000205

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CH-** ~~2010~~ 2011
Corresponding Lab Course: ~~CH 2011~~
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Survey of Organic Chemistry

Brief Statement of Change:
The lab course CH 2011 has recently been separated from the lecture course CH 2010. Consequently, since iRoar prohibits stand-alone courses from ending in "1", the chemistry department would like to renumber CH 2011 to CH 2020.

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 08/2014	X **Change Number to:** 2020
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Survey of Organic Chemistry
to:	to:

.. **Change of Credit**	From: Fixed Credit: 1 (0,3) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
X B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
.. **Change Prerequisite(s):**
from:
to:
Learning Objectives:
Topical Outline:
Evaluation:

Form Originator: DOMINY, Dominy,Brian N **Date Form Created:** 2/11/2014
Form Last Updated by: DOMINY, Dominy,Brian N **Date Form Last Updated:** 2/11/2014
Form Number: 7105

Approval

	2/14/2014	Jessica W. Morrison	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
R. Kurt Dietz	2/14/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	3/31/14	Nadia M. Ajraf	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	3/31/14	James P. Clements	7/11/14
College Dean	Date	President	Date

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CH- 3320**
Corresponding Lab Course: --
Corresponding Honors course: CH--3320
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Physical Chemistry

Brief Statement of Change:
The prerequisites have been broadened to include CHE 2200, allowing chemical engineering students to register for CH 3320. Currently, CH 3320 requires CH3310 (a course in thermodynamics) as the prerequisite. Chemical engineering students take an alternative thermodynamics course (CHE 2200), rather than CH 3310, and historically have performed well in CH 3320.

Last Term taught: 201301	.. **Change Abbrev to:**
Effective Term: 08/2014	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Physical Chemistry
to:	to:
.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-) / To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
X A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
X **Change Prerequisite(s):**
from: CH 3310
to: CH 3310 or CHE 2200
Learning Objectives:
Topical Outline:
Evaluation:
Form Originator: DOMINY, Dominy,Brian N **Date Form Created:** 2/10/2014
Form Last Updated by: DOMINY, Dominy,Brian N **Date Form Last Updated:** 3/18/2014
Form Number: 7083

Approval

Chair, Department Curriculum Committee	3/18/14 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	03/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/31/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

000207

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CH- 4030**
Corresponding Lab Course: --
Corresponding Honors course: CH--4030
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Adv Synth Tech

Brief Statement of Change:
Students who have not taken the physical and analytical chemistry labs lack the skills and techniques taught in these courses and, as a result, significantly underperform in CH 4030 (in some cases barely passing). One of the physical / analytical chemistry labs (CH 3400 or 4120) is being formally added as a prerequisite to ensure that students have the necessary skills to excel in CH 4030. Either of these two courses will provide the necessary foundation in the chemical fundamentals and measurement techniques essential for students to succeed in CH 4030. However, this prerequisite is no different than the expectations outlined in the curriculum map for second-semester, senior-level chemistry BS majors (which are the students who take CH 4030). In addition, to give students more flexibility in meeting the prerequisites for the course without sacrificing preparedness, we are adding CH 4020 as an option to substitute for CH 2050.

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 08/2014	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Adv Synth Tech
to:	to:

.. **Change of Credit**	From: Fixed Credit: 2 (0,6) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
X B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
X **Change Prerequisite(s):**
from: CH 2050, 2270, 2280, and (3150 or 3170 or 3390)
to: CH 2050 (or 4020), 2270, 2280, and (3400 or 4120)
Learning Objectives:
Topical Outline:
Evaluation:
Form Originator: ATENNYS, Tennyson,Andrew Gregory **Date Form Created:** 2/2/2014
Form Last Updated by: ATENNYS, Tennyson,Andrew Gregory **Date Form Last Updated:** 2/27/2014
Form Number: 7048

Approval

Chair, Department Curriculum Committee	3/18/14 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	03/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/31/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

000208

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CH- 4110**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: CH--6110
.. **Add Graduate course:** --
Course Title: Instrumental Analy

Brief Statement of Change:
CH 3320 is taught at the same time in the suggested Chemistry B.S. curriculum as CH 4110. Consequently, students have typically been taking CH 3320 concurrently with CH 4110 and have performed well. Based on this, the chemistry department would like to remove the prerequisite requirement of CH 3320 and instead require concurrent enrollment with CH 3320.

