENG 3111	3	CHEM ENG 3141	2
CHEM ENG 3120[1]	3	CHEM ENG 3150	3
ECON 1100 or 1200	3	STAT 3113	3
Upper level Humanities or Social Science Elective[4]	3	ENGLISH 1160 or 3560	3
	16		14

Senior Year[3]

First Semester	Credits	Second Semester	Credits
CHEM ENG 4091	3	CHEM ENG 4097[2]	3
CHEM ENG 4101[2]	3	CHEM ENG 4130[2]	3
CHEM ENG 4140	3	CHEM ENG 5XXX-Chem Eng Elective[6]	3
CHEM ENG 4110	3	Chem Eng 5xxx --Chem Eng Elective[6]	3
CHEM ENG 4241	**3**	Chem Eng 5xxx -Chem Eng Elective[6]	3
CHEM ENG 5XXX-Chem Eng Elective[6]	3		
	15		15

| Total Credits: 129-130 |

Note: The minimum number of hours required for a degree in chemical engineering is 129.

A cumulative grade point average of 2.50 or better and a "C" or better in **CHEM 1310**, **CHEM 1319**, **CHEM 1320**, **MATH 1214**, **MATH 1215** Chem 1310, Chem 1319, Chem 1320, Math 1214, Math 1215 and **PHYSICS 1135** Physics 1135 are required to be admitted into the chemical engineering major.

[1]	A grade of "C" or better is required in CHEM ENG 2100 & CHEM ENG 2110 in order to enroll in Chem Eng 3120 .
[2]	Communications emphasized course (See bachelor of science degree, general education communications requirement).
[3]	Chemical engineering majors are encouraged to take the fundamentals of engineering exam prior to graduation. It is the first step toward becoming a registered professional engineer.
[4]	Must meet the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. The prerequisites for the upper level course must be completed with a passing grade.
[5]	CHEM 2510, or CHEM 4610 and CHEM 4619, or BIO SCI 2213 and BIO SCI 2219, or CHEM 2220 and CHEM 2219, or Bio Sci 3313 and Bio Sci 3319, or CHEM 3420 and CHEM 3459.
[6]	A minimum of 12 cr. hr. from any Chem Eng 5xxx and any class from the approved list published on the Chemical Engineering web site but only 3 cr. hr. of CHEM ENG 4000, CHEM ENG 4099 or Chem Eng 4099H. Students may have no more than three hours from approved out-of-department electives.
[7]	**The programming elective will consist of a lecture and lab combination, and may be selected from COMP SCI 1971/COMP SCI 1981, COMP SCI 1972/COMP SCI 1982, or COMP SCI 1570/COMP SCI 1580. Note that COMP SCI 1570/COMP SCI 1580 requires one more credit hour than the other option. The lecture component must be completed with a grade of "C" or better.**

Chemical Engineering
Biochemical Engineering Emphasis

| Freshman Year |

First Semester	Credits	Second Semester	Credits
FR ENG 1100	1	MECH ENG 1720	3
CHEM 1310	4	CHEM ENG 1100, or COMP SCI 1972 *and* COMP SCI 1982, or COMP SCI 1971 *and* COMP SCI 1981	3
CHEM 1319	1	COMP SCI 1972, or 1971, or 1570[6]	2-3
ENGLISH 1120	3	COMP SCI 1982, or 1981, or 1580[6]	1
HISTORY 1200, or 1300, or 1310, or POL SCI 1200	3	CHEM 1320	3
MATH 1214	4	MATH 1215	4
CHEM 1100	1	PHYSICS 1135	4
	17		17-18

Sophomore Year

First Semester	Credits	Second Semester	Credits
CHEM ENG 2100[1]	3	CHEM ENG 2110[1]	3
CHEM ENG 2300	3	CHEM ENG 2310[2]	1
CHEM 2210	4	STAT 3113	3
MATH 2222	4	Science Elective[5]	4
PHYSICS 2135	4	MATH 3304	3
		ECON 1100 or 1200	3
	18		17

Junior Year

First Semester	Credits	Second Semester	Credits
CHEM ENG 3101	4	ECON 1100 or 1200	3
CHEM ENG 3111	3	CHEM ENG 3131	3
CHEM ENG 3120[1]	3	CHEM ENG 3141	2
Science Elective[5]	4	CHEM ENG 3150	3
Humanities or Social Sciences Elective[4]	3	Science Elective[5]	4
		ENGLISH 1160 (or English 3560)	3
	17		15

