Memorandum

To: Chris Kitchens, Chair, CECAS Curriculum Committee

From: Ken Webb, Bioengineering

Re: List of departmentally-approved technical requirement courses

Dear Chris,

Please find attached our current list of courses that may be used to fulfill 12 credits of BioE Tech Requirement in both bioengineering curricula. This list has been updated to remove BioE 4760 (not offered in last 5 years), BMOL 4260/6260 (not currently offered), and ECE 4100/6100 (deleted by ECE).

Thanks,
Ken.

John D. Wiffi 10/6/2017
Undergraduate Curriculum Committee Chair

BioE Technical requirements effective Fall ~~2017~~ 2018 curriculum and later

BioE Technical Electives. All students *must* take at least 6 credits from the following list with Lecture designation. Students *may* take all 12 credits with Lecture designation or may take up to 6 credits of non-lecture electives.

Course		Credits	Lecture
BIOE 3210	Biofluid Mechanics (for Bioelectrical Conc only)	3	Yes
BIOE 4020	Biocompatibility	3	Yes
BIOE 4120/6120	Orthopaedic Engr and Path	3	Yes
BIOE 4150/H4150	Research Principles	1	Yes
BIOE 4200/6200	Sports Engineering	3	Yes
BIOE 4230/6230	Cardiovascular Engr and Path	3	Yes
BIOE 4310/6310	Medical Imaging	3	Yes
BIOE 4350/6350	Modeling Multiphysics Problems	3	Yes
BIOE 4400/6400	Biopharamaceutical Engineering	3	Yes
BIOE 4490	Drug Delivery	3	Yes
BIOE 4500	Special Topics in Bioengineering	3	Yes
BIOE 4510	Creative Inquiry (Variable)	(1 – 3)	**No**
BIOE 4600	International Special Research Topics Variable	(1 – 6)	**No**
BIOE 4610	International Study in Bioengineering	3	Yes
BIOE 4690	International Internship Variable	(1 – 6)	**No**
BIOE 4710/6710	Biomedical Imaging in Biophotics	3	Yes
BIOE 4820/6820	Biomaterial Implantology	3	Yes
BIOE 4900	Internships	1	**No**
BIOE 4910/H4910	Research in Bioengineering Variable	(1 – 6)	**No**
BMOL 4250/6250	Biomolecular Engineering	3	Yes
ECE 2720 & 2730	Computer Organization and laboratory	4 (3 & 1)	Yes
ECE 3210/3120	Electronics II	4 (3 & 1)	Yes
ECE 3810	Fields waves and circuits	3	Yes
ECE 3170	Random signal analysis	3	Yes
ECE 3710 & 3720	Microcontroller interfacing and laboratory	4 (3 & 1)	Yes
ECE 4090	Cont and Discrete Syst Design	3	Yes
ECE 4320	Instrumentation	3	Yes
ECE 4270/6270	Microelectromechanical Systems	3	Yes
ECE 4670	Intro to DSP	3	Yes
MATH 3650	Numerical Methods for Engineers	3	Yes
MSE 4580	Surface Phenomena in Materials Science	3	Yes
PHYS 4170	Introduction to Biophysics I	3	Yes

Change Undergraduate Course

Change a Course

Subject:	ECE-Electrical and Comp Engr
Number:	4160
Effective Term:	Spring 2018
Title:	Smart Grid

Honors Course:

☐ Add Honors Course:

Last Term Course was taught: n/a

Brief Statement of Change Based on Assessment Results:
Adds Senior Standing prerequisite to ensure only senior ECE majors with the necessary prerequisite knowledge take the course.

Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

☑ Change Prerequisite(s) / Corequisite(s)

From	None
To	Senior Standing

Form

User ID:	cstrimp	**Name:**	Courtney Honeycutt
Date:	05/22/2017	**Number:**	31800

Carl Bo 9/13/17
Chair, Department Curriculum Committee Date

Daniel L. Noneaker 9/13/17
Department Chair Date

Christopher Kitchens 9/24/17
Chair, College Curriculum Committee Date

College Dean Date

Director, Calhoun Honors College Date

John D. Wiffi 10/6/2017
Chair, Undergraduate Curriculum Committee Date

Chair, Graduate Curriculum Committee Date

Robert H Jones 1/9/18
Provost Date

President Date

Change Undergraduate Course

001016

Change a Course

Subject: ECE-Electrical and Comp Engr
Number: 4310
Effective Term: Spring 2018
Title: Intro to Computer Vision
Honors Course:
☐ Add Honors Course:
Last Term Course was taught: 1708
Brief Statement of Change Based on Assessment Results:
Adds ECE 2230 as prerequisite, based on course developer request/necessary prerequisite knowledge.

Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

☑ Change Prerequisite(s) / Corequisite(s)

From None
To ECE 2230

Form

User ID: cstrimp **Name:** Courtney Honeycutt
Date: 05/22/2017 **Number:** 31801

Carl Bunn 9/13/17
Chair, Department Curriculum Committee Date

Daniel L. Noneaker 9/13/17
Department Chair Date

Christopher Kitchens 9/24/17
Chair, College Curriculum Committee Date

College Dean Date

Director, Calhoun Honors College Date

John D. Kniffin 10/6/2017
Chair, Undergraduate Curriculum Committee Date

Chair, Graduate Curriculum Committee Date

Robert H Jones 1/9/18
Provost Date

President Date

Change Undergraduate Course

Change a Course

Subject: ECE-Electrical and Comp Engr
Number: 4420
Effective Term: Spring 2018
Title: Knowledge Engr
Honors Course:
☐ Add Honors Course:
Last Term Course was taught: 201608

Brief Statement of Change Based on Assessment Results:
The previous prerequisites are not actually needed for the course. They may also severely limit enrollment by students from other schools in the online summer course. The real prereq that is valuable is a knowledge of probability theory. Each of these three courses gives that background. All ECE students take ECE 3170. All Math students take MATH 4000, and all CPSC students take STAT 3090.

Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

☑ Change Prerequisite(s) / Corequisite(s)

From	ECE 3220 and ECE 3520, each with a C or better
To	ECE 3170 or MATH 4000 or STAT 3090

Form

User ID: cstrimp **Name:** Courtney Honeycutt
Date: 05/22/2017 **Number:** 31802

Carl Bare 9/13/17
Chair, Department Curriculum Committee Date

Daniel L. Noneaker 9/13/17
Department Chair Date

Christopher Kitchens 9/24/17
Chair, College Curriculum Committee Date

College Dean Date

Director, Calhoun Honors College Date

John D. Kniffin 10/6/2017
Chair, Undergraduate Curriculum Committee Date

Chair, Graduate Curriculum Committee Date

Robert H Jones 1/9/18
Provost Date

President Date

000020

Change Undergraduate Course

Change a Course

Subject:	ECE-Electrical and Comp Engr
Number:	4550
Effective Term:	Spring 2018
Title:	Robot Manipulators
Honors Course:	
☐ Add Honors Course:	
Last Term Course was taught:	201605

Brief Statement of Change Based on Assessment Results:
The new set of prerequisites matches what the students really need and is the preferred prerequisite by the course developer.

Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

☑ Change Prerequisite(s) / Corequisite(s)

From	MATH 2060 and MATH 3110, each with a C or better.
To	Math 2080 and Phys 1220, each with a C or better, and Senior Standing.

Form

User ID:	cstrimp	**Name:**	Courtney Honeycutt
Date:	05/22/2017	**Number:**	31797

Carl Baum 9/13/17

Chair, Department Curriculum Committee Date

Daniel L. Noneaker 9/13/17

Department Chair Date

Christopher Kitchens 9/24/17

Chair, College Curriculum Committee Date

College Dean Date

Director, Calhoun Honors College Date

John D. Wiffin 10/6/2017

Chair, Undergraduate Curriculum Committee Date

Chair, Graduate Curriculum Committee Date

Robert W Jones 1/9/18

Provost Date

President Date

Change Major

If Gen Ed requirements are changed a separate Gen Ed Checklist form must accompany this form.

Major Name: Electrical Engineering

Degree: Bachelor of Science

Effective Catalog Year: 2018-2019

- ☐ **Change Major Name to:** ELEN
- ☐ **Change Degree to:** Bachelor of Science
- ☑ **Change Curriculum Requirements**
- ☐ **Change General Education Requirements**
- ☐ **Add, Change, or Delete Concentration(s)**
- ☐ **Add, Change, or Delete Emphasis Area(s)**

Curriculum Map: EE Curriculum Change form v5-20170522145657.pdf

Description: Add ECE 4160 to technical elective list.