Last Term taught: 201301 Effective Term: 08/2014	.. **Change Abbrev to:** .. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: Instrumental Analy to:
.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-)
	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
X A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
X **Change Prerequisite(s):**
from: CH 3310 and CH 3320
to: CH 3310 and concurrent enrollment with CH 3320
Learning Objectives:
Topical Outline:
Evaluation:
Form Originator: DOMINY, Dominy,Brian N **Date Form Created:** 2/10/2014
Form Last Updated by: DOMINY, Dominy,Brian N **Date Form Last Updated:** 3/18/2014
Form Number: 7087

Approval

Chair, Department Curriculum Committee	3/18/14 Date	Chair, Undergraduate Curriculum Committee	5/6/2014 Date
Department Chair	08/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/31/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CH- 4430**
Corresponding Lab Course: --
Corresponding Honors course: CH--4430
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Research Problems

Brief Statement of Change:
The Department of Chemisty would like to make this course more accessible to current Chemistry majors and non-majors.

Last Term taught: 201301	.. **Change Abbrev to:**
Effective Term: 08/2014	.. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: Research Problems to:
.. **Change of Credit**	From: Fixed Credit: (,) Variable Credit: 1-6 (-), (-) / To: Fixed Credit: (,) Variable Credit: - (-),(-)
.. **Add cross-listing with the following child course(s):**	
.. **Delete cross-listing with the following child course(s):**	
.. **Reverse Parent/Child relationship with:**	

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	X Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
X L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Senior standing in Chemistry.
to: Consent of Instructor required.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: CRISP, Crisp,Ashley E **Date Form Created:** 2/10/2014
Form Last Updated by: CRISP, Crisp,Ashley E **Date Form Last Updated:** 2/14/2014
Form Number: 7081

Approval

Chair, Department Curriculum Committee	2/14/2014 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	02/14/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/31/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CH- 4440**
Corresponding Lab Course: --
Corresponding Honors course: CH--4440
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Research Problems

Brief Statement of Change:
The Department of Chemistry would like to make this course more accessible to current Chemistry majors and non-majors.

Last Term taught: 201301	.. **Change Abbrev to:**
Effective Term: 08/2014	.. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: Research Problems to:
.. **Change of Credit**	From: Fixed Credit: (,) Variable Credit: 1-6 (-), (-) / To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	X Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
X L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Senior standing in Chemistry.
to: Consent of Instructor.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: CRISP, Crisp,Ashley E **Date Form Created:** 2/10/2014
Form Last Updated by: CRISP, Crisp,Ashley E **Date Form Last Updated:** 2/14/2014
Form Number: 7082

Approval

Chair, Department Curriculum Committee	2/14/2014 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	02/14/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/31/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date

000220

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CPSC-** 1990
Corresponding Lab Course:
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Selected Topics

Brief Statement of Change:
Drop consent of instructor to allow student to enroll without requiring a prerequisite override.

Last Term taught: 201308
Effective Term: 08/2014

.. **Change Abbrev to:**
.. **Change Number to:**

.. **Change Catalog Title:**
from:
to:

.. **Change Transcript Title:**
from: Selected Topics
to:

.. **Change of Credit** From: Fixed Credit: (,) Variable Credit: 1-8 (-), (-) To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**

.. **Delete cross-listing with the following child course(s):**

.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**

from:	to:
X A-Lecture Only	..
.. B-Lab (w/fee)	..
.. D-Seminar	..
.. E-Independent Study	..
.. F-Tutorial (w/fee)	..
.. G-Studio	..
.. H-Field course	..
.. I-Study Abroad	..
.. L-Lab (no/fee)	..
.. N/B-Lecture/Lab(w/fee)	..
.. N/L-Lecture/Lab(no fee)	..