Senior Year[3]

First Semester	Credits	Second Semester	Credits
CHEM ENG 4091	3	CHEM ENG 4097[2]	3
CHEM ENG 4220[2]	3	CHEM ENG 4210	3
CHEM ENG 4110	3	CHEM ENG 4220	3
CHEM ENG 5250	3	CHEM ENG 4241	3
CHEM ENG 4201	3	Humanities or Social Science Elective[4]	3
Upper Level Humanities or Social Sciences Elective[4]	3	CHEM ENG 4201[2]	3
	15		15
Total Credits: 131-132			

Note: The minimum number of hours required for a degree in chemical engineering with an emphasis in biochemical engineering is 131.

A cumulative grade point average of 2.50 or better and a "C" or better in **CHEM 1310, CHEM 1319, CHEM 1320, MATH 1214, MATH 1215** ~~Chem 1310, Chem 1319, Chem 1320, Math 1214, Math 1215~~ and **PHYSICS 1135** ~~Physics 1135~~ are required to be admitted into the chemical engineering major.

1	A grade of "C" or better is required in <u>CHEM ENG 2100</u> & <u>CHEM ENG 2110</u> in order to enroll in <u>CHEM ENG 3120</u>.
2	Communications emphasized course (See bachelor of science degree, general education communications requirement).
3	Chemical engineering majors are encouraged to take the fundamentals of engineering exam prior to graduation. It is the first step toward becoming a registered professional engineer.
4	Must meet the requirements as specified under "Engineering Degree Requirements" published in the current undergraduate catalog. The prerequisites for the upper level course must be completed with a passing grade.
5	A minimum of 12 credit hours in Science Electives are required. Select three courses from <u>CHEM 2220</u> <u>CHEM 4610</u>, <u>CHEM 4620</u>, <u>BIO SCI 2213</u>, <u>BIO SCI 3313</u>, and <u>BIO SCI 4323</u>; and a minimum of two laboratory courses from <u>CHEM 2229</u> or <u>CHEM 2219</u> <u>CHEM 4619</u>, <u>BIO SCI 2219</u>, <u>BIO SCI 3319</u>, and <u>BIO SCI 4329</u>.
6	**The programming elective consists of a lecture and lab combination, and may be selected from <u>COMP SCI 1971</u>/<u>COMP SCI 1981</u>, <u>COMP SCI 1972</u>/<u>COMP SCI 1982</u>, or <u>COMP SCI 1570</u>/<u>COMP SCI 1580</u>. Note that <u>COMP SCI 1570</u>/<u>COMP SCI 1580</u> requires one more credit hour than the other options. The lecture component must be completed with a grade of "C" or better.**

Justification for request

1. Comp Sci 1570 and Comp Sci 1580 are added as alternative choices because they have been accepted in recent years as equivalent Comp Sci courses by the ChE department.

2. Chemical process safety and biochemical process safety courses are unified into one (ChE 4241) to cover both components for all ChE students.

3. ChE 4220 and ChE 4201 are swapped between the two semesters of senior year in order to match their lecture courses better for more effective teaching and learning of BioChE emphasis area.

4. Footnote 5: Chem 2289 (Organic Chemistry Lab) is not longer offered by the Chemistry Department. The ChE department has been accepting Chem 2219 (Organic Chemistry I Lab) for this purpose in recent years.

5. Footnote 6: Replace a fixed number (4) of tech. elect. courses with an equivalent number (12) of credit hours in order to allow a greater variety of tech. elect. courses to be developed and offered to ChE students. H (honor session) was missing from and is added back to the second Chem Eng 4099 in the sentence.

Supporting Documents

Course Reviewer Comments

ershenb (12/12/18 9:07 am): .

ershenb (12/13/18 9:23 am): Per the request of Dr. Wang, removed ChE 1100 from Freshman Yr. 2nd semester from both ChE BS and BioChE emphasis. Formatted the COMP SCI programming electives

per ChE BS footnote 7 and BioChE emphasis footnote 6.

ershenb (12/13/18 10:56 am): Per Dr. Wang's request, correct the Number 3 in the justifications section to show ChE 4220 (not ChE 4210), was swapped with ChE 4201.