Additional Information:

Description:

Summary/Explanation

ECE 4160, previously taught as an ECE 4930 Selected Topics course, has been approved as a permanent course offering. This change adds ECE 4160 to the technical electives list for Electrical Engineering majors.

Rationale for Change Major

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☐ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☑ **Other (Please specify.)**

Add ECE 4160 to technical elective list.

Form

User ID: cstrimp **Name:** Courtney Honeycutt

Date: 05/22/2017 **Number:** 31796

Carl Sam 9/13/17
Chair, Department Curriculum Committee Date

Daniel L. Mowrey 9/13/17
Department Chair Date

Christopher Kitchens 9/24/17
Chair, College Curriculum Committee Date

College Dean Date

Director, Calhoun Honors College Date

John D. Kniffin 10/6/2017
Chair, Undergraduate Curriculum Committee Date

Chair, Graduate Curriculum Committee Date

Robert H Jones 1/9/18
Provost Date

President Date

ELECTRICAL ENGINEERING

Bachelor of Science

Electrical engineers are in high demand for a wide range of influential positions. Professional duties range from analytical problem solving to the design of components and systems. The scope of employment requires a unique breadth and depth of knowledge and technical skills, which are reflected in the Electri-cal Engineering program. This program also offers an excellent preparation for graduate education. Detailed information can be found at *www.clemson. edu/ces/departments/ece/*.

Building on a foundation of mathematical and physi-cal sciences, students progress into the application of these in the engineering science areas of circuits, electronics, communications, controls, power, and electromagnetics. In these subjects, students also begin to apply the concepts and techniques learned to the design of circuits and systems. Senior techni-cal design courses offer the opportunity to further develop expertise in a selected area.

In addition to these technical skills, students learn to communicate effectively, both orally and with the written word. Because engineers work for the benefit of society, the curriculum includes a strong component of humanities and social science courses. Also, many project design assignments enable the development of interpersonal, teamwork, and man-agement skills, which are necessary for success in a professional engineering career.

Freshman Year

First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
2 - ENGR 1020 Engineering Disciplines and Skills
4 - MATH 1060 Calculus of One Variable I[1]
3 - Arts and Humanities Requirement[2] or
3 - Social Science Requirement[2]
16

Second Semester
4 - CH 1020 General Chemistry
3 - ENGR 1410 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II[1]
3 - PHYS 1220 Physics with Calculus I[1]
3 - Arts and Humanities Requirement[2] or
3 - Social Science Requirement[2]
17

Sophomore Year

First Semester
3 - CPSC 1110 Elementary Computer Programming in C/C++[1]
2 - ECE 2010 Logic and Computing Devices[1]
3 - ECE 2020 Electric Circuits I[1]
1 - ECE 2090 Logic and Computing Devices Lab. 1
- ECE 2110 Electrical Engineering Lab. I[1]
4 - MATH 2060 Calculus of Several Variables[1]
3 - PHYS 2210 Physics with Calculus II[1]
17

Second Semester
1 - ECE 2120 Electrical Engineering Lab. II[1]
3 - ECE 2620 Electric Circuits II[1]
3 - ECE 2720 Computer Organization[1]
1 - ECE 2730 Computer Organization Laboratory
4 - MATH 2080 Intro. to Ordinary Diff. Equations[1]
3 - Arts and Humanities Requirement[2] or
3 - Social Science Requirement[2]
15

Junior Year

First Semester
1 - ECE 3110 Electrical Engineering Lab. III[1]
3 - ECE 3200 Electronics I[1]
3 - ECE 3300 Signals, Systems, and Transforms[1]
3 - ECE 3600 Electric Power Engineering[1]
3 - ECE 3800 Electromagnetics[1]
3 - Advanced Mathematics Requirement[3]
16

Second Semester
1 - ECE 3120 Electrical Engineering Lab. IV
3 - ECE 3170 Random Signal Analysis[1]
3 - ECE 3210 Electronics II[1]
3 - ECE 3710 Microcontroller Interfacing[1]
1 - ECE 3720 Microcontroller Interfacing Lab
3 - ECE 3810 Fields, Waves, and Circuits[1]
3 - ENGL 3140 Technical Writing
17

Senior Year

First Semester
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - ECE 4090 Continuous and Discrete Syst. Des.[1]
3 - ECE 4270 Communications Systems
2 - ECE 4950 Integrated Systems Design I[1]
3 - Electrical Engineering Technical Requirement[4]
14

Second Semester
2 - ECE 4960 Integrated System Design II
3 - Arts and Humanities Requirement or
3 - Social Science Requirement
6 - Electrical Engineering Technical Requirement[4]
3 - Special Requirement[5]
14

126 Total Semester Hours

1 The course must be passed with a C or better either to transfer into ECE from General Engineering or to satisfy later course prerequisites.