.. **Change Course Modifier**

from:	to:
.. Pass/Fail Only	..
X Graded	..
.. Variable Title	..
.. Creative Inquiry	..
X Repeatable	..
maximum credits	
from:	
to:	

.. **Change General Education Designation**

from:	to:
.. Creative Inquiry	..
.. English Composition	..
.. Oral Communication	..
.. Mathematics	..
.. Natural Science w/Lab	..
.. Natural Science w/Lab	..
.. Math or Science	..
.. A&H (Literature)	..
.. A&H (Non-Literature)	..
.. Social Science	..
.. CCA	..
.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Consent of instructor.
to: (none)

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: MARK, Smotherman,Mark K **Date Form Created:** 3/18/2014
Form Last Updated by: MARK, Smotherman,Mark K **Date Form Last Updated:** 3/18/2014
Form Number: 7300

Approval

Chair, Department Curriculum Committee	3/18/14 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	3/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/28/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

000221

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CPSC** 3990
Corresponding Lab Course
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Selected Topics

Brief Statement of Change:
Drop consent of instructor to allow student to enroll without requiring a prerequisite override.

Last Term taught: 201308
Effective Term: 08/2014

.. **Change Abbrev to:**
.. **Change Number to:**

.. **Change Catalog Title:**
from:
to:

.. **Change Transcript Title:**
from: Selected Topics
to:

.. **Change of Credit**

From: Fixed Credit: (,)	To: Fixed Credit: (,)
Variable Credit: 1-8 (-), (-)	Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**

from:	to:
X A-Lecture Only	..
.. B-Lab (w/fee)	..
.. D-Seminar	..
.. E-Independent Study	..
.. F-Tutorial (w/fee)	..
.. G-Studio	..
.. H-Field course	..
.. I-Study Abroad	..
.. L-Lab (no/fee)	..
.. N/B-Lecture/Lab(w/fee)	..
.. N/L-Lecture/Lab(no fee)	..

.. **Change Course Modifier**

from:	to:
.. Pass/Fail Only	..
X Graded	..
.. Variable Title	..
.. Creative Inquiry	..
X Repeatable	..
maximum credits	
from:	
to:	

.. **Change General Education Designation**

from:	to:
.. Creative Inquiry	..
.. English Composition	..
.. Oral Communication	..
.. Mathematics	..
.. Natural Science w/Lab	..
.. Natural Science w/Lab	..
.. Math or Science	..
.. A&H (Literature)	..
.. A&H (Non-Literature)	..
.. Social Science	..
.. CCA	..
.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Junior standing and consent of instructor.
to: Junior standing.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: MARK, Smotherman,Mark K **Date Form Created:** 3/18/2014
Form Last Updated by: MARK, Smotherman,Mark K **Date Form Last Updated:** 3/18/2014
Form Number: 7300

Approval

Chair, Department Curriculum Committee	3/18/14 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	3/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	3/28/14 Date	Provost	7/8/14 Date
College Dean	3/31/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

Curriculum and Course Change System

0002222

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: ME- 2010**
Corresponding Lab Course: ME--2011
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Statics & Dynamics

Brief Statement of Change:
Prerequisite and concurrent enrollment courses due to change in first year courses.

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 05/2014	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Statics & Dynamics
to:	to:
.. **Change of Credit**	From: Fixed Credit: 5 (3,4) Variable Credit: - (-), (-) / To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**	.. **Change Course Modifier**	.. **Change General Education Designation**	
from:	from:	from:	to:
to:	to:	.. Creative Inquiry	..
.. A-Lecture Only ..	.. Pass/Fail Only ..	.. English Composition	..
.. B-Lab (w/fee) ..	X Graded ..	.. Oral Communication	..
.. D-Seminar ..	.. Variable Title ..	.. Mathematics	..
.. E-Independent Study ..	.. Creative Inquiry ..	.. Natural Science w/Lab	..
.. F-Tutorial (w/fee) ..	.. Repeatable	.. Natural Science w/Lab	..
.. G-Studio ..	maximum credits	.. Math or Science	..
.. H-Field course ..	from:	.. A&H (Literature)	..
.. I-Study Abroad ..	to:	.. A&H (Non-Literature)	..
.. L-Lab (no/fee) ..		.. Social Science	..
X N/B-Lecture/Lab(w/fee) ..		.. CCA	..
.. N/L-Lecture/Lab(no fee) ..		.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Prereq: Mths 1060, 1080; phys 1220 each with a C or betterprereq or Concurrent enrollemnt: ENGR 2080 and ENGR 1410 and Phys 1240 and Mths 2060 each with a C or better. Co-req ME 2011
to: Prereq: MATH 1060 OR MATH 1070, MATH 1080; Phys 1220; ENGR 1070 and ENGR 1080 or ENGR 1410 each with a C or better. Prereq or Concurrent: ENGR 2080 and 1090 and Phys 1240 and MATH 2060 each with a C