Key: 150

Program Change Request

Date Submitted: 11/13/18 9:23 am

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

File: 153.60

Last approved: 11/02/18 11:29 am

Last edit: 12/04/18 9:10 am

Changes proposed by: stanleyj

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

Start Term
Fall 2019
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. 11/21/18 3:37 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 11/27/18 1:36 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/03/18 8:54 am Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 10:24 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 6, 2014 by Stanley (stanleyj)
2. Aug 13, 2014 by pantaleoa

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 a minimum of **21** ~~24~~ credit hours of humanities/social-sciences as specified below:

- ENGLISH 1120
- HISTORY 1200 **or** HISTORY 1300 **or** HISTORY 1310 **or** POL SCI 1200
- ECON 1100 **or** ECON 1200
- Technical Communication Elective: ENGLISH 1160 **or** ENGLISH 3560
- SP&M S 1185
- The remaining minimum of **6** ~~9~~ additional credit hours must be three-credit hour lecture courses offered in disciplines in the humanities and social sciences. Humanities courses are defined as those in: Art, English and Technical Communication, Etymology, Foreign Languages, Music, Philosophy, Speech and Media Studies, and Theatre. Social Sciences courses are defined as those in: ~~Economics, History, Political Science, and Psychology. At least one of the courses must be at the upper level.~~**Economics, History, Political Science,** ~~Upper-level H/SS courses are defined as those at the 2000-level or above,~~ and **Psychology.** ~~that require as a prerequisite the successful completion of a lower-level H/SS course.~~ Study abroad courses may count as **H/SS courses. H/SS courses** ~~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.

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[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	**Professional Development Elective[20]**	**3**

COMP ENG Elective B[3,19]	3	Free Elective[18]	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 3151, COMP ENG 3110,COMP ENG 5410, COMP ENG 4096, and ELEC ENG 2100, ELEC ENG 2101, ELEC ENG 2120, ELEC ENG 2200, ELEC ENG 2201, and ELEC ENG 3410 and the COMP ENG electives A, B, C, D and E. Also, students may not enroll in other courses that use these courses as prerequisites until the minimum grade of "C" is attained.
4	Students may take PHYSICS 1111 and PHYSICS 1119 in place of PHYSICS 1135. Students may take PHYSICS 2111 and PHYSICS 2119 in place of PHYSICS 2135.
5	All electives must be approved by the student's advisor. Students must comply with the general education requirements with respect to selection and depth of study. These requirements are specified in the current catalog.
6	Students who drop a lecture course prior to the deadline to drop a class must also drop the corequisite lab course.
7	Students must earn a passing grade on the ELEC ENG Advancement Exam I (associated with ELEC ENG 2100) before they enroll in ELEC ENG 2120 or ELEC ENG 2200 and ELEC ENG 2201.
8	Students must earn a passing grade on the COMP ENG Advancement Exam (associated with COMP ENG 2210) before they enroll in any course with COMP ENG 2210 and COMP ENG 2211 as prerequisites.
9	Students must earn a passing grade on the ELEC ENG Advancement Exam II (associated with ELEC ENG 2120) before they enroll in ELEC ENG 3410 and ELEC ENG 3411.
10	Students must take one of the following courses: MATH 3108, MATH 3109, MATH 5302, MATH 5603, MATH 5105, MATH 5106, MATH 5107, MATH 5108, MATH 4209, MATH 4211, MATH 5215, MATH 5222, MATH 5325, MATH 4530, MATH 5737, MATH 5351, MATH 5154, MATH 4096, MATH 5483, MATH 5585, STAT 5644, STAT 5346, STAT 5353.
11	Students must take one of MECH ENG 2340, MECH ENG 2519, MECH ENG 2527, PHYSICS 2311, PHYSICS 2401, CHEM 2210, BIO SCI 2213, BIO SCI 2223, CIV ENG 2200, MECH ENG 2350, PHYSICS 2305, PHYSICS 4311, CER ENG 4240, or NUC ENG 3205.
12	Students may replace STAT 3117 with STAT 3115 or STAT 5643.
13	Student must take English 3560 or English 1160. Students may replace 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.
20	**Students must take one of the following courses:** *BUS 5980, ECON 4430, ECON 5337, ENG MGT 2310, ENG MGT 3320, ENG MGT 4110, ENG MGT 5514, PHIL 3225*