2 See General Education section of the Undergraduate Announcements. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

[3]MATH 4190, 4340, 4350, 4530, or 4540

[4]Nine credit hours from ECE 2220, ECE 4040, ECE 4050*, ECE 4060, ECE 4160, ECE 4180, ECE 4190, ECE 4200, ECE 4220, ECE 4300, ECE 4320, ECE 4360, ECE 4370, ECE 4380, ECE 4400, ECE 4420, ECE 4460, ECE 4550, ECE 4570, ECE 4600, ECE 4610, ECE 4670, ECE 4680, ECE 4730, ECE 4910*, ECE 4920*, ECE 4930*, ECE 4990*, BIOE 3700, BIOE 4310, BIOE 4350, BIOE 4710, and ME 3100. A maximum of three credit hours of courses marked with an asterisk can be used to satisfy this requirement.

[5]Three additional credits of university or college approved Arts and Humanities or Social Science courses; or ELE 3010 or 4010; or any additional three-credit, 4000-level course from footnote 4 above or footnote 3 in the Computer Engineering curriculum; or one additional course selected ! Tom MATH 4120, 4340, 4350, 4400, 4410, or 4530.

Notes:

1. A student is allowed to enroll in ECE courses (excluding ECE 2070, 2080, 3080) only when all prerequisites have been passed with a grade of C or better.
2. All Electrical Engineering students must have a cumulative engineering grade-point average of 2.0 to enroll in any 3000- or 4000-level ECE courses.
3. No student may exceed a maximum of two attempts, excluding a *W*, to complete successfully any ECE course.

Change Major

If Gen Ed requirements are changed a separate Gen Ed Checklist form must accompany this form.

Major Name: Computer Engineering

Degree: Bachelor of Science

Effective Catalog Year: 2018-2019

- ☐ **Change Major Name to:** CPEN
- ☐ **Change Degree to:** Bachelor of Science
- ☑ **Change Curriculum Requirements**
- ☐ **Change General Education Requirements**
- ☐ **Add, Change, or Delete Concentration(s)**
- ☐ **Add, Change, or Delete Emphasis Area(s)**

Curriculum Map: CpE Curriculum Change form v5-20170913093042.pdf

Description: Add ECE 4160, 4310 to technical elective list. Add ECE 3270 footnote.

Additional Information:

Description:

Summary/Explanation

ECE 4160 and ECE 4310 (previously offered as ECE 4930 Selected Topics courses) have been approved as permanent courses. This change adds them to the curriculum map as options for the technical elective requirement for Computer Engineering Majors. Also added footnote to ECE 3270, indicating a C or better is required, since it is now a prerequisite for ECE 4960 for CPEN majors.

Rationale for Change Major

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☐ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☑ **Other (Please specify.)**

Add ECE 4160, 4310 to technical elective list.

Form

User ID: cstrimp **Name:** Courtney Honeycutt

Date: 09/13/2017 **Number:** 31795

Carl Bauer 9/13/17

Chair, Department Curriculum Committee Date

Daniel L. Noneaker 9/13/17

Department Chair Date

Christopher Kitchens 9/24/17

Chair, College Curriculum Committee Date

College Dean Date

Director, Calhoun Honors College Date

John D. Wolfe 10/6/2017

Chair, Undergraduate Curriculum Committee Date

Chair, Graduate Curriculum Committee Date

Robert H Jones 1/9/18

Provost Date

President Date

COMPUTER ENGINEERING

Bachelor of Science

Computer engineers have excellent career opportunities in the design and application of hardware and software components for a variety of computer applications. These include mainframe, desktop, and embedded microprocessor platforms, as well as the networking of various types of computers and peripherals.