Learning Objectives:
Topical Outline:
Evaluation:

Form Originator: JANEEN, Putman,Janeen Marie **Date Form Created:** 2/20/2014
Form Last Updated by: JANEEN, Putman,Janeen Marie **Date Form Last Updated:** 4/8/2014
Form Number: 7156

Approval

Curriculum and Course Change System

000223

Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Comm 5/2/2014
Department Chair	4/9/14 Date	Chair, Graduate Curriculum Committee
Chair, College Curriculum Committee	4-9-14 Date	Provost 7/8/14
College Dean	4/29/14 Date	President 7/11/14
Director, Calhoun Honors College	4/21/14 Date	

Curriculum and Course Change System

000224

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: ME- 3100**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Thermo/Heat Transfer

Brief Statement of Change:
Preq clarification change.

Last Term taught: 201301
Effective Term: 05/2014

.. **Change Abbrev to:**
.. **Change Number to:**

.. **Change Catalog Title:**
from:
to:

.. **Change Transcript Title:**
from: Thermo/Heat Transfer
to:

.. **Change of Credit** From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-) To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**

.. **Delete cross-listing with the following child course(s):**

.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**

from:	to:
X A-Lecture Only	..
.. B-Lab (w/fee)	..
.. D-Seminar	..
.. E-Independent Study	..
.. F-Tutorial (w/fee)	..
.. G-Studio	..
.. H-Field course	..
.. I-Study Abroad	..
.. L-Lab (no/fee)	..
.. N/B-Lecture/Lab(w/fee)	..
.. N/L-Lecture/Lab(no fee)	..

.. **Change Course Modifier**

from:	to:
.. Pass/Fail Only	..
X Graded	..
.. Variable Title	..
.. Creative Inquiry	..
.. Repeatable maximum credits from: to:	..

.. **Change General Education Designation**

from:	to:
.. Creative Inquiry	..
.. English Composition	..
.. Oral Communication	..
.. Mathematics	..
.. Natural Science w/Lab	..
.. Natural Science w/Lab	..
.. Math or Science	..
.. A&H (Literature)	..
.. A&H (Non-Literature)	..
.. Social Science	..
.. CCA	..
.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Junior standing in an engineering curriculum.
to: Junior standing in an engineering curriculum. Not open to Mechanical Engineering majors.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: MBFREE, Freeman Jr,Michael B **Date Form Created:** 3/17/2014
Form Last Updated by: MBFREE, Freeman Jr,Michael B **Date Form Last Updated:** 3/17/2014
Form Number: 7293

Approval

Chair, Department Curriculum Committee	Date 3/17/14	Chair, Undergraduate Curriculum Committee Jessica W. Anderson	Date 5/2/2014
Department Chair	Date 3/31/14	Chair, Graduate Curriculum Committee Nadim M. Aziz	Date 7/8/14
Chair, College Curriculum Committee	Date 3/31/14	Provost James P. Clements	Date 7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

000225

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: ME-** ~~202~~ 3070
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Founda Mech Syst

Brief Statement of Change:
Changing course description to match the new course (ME 3070).

Last Term taught: 201306	X **Change Abbrev to:** ME
Effective Term: 05/2014	X **Change Number to:** 307

.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: Founda Mech Syst	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
X A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

X **Change Catalog Description:**
from: Introduction to basic physical elements of mechanical engineering systems. Problem solving, design, and resourceful application of mathematics and general principles from students' science courses are emphasized throughout.
to: Introduction to physical elements and mechanisms that define basic mechanical engineering systems. Application of kinematic and kinetic analysis to mechanisms and the role of design in mechanisms.