An ~~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 in** ~~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

Supporting Documents

Professional Development Elective - 1018.docx

Course Reviewer Comments

ershenb (11/27/18 1:35 pm): Removed Math 3103 from footnote 10 per Dr. Stanley's email (Math 3103 is being deactivated Spring 2019).

ershenb (12/04/18 9:10 am): grammatical edits

Key: 153

In Spring 2018, the College of Engineering and Computing made a uniform requirement for engineering degree programs of 21 humanity and social science credit hours, which meets ABET requirements. The EE and CpE BS degree programs in Spring 2018 had 24 humanity and social science credit hours, providing an opportunity for The ECE department to adopt a new 3 credit hour course addressing EE and CpE BS degree program needs. In Spring 2018, the ECE department presented the 3 credit hour opportunity to the ECE Academy and to ECE Faculty and requested feedback for 3 credit hour course that would better prepare our students for post-graduation opportunities. The ECE Academy and Faculty recommended a "Systems" elective or similar area course, where students select from a course list which could include: Project Management; Engineering Ethics; Engineering Economics; Entrepreneurship; Leadership. For CpE, in reviewing possible course adoption options, the EE and CpE Associate Chairs and the Department Chair examined the ASEE Computer Engineering Curriculum Recommendations from 2016, which include the following areas:

- Circuits and Electronics
- Computing Algorithms
- Computer Architecture and Organization
- Digital Design
- Computer Networks
- Preparation for Professional Service
- Information Security
- Signal Processing
- Systems and Project Engineering
- System Resource Management
- Software Design

In the current CpE BS degree program curriculum, there are 4 areas from the ASEE recommendations that are weakly addressed, including Information Security, Systems and Project Engineering, and System Resource Management. In evaluating the recommendations from the ECE Academy and Faculty for a "Systems" area type course could be utilized to enhance the experience for students in Preparation for Professional Service, Systems and Project Engineering, and/or System Resource Management.

This "Systems" area elective was presented to the ECE Faculty at the August 2018 ECE Faculty Retreat. The ECE Faculty recommended contacting companies and exploring currently offered undergraduate courses in the proposed course list areas. At the beginning of the Fall 2018 semester, the EE and CpE Associate Chairs for Undergraduate Studies identified possible offerings for a possible "Systems" elective. The CpE Associate Chair for Undergraduate Studies consulted with the Civil, Architectural and Environmental Engineering, Engineering Management, and Mechanical and Aerospace Engineering departments about the content, frequency of offering, and prerequisites for courses on the course list. The CpE Associate Chair for Undergraduate Studies met with 12 companies at the September 2018 Career Fair to question what course area(s) would strengthen our graduates in preparing them for internship/co-op and full time positions. The feedback from the 12 companies for a new course area includes:

- Embedded systems/Real-time systems/PLCs (3 companies)
- Leadership/Project management (5 companies)
- Communication skills (4 companies)

- Project work/Team building (5 companies)
- Business or engineering economics (2 companies)
- Technical and personal communication (4 companies)
- Ethics (1 company)

In taking the compiled list of courses from the EE and CpE Associate Chairs for Undergraduate Studies for a possible "Systems" elective and looking at the ECE Academy and Company recommendations as well as the recommendations from the departments offering the courses, the following list of undergraduate courses was compiled for a 3 credit hour Professional Elective:

- *BUS 5980 Business Models for Entrepreneurship and Innovation* (LEC 3.0)
- *ECON 4430 Cost-Benefit Analysis* (LEC 3.0)
- *ECON 5337 Financial Mathematics* (LEC 3.0)
- *ENG MGT 2310 Introduction to System Engineering (LEC 3.0)*
- *ENG MGT 3320 Introduction to Project Management (LEC 3.0)*
- *ENG MGT 4110 General Management-Design and Integration (LEC 3.0)*
- *ENG MGT 5514 Patent Law (LEC 3.0)*
- *PHIL 3225 Engineering Ethics (LEC 3.0)*

The course list was reviewed in September 2018 by the ECE Executive Committee and Department Chair. The Executive Committee was receptive to the course list but wanted to ensure that the courses would be offered regularly for students and that would be room for ECE in the sections for these courses. The Executive Committee agreed that the courses meet the intent of the ECE Academy and Company recommendations, and they fill a Professional Development elective in the "Systems" area. Accordingly, the following motion for a 3 credit hour Professional Development Elective was put together for consideration for the ECE Faculty at the October 18, 2018 faculty meeting.