Based on a strong foundation in mathematics, computer science, and the physical sciences, the Computer Engineering program includes engineering science and design in circuits, electronics, computer organizations and design, peripheral interfacing, and software engineering. Emphasis is placed on hands-on experience with networked computer systems, micro-, mini-, and mainframe computers, and the solution of a wide range of practical problems using engineering principles. In addition to these technical skills, students learn to communicate effectively and to develop interpersonal, teamwork, and management skills, all of which contribute to success in a professional engineering career. The program is also an excellent preparation for graduate study.

Information on the program and its objectives is available at *www.clemson.edu/ces/departments/ece/*.

Freshman Year

First Semester

4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
2 - ENGR 1020 Engineering Disciplines and Skills
4 - MATH 1060 Calculus of One Variable I[1]
3 - Arts and Humanities Requirement[2] *or*
3 - Social Science Requirement[2]

16

Second Semester

3 - ENGR 1410 Programming and Problem Solving
4 - MATH 1080 Calculus of One Variable II[1]
3 - PHYS 1220 Physics with Calculus I[1]
6 - Arts and Humanities Requirement[2] *or*
6 - Social Science Requirement[2]

16

Sophomore Year

First Semester

3 - CPSC 1110 Elementary Computer Programming in C/C++[1]
2 - ECE 2010 Logic and Computing Devices[1]
3 - ECE 2020 Electric Circuits I[1]
1 - ECE 2090 Logic and Computing Devices Lab.1
- ECE 2110 Electrical Engineering Lab. I[1]
4 - MATH 2060 Calculus of Several Variables[1]
3 - PHYS 2210 Physics with Calculus II[1]

17

Second Semester

1 - ECE 2120 Electrical Engineering Lab. II[1]
3 - ECE 2220 Systems Programming Concepts for Computer Engineering[1]
3 - ECE 2620 Electric Circuits II[1]
3 - ECE 2720 Computer Organization[1]
1 - ECE 2730 Computer Organization Laboratory
4 - MATH 2080 Intro. to Ordinary Diff. Equations[1]

15

Junior Year

First Semester

3 - ECE 2230 Computer Systems Engineering[1]
1 - ECE 3110 Electrical Engineering Lab. III[1]
3 - ECE 3200 Electronics I[1]
3 - ECE 3300 Signals, Systems, and Transforms[1]
3 - ECE 3710 Microcontroller Interfacing[1]
1 - ECE 3720 Microcontroller Interfacing Lab.
3 - MATH 3110 Linear Algebra[1]

17

Second Semester

3 - ECE 3170 Random Signal Analysis[1]
3 - ECE (CPSC) 3220 Intro. to Operating Systems[1]
3 - ECE 3270 Digital Computer Design[1]
3 - ECE 3520 Programming Systems[1]
3 - MATH 4190 Discrete Math. Structures I

15

Senior Year

First Semester

3 - COMM 1500 Intro. to Human Comm. *or*
3 - COMM 2500 Public Speaking
3 - ECE 4090 Continuous and Discrete Sys. Design[1]
2 - ECE 4950 Integrated System Design I[1]
3 - ENGL 3140 Technical Writing
6 - Computer Engineering Technical Requirement[3]

17

Second Semester

2 - ECE 4960 Integrated System Design II
3 - Arts and Humanities Requirement[2] *or*
3 - Social Science Requirement[2]
6 - Computer Engineering Technical Requirement[3]
3 - Special Requirement[4]

14

127 Total Semester Hours

[1]The course must be passed with a C or better either to transfer into ECE from General Engineering or to satisfy later course prerequisites.

[2]See General Education section of the *Undergraduate Announcements*. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

[3]Twelve credit hours from ECE 3210*, ECE 4050+, ECE 4160*, ECE 4270, ECE 4300, ECE 4310, ECE 4380, ECE 4400, ECE 4420, ECE 4490, ECE 4550, ECE 4600, ECE 4670, ECE 4680, ECE 4730, ECE 4680, ECE 4910+, ECE 4920+, ECE 4930+, ECE 4990+, BIOE 3700*, BIOE 4310*, BIOE 4350*, and BIOE 4710*. Three credit hours of this requirement must include ECE 4270, ECE 4300, or ECE 4400. A maximum of six credit hours of courses marked with an asterisk and a maximum of three credit hours marked with a plus can be used to satisfy this requirement.