X **Change Prerequisite(s):**
from: Preq: ME 2010, and ME 2040 (formerly ME 3020) each with a C or better.
to: Preq: ME 2010 with a C or better. Preq or Concurrent enrollment: ME 2040 with a C or better.

Learning Objectives: 1.Students will develop an understanding of basic element of mechanical systems, underlying principles and apply them to design problems.
2.Students will analyze the behavior of basic mechanical elements used to generate and convey motion by mechanical means, in particular gears and gear trains, cams, linkages, clutches and brakes, and classical mechanisms.
3.Students will employ these basic mechanical elements in the design of simple mechanical systems.
4.Students will demonstrate sound, rational approaches to the solution of engineering problems.
5.Students will demonstrate an ability to use techniques, skills, and modern engineering tools needed for engineering practice.
6.When presented with design problems, students will be able to apply knowledge of mechanical systems and reverse engineering techniques
7.Students will write technical reports and communicate how mechanical systems function, how they are made, and design improvements through technical reports

Topical Outline: Design and the process of design, product decomposition, problem solving strategies 6
Introduction and definition of machine elements 4
Mechanisms, elements of mechanical systems as well as analysis of machines including linkages, cams, gears, transmissions, belts, and chains 14
Application of mechanical components to engineering objectives. 8
Integrated mechanical design problems 10
Tests 3
Total 45

Evaluation: Homework and Projects = 5%
Design Projects = 15%
Tests = 65%
Final Exam = 15%

Form Originator: MBFREE, Freeman Jr,Michael B **Date Form Created:** 3/17/2014
Form Last Updated by: MBFREE, Freeman Jr,Michael B **Date Form Last Updated:** 4/17/2014
Form Number: 7291

Approval

000226

Chair, Department Curriculum Committee	4/18/14 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	4/24/14 Date	Provost	7/8/14 Date
College Dean	4/21/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

Curriculum and Course Change System

000227

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

Course Abbreviation & Number:
X **New Undergraduate Course:** ME- 4250
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 05/2014
Catalog Title: Aircraft Conceptual Design
Transcript Title: Aircraft Conceptual Design
Fixed Credit Course: 3 (3,0)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
X A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
.. N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: The course develops the aspects involved in the conceptual design of an aircraft. The focus is on the interplay between goals and constraints in the process of the design of a subsonic aircraft.

Prerequisite(s): ME 308

Projected Enrollment:
Year 1 - 25 Year 2 - 30 Year 3 - 35 Year 4 - 40

Required course for students in:

Statement of need and justification based on assessment results of student learning outcomes: Due to the successful execution as a selected topics course multiple times this course needs a permanent course number.

Textbook(s): Corke, Design of Aircraft, Prentice Hall (a softbound copy is in print and used copies exist).

Learning Objectives: Course Objective 1:
1. You will be able to outline and explain the major steps involved conceptual design process of an aircraft.
2. You will be able to make reasonable judgements on design values and show reason for such estimates.
3. You will show initiative and be able to make use of all available resources (text, notes, references, library, internet, phone calls).
Course Objective 2:
1. You will demonstrate the ability to size components to meet applicable mission goals.
2. You will demonstrate the cause and effect between design variable values on the performance of an aircraft conceptual design.
3. You will be able to conceive and specify appropriate components for a specific application and to set objectives, to justify appropriate modifications of objectives , and to meet objectives.
Course Objective 3:
1. You will generate and justify an original design analysis of a light aircraft that meets at least 90% of the performance criteria specified in the problem definition.

2. You will be able to communicate design results effectively in a written report that demonstrates structured thinking and appropriate use of graphs in a succinct, appropriate format and consistent with expectations from a senior-level engineering student.