Proposed motion:
- Replace the 3.0 credit hour upper level Hum/SS requirement in the EE and CpE BS degree programs with:
  - 3.0 credit hour Professional Development Elective where EE and CpE students must take one of the following courses:
    - **BUS 5980 Business Models for Entrepreneurship and Innovation** (LEC 3.0)
    - **ECON 4430 Cost-Benefit Analysis** (LEC 3.0)
    - **ECON 5337 Financial Mathematics** (LEC 3.0)
    - **ENG MGT 2310 Introduction to System Engineering** *(LEC 3.0)*
    - **ENG MGT 3320 Introduction to Project Management** *(LEC 3.0)*
    - **ENG MGT 4110 General Management-Design and Integration** *(LEC 3.0)*
    - **ENG MGT 5514 Patent Law** *(LEC 3.0)*
    - **PHIL 3225 Engineering Ethics (LEC 3.0)**
  - Professional Development Elective is either a co- or prerequisite for EE 4096/CpE 4096
- The proposed motion will reduce the EE and CpE Hum/SS requirements from 24 hours to 21 hours which meets the engineering Hum/SS requirement for S&T

After discussion, the motion was unanimously approved by the ECE Faculty to adopt this Professional Development Elective and is sought to be made effective for the Fall 2019 semester.

Program Change Request

Date Submitted: 11/28/18 11:56 am

Viewing: **EL ENG-BS : Electrical Engineering BS**

File: 155.47

Last approved: 06/18/18 12:29 pm

Last edit: 12/04/18 9:28 am

Changes proposed by: ferdowsi

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

Start Term
Fall **2019** ~~2018~~
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. 11/28/18 8:24 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 11/30/18 2:47 pm Brittany Parnell (ershenb): Approved for CCC Secretary
3. 12/13/18 3:02 pm Stephen Raper (sraper): Approved for Engineering DSCC Chair
4. 12/17/18 10:25 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

History

1. Aug 6, 2014 by Watkins (watkins)
2. Aug 13, 2014 by pantaleoa

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 a minimum of **21** ~~24~~ credit hours of humanities/social-sciences as specified below:

- **ENGLISH 1120**
- ~~ENGLISH 1120~~ ~~HISTORY 1200 or HISTORY 1300 or HISTORY 1310 or POL SCI 1200~~ **HISTORY 1200** ~~ECON 1100~~ or **HISTORY 1300** or **HISTORY 1310** or **POL SCI 1200** ~~ECON 1200~~
- **ECON 1100** or **ECON 1200**
- Technical Communication Elective: **ENGLISH 1160** or **ENGLISH 3560**
- **SP&M S 1185**
- ~~ENGL 1160 or ENGL 3560~~ ~~SP&M 1185~~ The remaining minimum of **6** ~~9~~ additional credit hours must be three-credit hour lecture courses offered in disciplines in the humanities and social sciences. Humanities courses are defined as those in: Art, English and Technical Communication, Etymology, Foreign Languages, Music, Philosophy, Speech and Media Studies, and Theatre. Social Sciences courses are defined as those in: ~~Economics, History, Political Science, and Psychology. At least one of the courses must be at the upper level.~~ **Economics, History, Political Science,** ~~Upper-level H/SS courses are defined as those at the 2000 level or above,~~ and **Psychology.** ~~that require as a prerequisite the successful completion of a lower-level H/SS course.~~ Study abroad courses may count as **H/SS courses. H/SS courses** ~~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.

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	**Professional Development Elective[20]**	**3**
Free Elective[18]	2	Free Elective[18]	3
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 SP&M S 1185 with the ROTC sequence of MIL ARMY 4250 and MIL ARMY 4500 or MIL AIR 4110 and MIL AIR 4120.
14	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.
20	**Students must take one of the following courses: BUS 5980, ECON 4430, ECON 5337, ENG MGT 2310, ENG MGT 3320, ENG MGT 4110, ENG MGT 5514, and PHILOS 3225.**