[4]Three additional credits of university or college approved Arts and Humanities or Social Science courses; or ELE 3010 or 4010; or any additional threee-credit, 4000-level course from footnote 3 above or footnote 4 in the Electrical Engineering curriculum; or one additional course selected

from MATH4120, 4340, 4350, 4400, 4410, or 4530.

Notes:

1. A student is allowed to enroll in ECE courses (excluding ECE 2070, 2080, 3080) only when all prerequisites have been passed with a grade of C or better.
2. All Computer Engineering students must have a cumulative engineering grade-point average of 2.0 to enroll in any 3000- or 4000-level ECE courses.
3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE course.

000028

Delete Undergraduate Course

Delete a Course

Subject:	ENGR-Engineering
Number:	1300
Effective Term:	Spring 2018
Title:	Engr Fundamentals
☐ Delete Honors Course:	
Last Term Course was taught:	201208

Brief Statement of Change Based on Assessment Results:
This course has not been taught in several years and is not a curricular requirement for any of the engineering curricula.

Rationale for Delete Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☑ **Evolution of the Discipline**
- ☐ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

Form

User ID:	jminor	**Name:**	John Minor
Date:	09/07/2017	**Number:**	33180

000029

Chair, Department Curriculum Committee — 9/13/2017 — Date

Department Chair — 9/13/17 — Date

Christopher Kitchens — 9/24/17

Chair, College Curriculum Committee — Date

College Dean — Date

Director, Calhoun Honors College — Date

Chair, Undergraduate Curriculum Committee — 10/6/2017 — Date

Chair, Graduate Curriculum Committee — Date

Provost — 1/9/18 — Date

President — Date

000030

Delete Undergraduate Course

Delete a Course

Subject:	ENGR-Engineering
Number:	1301
Effective Term:	Spring 2018
Title:	Engr Fundamental Lab
☐ Delete Honors Course:	
Last Term Course was taught:	999999

Brief Statement of Change Based on Assessment Results:
This course has not been taught in several years and is not a curricular requirement for any of the engineering curricula.

Rationale for Delete Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☑ **Evolution of the Discipline**
- ☐ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

Form

User ID:	jminor	**Name:**	John Minor
Date:	09/13/2017	**Number:**	33363

000031

Chair, Department Curriculum Committee — 9/13/2017 — Date

Department Chair — 9/13/17 — Date

Christopher Kitchens — 9/24/17

Chair, College Curriculum Committee — Date

College Dean — Date

Director, Calhoun Honors College — Date

John D. Wiffin — 10/6/2017

Chair, Undergraduate Curriculum Committee — Date

Chair, Graduate Curriculum Committee — Date

Robert H Jones — 1/9/18

Provost — Date

President — Date

000032

Change Undergraduate Course

Change a Course

Subject:	ENGR-Engineering
Number:	2090
Effective Term:	Spring 2018
Title:	Intr to Engr/Computer Graphics
Honors Course:	
☐ Add Honors Course:	
Last Term Course was taught:	999999

Brief Statement of Change Based on Assessment Results:
This course no longer needs a lab and will change to be a two credit hour lecture only course.

Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☑ **Evolution of the Discipline**
- ☐ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

☑ Change of Credit

From

Fixed Credit Course

Credit Hrs	Contact Hrs
2	1

Variable Credit Course

Credit Hrs		Contact Hrs	
Min	**Max**	**Min**	**Max**

To

Fixed Credit Course

Credit Hrs	Contact Hrs
2	2

Variable Credit Course

Credit Hrs		Contact Hrs	
Min	**Max**	**Min**	**Max**

Learning Objectives

- **Use solid modeling software to transform ideas into parts, pictorial representations, engineering drawings, and models**
- Use the engineering design cycle involving sketching, computer modeling, engineering analysis, rapid prototyping, refining designs, and producing drawings
- Develop and use 3-D visualization skills through standard engineering graphical presentations
- **Communicate technical information effectively by correctly applying standards and conventions to produce engineering drawings with proper dimensions and tolerances**
- Communicate technical information using engineering drawings with proper dimensions and tolerances

000033

Topical Outline

1. Course Mechanics – 2 hour
a. Course and Technology (Canvas) Introduction
b. Introduction to Engineering Graphics
c. Getting started with CAD