Topical Outline: 1. Flight: Historical Perspective. (1 units)
2. Aircraft Systems and Overview (1 units)
3. Aircraft Design Definitions. (1 units)
4. Static Performance Part 1 (3 units)
5. Preliminary Estimates (Weight, Wing Loading, Shapes, Powerplant). (15 units)
6. Wing and Tail Design. (7 units)
7. Static Performance: Part 2. (7 units)
8. Static Stability and Control. (3 units)
9. Aircraft Design and Report. (7 units)

Evaluation: 1. Final Design and Oral Presentation 50%
2. Quizzes (3 or 4) 35%
3. Preliminary Design Oral Summary 15%

Form Originator: JANEEN,Putman,Janeen Marie **Date Form Created:** 3/28/2014
Form Last Updated by: JANEEN, Putman,Janeen Marie **Date Form Last Updated:** 3/31/2014
Form Number: 7323

Approval

		Jessica W. Murdaugh 5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Comn
3/31/14		
Department Chair	Date	Chair, Graduate Curriculum Committee
3/31/14	Nadia M. Ajji 7/8/14	
Chair, College Curriculum Committee	Date	Provost
3/31/14	James P. Clements 7/11/14	
College Dean	Date	President
Director, Calhoun Honors College	Date	

Curriculum and Course Change System

000229

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

Course Abbreviation & Number:
X **New Undergraduate Course:** ME- 4280
.. **New Honors Course:** --
X **New Graduate Course:** ME- 628

Effective Term: 05/2014
Catalog Title: Thermal-hydraulics of nuclear reactors
Transcript Title: Thermal-hydraulics of nuc reac
Fixed Credit Course: 3 (3,0)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
X A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
.. N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: The main objective of this course is to provide the mechanical engineer with the basic concepts required to understand the thermal-hydraulic behavior of nuclear reactors in normal operating conditions.

Prerequisite(s): ME 304

Projected Enrollment:
Year 1 - 30 Year 2 - 35 Year 3 - 40 Year 4 - 45

Required course for students in:

Statement of need and justification based on assessment results of student learning outcomes: Due to the successful execution as a selected topics course multiple times this course needs a permanent course number.

Textbook(s): Instructor's lecture notes.

Learning Objectives: Students will be able:
• to define the principal variables used to describe the thermal-hydraulic behavior of a nuclear reactor (e.g. core thermal parameters, void fractions)
• to explain the essential physical phenomena encountered in the thermal-hydraulic design of a nuclear reactor (e.g. boiling crisis, choked flow),
• to approach a thermal-hydraulic problem in a rational, efficient and professional way,
• to develop simple models of processes or systems for design or performance calculations, (e.g. thermal behavior of fuel elements, pressurizers, steam generators).

Topical Outline: 1. Description and thermodynamic analysis of the main reactor types - 7
2. Guidelines for the thermal design of nuclear reactors-1
3. Thermal design of the fuel rods-8
4. Two-phase flow modeling-15
5. Boiling and condensation heat transfer-5
6. Two-phase flow instabilities in pipes and channels-4
7. Choked flows and circuit depressurization-2
8. Pressurizer-1
9. Steam generator-1

10 midterm exam - 1
Total 45 units

Evaluation: 4280
Homework - 10%
Design Projects (2) - 40%
Mid-term exam - 20%
Final Exam - 30%
6280
Homework: 10%
Design projects (3*): 60%
Midterm exam: 10%
Final exam: 20%
*The third project will be a graduate level thermalhydraulic design of a steam generator.

Form Originator: JANEEN,Putman,Janeen Marie **Date Form Created:** 3/18/2014
Form Last Updated by: JANEEN, Putman,Janeen Marie **Date Form Last Updated:** 3/28/2014
Form Number: 7296

Approval

Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Comn
	3/31/14	Patrice W. Mathews 5/2/2014
Department Chair	Date	Chair, Graduate Curriculum Committee
	3/31/14	Nadia M. Aziz 7/8/14
Chair, College Curriculum Committee	Date	Provost
	3/31/14	James P. Clements 7/11/1
College Dean	Date	President
Director, Calhoun Honors College	Date	

Curriculum and Course Change System

000231

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: ME- ~~3020~~ 2040**
Corresponding Lab Course: --
Corresponding Honors course: ME-~~3020~~ 2040
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Mech of Materials

Brief Statement of Change:
Changing course description to match new course

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 05/2014	X **Change Number to:** 2040
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Mech of Materials
to:	to:

.. **Change of Credit**	From: Fixed Credit: 3 (3,0)	To: Fixed Credit: (,)
	Variable Credit: - (-), (-)	Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:		from:		from:	to:
to:		to:		.. Creative Inquiry	..
X A-Lecture Only	..	.. Pass/Fail Only	..	.. English Composition	..
.. B-Lab (w/fee)	..	X Graded	..	.. Oral Communication	..
.. D-Seminar	..	.. Variable Title	..	.. Mathematics	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Natural Science w/Lab	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Math or Science	..
.. H-Field course	..	from:		.. A&H (Literature)	..
.. I-Study Abroad	..	to:		.. A&H (Non-Literature)	..
.. L-Lab (no/fee)	..			.. Social Science	..
.. N/B-Lecture/Lab(w/fee)	..			.. CCA	..
.. N/L-Lecture/Lab(no fee)	..			.. STS	..

X **Change Catalog Description:**
from: Relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. Includes Honors sections.
to: ME 2040: Mechanics of Materials. 3(3,0). Relationships between external loads on solid bodies or members and the resulting internal effects and dimensional changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. Includes Honors sections.

.. **Change Prerequisite(s):**
from:
to:

Learning Objectives: 1.Students will be able to choose analysis methods that are appropriate to given situations, such as analysis of open vs. closed thin-walled section in torsion, statically indeterminate vs. statically determinate analysis, etc.
2.Students will be able to determine the stresses and deformations in members that have various cross -sectional shapes and are subject to given loads.

3.Students will be able to analyze statically determinate and statically indeterminate members and assemblies of members.
4.Students will be able to properly combine stresses due to multiple types of simultaneous loads.
5.Students will recognize the role of analysis in the design of structures and machines by using analysis methods to perform sizing of simple members.

Topical Outline: Topics Hours
Introduction 1
Concepts of stress and strain, material behavior, design concepts 4
Stresses and deformation of axially loaded members and assemblies 3
Stresses and deformation of bars under torsion 4
Shear and moment equations and diagrams 3
Bending stresses in beams 2
Shearing stresses in beams 4
Combined stresses - axial, shear, torsion, and bending 4
Stress transformation, principal stresses, intro to failure theories 4
Deflection of beams and indeterminate beams 5
Review and expanded coverage of selected topics 8
Tests 3
Total 45

Evaluation: Homework = 10%
Tests = 60%
Final Exam = 30%

Add course requirements for honors and/or 600-level courses (if applicable): Honors students will have an additional project to complete which could change their final grade. This project will be chosen by the student and instructor and include more in depth work with a report at the end.

Form Originator: JANEEN, Putman,Janeen Marie **Date Form Created:** 4/17/2014
Form Last Updated by: JANEEN, Putman,Janeen Marie **Date Form Last Updated:** 4/17/2014
Form Number: 7405

Approval

Chair, Department Curriculum Committee	4/18/14 Date	Patricia W. Mokwa 5/2/2014 Chair, Undergraduate Curriculum Comn
Department Chair	4/24/14 Date	Chair, Graduate Curriculum Committee
Chair, College Curriculum Committee	4/21/14 Date	Provost 7/8/14
College Dean	Date	James P. Clements 7/11/14 President
Director, Calhoun Honors College	Date	

000233

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CHE- 1300**
Corresponding Lab Course: CHE--1301
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Chemical Eng Tools

Brief Statement of Change:
Change of ENGR preq from 1020 to 1060 because ENGR 1020 is no longer offered.

Last Term taught: 201301	.. **Change Abbrev to:**
Effective Term: 05/2014	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Chemical Eng Tools
to:	to:
.. **Change of Credit**	From: Fixed Credit: 2 (1,2) Variable Credit: - (-), (-) / To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
X N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
X **Change Prerequisite(s):**
from: Preq: CH 1010 and ENGR 1020, each with a C or better. Preq or concurrent enrollment: MATH 1060 or MATH 1070; and PHYS 1220. Coreq: CHE 1301.
to: Preq: CH 1010 and ENGR 1060, each with a C or better. Preq or concurrent enrollment: MATH 1060 or MATH 1070; and PHYS 1220. Coreq: CHE 1301.
Learning Objectives:
Topical Outline:
Evaluation:
Form Originator: CKITCHE, Kitchens,Christopher L **Date Form Created:** 4/7/2014
Form Last Updated by: CKITCHE, Kitchens,Christopher L **Date Form Last Updated:** 4/18/2014
Form Number: 7373