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**, ~~ELEC ENG 3001, ELEC ENG 4001, ELEC ENG 5001, COMP ENG 3001, COMP ENG 4001,~~ or **COMP ENG 5001** ~~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 in** ~~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
Supporting Documents
Course Reviewer Comments
ershenb (11/29/18 11:03 am): .
ershenb (12/04/18 9:28 am): grammatical edit

Key: 155

Course Change Request

New Experimental Course Proposal

Date Submitted: 11/26/18 10:00 am

Viewing: **ELEC ENG 5001.007 : Process Control System Safety, Security and Alarms**

File: 4582

Last edit: 12/17/18 9:57 am

Changes proposed by: kte

Requested Effective Change Date	Fall 2019
Department	Electrical and Computer Engineering
Discipline	Electrical Engineering (ELEC ENG)
Course Number	5001
Topic ID	007
Experimental Title	Process Control System Safety, Security and Alarms
Experimental Abbreviated Course Title	Proc Cont Safe Secur Alm
Instructors	Kelvin Erickson
Experimental Catalog Description	Lifecycle approach for industrial automation in the context of IEC 61511 (safety) and IEC 62443 (IACS cybersecurity) standards. Functional safety and cybersecurity fundamentals for risk analysis, safety/ cybersecurity requirements, inherently safer/secure design techniques, SIL/SL verification, operations, real-world cybersecurity attacks, alarm management.
Prerequisites	Elec Eng 3340 or Chem Eng 4110.
Field Trip Statement	None
Credit Hours	LEC: 3 LAB: 0 IND: 0 RSD: 0 Total: 3
Justification for new course:	Subject matter that is important to those in the field of process control and factory automation. This course will be taught online, using existing courses or parts of courses already offered online by Exida in these subject areas. The S&T instructor will coordinate the course, but the content will be taught by Exida engineers. I expect to add a Chem Eng co-list, but am submitting the EC now rather than wait on the CBE department.
Semester(s) previously taught	None
Co-Listed Courses:	CHEM ENG 5001 - Special Topics
Course Reviewer Comments	**ershenb (11/26/18 9:17 am):** Rollback: Rollback per Dr. Erickson's email.

In Workflow

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

Approval Path

1. 11/21/18 3:38 pm Daryl Beetner (daryl): Approved for RELECENG Chair
2. 11/26/18 9:17 am Brittany Parnell (ershenb): Rollback to Initiator
3. 11/26/18 11:21 am Daryl Beetner (daryl): Approved for RELECENG Chair
4. 11/26/18 1:54 pm Muthanna Al-Dahhan (aldahhanm): Approved for RCHEMENG Chair
5. 11/27/18 9:07 am Brittany Parnell (ershenb): Approved for CCC Secretary
6. 12/03/18 8:53 am Stephen Raper (sraper): Approved for Engineering DSCC Chair

Key: 4582

7. 12/17/18 10:25 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Preview Bridge

Course Change Request

New Experimental Course Proposal

Date Submitted: 11/27/18 3:26 pm

Viewing: **HISTORY 3001.007 : World History**

File: 4584

Last edit: 12/17/18 10:07 am

Changes proposed by: behrendta

Requested Effective Change Date	Fall 2019
Department	History and Political Science
Discipline	History (HISTORY)
Course Number	3001
Topic ID	007
Experimental Title	World History
Experimental Abbreviated Course Title	World History
Instructors	Andrew Behrendt

Experimental Catalog Description	This is an introductory survey of world history, by which is meant an overview of major processes and interactions in the development of human society since the appearance of hominids ca. 3 million years ago. It emphasizes global patterns and connections in political, social, cultural, and economic history, and adopts a global geographical perspective.
Prerequisites	One of the following: History 1100, History 1200, History 1300, or History 1310.
Field Trip Statement	
Credit Hours	LEC: 3 LAB: 0 IND: 0 RSD: 0 Total: 3

Justification for new course:	Missouri S&T currently does not offer a World History survey course, which a standard offering among undergraduate history programs. The field of world history is one of the most active and innovative areas in contemporary historical research and pedagogy. This is in response not only to academic trends, but to a general demand for a more "globalized" undergraduate education. The way this course is designed, as a one-semester survey, aims to help train students to "think globally" by taking the whole world as the basic unit of analysis. It will also give them brief introductions to the history of contemporary issues, such as globalization, the "rise" of Asia, the place of Islam in world history, global environmental history, and the development of global commercial networks.
Semester(s) previously taught	Never at Missouri S&T, but the proposed instructor has taught it multiple times at the University of Pittsburgh.
Co-Listed Courses:	