2. Design and Modeling – 17 hours
a. Computer-Aided Design (CAD)
b. Basics of 2-Dimensional Drawings
c. Basics of 2-Dimensional Drawing Editing
d. 3-D Solid Modeling
e. Orthographic Projections
f. Auxiliary and sectional Views
g. 3-D Surface Modeling
h. Threads

3. Solving Engineering Problems – 8 hours
a. Rapid Prototyping
b. Troubleshooting

4. Professional Communication – 3 hours
a. Working Drawings
b. Dimensioning and Tolerance

Evaluation

Undergraduate

A	90	-	100
B	80	-	89
C	70	-	79
D	60	-	69
F	<		60

Assignments - 15%
In Class Activities - 30%
Tests - 30%
Projects - 10%
Final Exam - 15%

Syllabus

Upload File: ENGR 2090 - Syllabus-20170913142056.pdf

Description: ENGR 2090 Syllabus

Form

User ID: jminor **Name:** John Minor
Date: 09/13/2017 **Number:** 33375

000034

Chair, Department Curriculum Committee — 9/13/2017 — Date

Department Chair — 9/13/17 — Date

Christopher Kitchens — 9/24/17

Chair, College Curriculum Committee — Date

College Dean — Date

Director, Calhoun Honors College — Date

John D. Wiffin — 10/6/2017

Chair, Undergraduate Curriculum Committee — Date

Chair, Graduate Curriculum Committee — Date

Robert H Jones — 1/9/18

Provost — Date

President — Date

000035

Delete Undergraduate Course

Delete a Course

Subject:	ENGR-Engineering
Number:	2091
Effective Term:	Spring 2018
Title:	Intr to Engr/Com Graphics Lab
☐ Delete Honors Course:	
Last Term Course was taught:	999999

Brief Statement of Change Based on Assessment Results:
This course no longer needs a lab.

Rationale for Delete Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☑ **Evolution of the Discipline**
- ☐ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

Form

User ID:	jminor	**Name:**	John Minor
Date:	09/13/2017	**Number:**	33374

000036

Chair, Department Curriculum Committee — 9/13/2017 — Date

Department Chair — 9/13/17 — Date

Christopher Kitchens — 9/24/17

Chair, College Curriculum Committee — Date

College Dean — Date

Director, Calhoun Honors College — Date

Chair, Undergraduate Curriculum Committee — 10/6/2017 — Date

Chair, Graduate Curriculum Committee — Date

Robert H Jones — 1/9/18

Provost — Date

President — Date

Change Undergraduate Course

Change a Course

Subject: IE-Industrial Engineering
Number: 4000
Effective Term: Spring 2018
Title: Honors Thesis
Honors Course:
☐ Add Honors Course:
Last Term Course was taught: 201701

Brief Statement of Change Based on Assessment Results:
Based on assessment results it was determined that the current prerequisite for the course is not necessarily needed to be successful in this course. Therefore, we are removing IE 2680 from the prerequisite list for IE 4000.

Rationale for Changing a Course

- ☐ Strengthen Program Requirement(s)
- ☐ Alignment of Student Learning Outcomes
- ☐ Alternative Delivery of Content
- ☐ Improve Time to Degree
- ☐ Evolution of the Discipline
- ☑ Changing Prerequisites
- ☐ Address DWF Rates
- ☐ General Education Modifications
- ☐ Other (Please specify.)

☑ Change Prerequisite(s) / Corequisite(s)

From	D or better in IE 2680
To	Consent of instructor

Form

User ID:	burak	**Name:**	Burak Eksioglu
Date:	09/14/2017	**Number:**	33387

Digitally signed by Burak Ekoglu
DN: cn=Burak Ekoglu, o=Clemson University, ou=Industrial Engineering, email=burake@clemson.edu, c=US
Date: 2017.09.15 21:38:47 -04'00'

Chair, Department Curriculum Committee — Date

Jonathan Smith (Sep 18, 2017) — Sep 18, 2017

Department Chair — Date

Christopher Kitchens — 9/24/17

Chair, College Curriculum Committee — Date

College Dean — Date

Director, Calhoun Honors College — Date

John D. Kniffin — 10/6/2017

Chair, Undergraduate Curriculum Committee — Date

Chair, Graduate Curriculum Committee — Date

Robert R Jones — 11/9/18

Provost — Date

President — Date