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. 11/27/18 3:29 pm sfogg: Approved for RHISTORY Chair
2. 11/28/18 9:29 am Brittany Parnell (ershenb): Approved for CCC Secretary
3. 11/28/18 9:50 am Petra Dewitt (dewittp): Approved for Arts & Humanities DSCC Chair
4. 12/17/18 10:26 am Brittany Parnell (ershenb): Approved for Pending CCC Agenda post

Course Reviewer
Comments

Key: 4584

Preview Bridge

Minor Creation Policy Ad Hoc Committee Report

Introduction

The purpose for the Experimental Course (EC) process is to allow for development of modern degrees via new course content but also to help determine marketability and viability/cost effectiveness of the new courses. New or substantially different degree programs are subject to degree viability justification and approval by state agencies. New course creation can skip the EC process by making the course to be required within a degree program. Minor and certificate programs are useful marketing tools that exemplify uniqueness and value of the S&T campus to attract students but are elective and supportive to a program of study, not degree programs in their own right.

Course viability is subject to the Chancellor Policy Memo II-30, as well as the respective policies of each college. While course enrollments of courses being developed within the EC process are more lenient than permanently numbered courses, it is expected that new courses with permanent numbers will meet viability policies. Minors are commonly created for the purposes specified above as an extension of a degree program, having required courses in common, which has no additional program cost since the courses are populated as required parts of the degree program. As such, minors created from degree programs are encouraged. Departments can choose to skip the EC process and create a new permanent course, e.g., when creating a minor, emphasis, or certificate, in addition to courses that are also to be required within a degree program.

Certificates are to undergo regular curriculum approval processes, subject to the following:

Undergraduate certificates must have one primary owner (i.e., degree program) that does not preclude co-listing and must consist of currently offered or already approved (i.e., hard numbered) courses. Experimental courses may not be included as a part of a proposed certificate program of study. Proposed certificate programs, once approved, shall not allow substitute courses except in extenuating circumstances. Such extenuating circumstances must be approved by the associated Dean of the College in which the certificate program resides or of Graduate Studies for graduate certificates. Approved certificates shall become effective in the Fall Semester of an academic year. Certificates already approved or in approval processes prior to creation of this policy shall be grandfathered as approved under their existing processes but any future changes to those or later certificates must follow the regular curriculum approval system/processes.

Proposed Certificate programs of study must be submitted to the Missouri Department of Higher Education (MDHE) for approval. Certificate proposals are to be submitted through the campus curriculum approval process in parallel with an MDHE submittal after approval by the associated Dean, and can be approved by faculty senate and become a Certificate subject to MDHE approval. The action of MDHE shall be reported by the CCC at the FS meeting following MDHE approval or rejection of the Certificate.

Minor or Certificate with Permanent Course Creation

The goal is to underscore the excellence available in academic learning on campus but to not maintain those that do not attract students. Each degree program is allowed one minor or certificate program that requires no student population justification per year, having been ostensibly created from required courses of their degree program, but departments may create as many other minors or certificates as are reasonably populated. All current minor and certificate programs are included in any counting of minors and certificates that are not justified by population.

Minors or certificates can be used as a reason to create new classes that bypass the EC process provided there is a compelling reason for their creation. The campus curriculum committee (CCC) will recommend to the Senate those that are deemed compelling. All proposed permanent courses, those proposing non-experimental catalog numbers, must be required in the minor or certificate. No more than 6 credit hours of new permanent courses per year that bypass the EC process are allowed; any additional course credit hours bypassing the EC process must be well-justified.

Course Purging Policy

To avoid simply a bypassing of the EC process, minors and certificates and their respective courses shall be evaluated for number of students completing said minor and courses at a period of 5 years and assessed against the appropriate campus policy(ies). Minors and certificates and their courses required within the minor or certificate not meeting those policies are to be deactivated along with the new courses that were created outside the EC process when the minor or certificate was created unless the course has been taught successfully within the last 5 years.

Courses not taught are routinely purged from the catalog about every 10 years. At the 10 year review, any required courses for a degree program, minor, or certificate but having not been taught successfully during the last 10 years will be assessed by the campus curriculum committee for deactivation, along with the degree program, minor, or certificate requiring that course.