Approval

Chair, Department Curriculum Committee	4/18/14 Date	Chair, Undergraduate Curriculum Committee	5/2/20 Date
Department Chair	4/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	4/24/14 Date	Provost	7/8/ Date
College Dean	4/21/14 Date	President	7/11 Date

000234

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CHE- 2110**
Corresponding Lab Course: CHE--2111
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Intro to Chem Eng

Brief Statement of Change:
Change of Preq to remove ENGR 1300 course that is no longer offered.

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 05/2014	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Intro to Chem Eng
to:	to:
.. **Change of Credit**	From: Fixed Credit: 4 (3,2) To: Fixed Credit: (,)
	Variable Credit: - (-), (-) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
X N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
X **Change Prerequisite(s):**
from: Preq: CH 1020 and MTHS 1080 and PHYS 1220; and one of CHE 1300 or ENGR 1300. Coreq: CHE 2111.
to: Preq: CH 1020, MATH 1080, PHYS 1220, and CHE 1300. Coreq: CHE 2111.
Learning Objectives:
Topical Outline:
Evaluation:
Form Originator: CKITCHE, Kitchens,Christopher L **Date Form Created:** 4/7/2014
Form Last Updated by: CKITCHE, Kitchens,Christopher L **Date Form Last Updated:** 4/7/2014
Form Number: 7374

Approval

Chair, Department Curriculum Committee	4/18/14 Date	Chair, Undergraduate Curriculum Committee	5/6/2014 Date
Department Chair	4/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	4/24/14 Date	Provost	7/8/14 Date
College Dean	4/21/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

Curriculum and Course Change System

000235

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CE- 2010**
Corresponding Lab Course: --
Corresponding Honors course: CE--2010
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Statics

Brief Statement of Change:
ENGR 1410 has been a prerequisite (or concurrent enrollment) for Statics. This course is being restructured into another series of coures, and the prerequisite for Statics needs to be updated to reflect the change.

Last Term taught: 201308 Effective Term: 05/2014	.. **Change Abbrev to:** .. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: Statics to:

.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
X A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Prereq: PHYS 1220 with a C or better. Prereq or concurrent enrollment: ENGR 1410 and MATH 2060.
to: Prereq: PHYS 1220 with a C or better. Prereq or concurrent enrollment: MATH 2060 and ENGR 1070.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Baker,Kristin L **Date Form Created:** 4/9/2014
Form Last Updated by: KRISTI, Baker,Kristin L **Date Form Last Updated:** 4/9/2014
Form Number: 7390

Approval

	4/9/14		5/8/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/9/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/20/14		7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14		7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

Curriculum and Course Change System

000236

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CE- 2060**
Corresponding Lab Course: CE--2061
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Structural Mechanics

Brief Statement of Change:
ENGR 1410 has been a prerequisite for CE 2060. This course is being restructured into a series of courses, and the prerequisite for CE 2060 needs to be updated to reflect this change.

Last Term taught: 201308 Effective Term: 05/2014	.. **Change Abbrev to:** .. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: Structural Mechanics to:

.. **Change of Credit**	From: Fixed Credit: 4 (3,3) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
X N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Prereq: CE 2010 and ENGR 1410 and MATH 2060.
to: Prereq:CE 2010 and MATH 2060 and ENGR 1090.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Baker,Kristin L **Date Form Created:** 4/9/2014
Form Last Updated by: KRISTI, Baker,Kristin L **Date Form Last Updated:** 4/9/2014
Form Number: 7391

Approval

Chair, Department Curriculum Committee	4/9/14 Date	Chair, Undergraduate Curriculum Committee	5/2/2014 Date
Department Chair	4/9/2014 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	4/24/14 Date	Provost	7/18/14 Date
College Dean	4/21/14 Date	President	7/11/14 Date
Director, Calhoun Honors College	Date		

Curriculum and Course Change System

0002237

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CE- 2080**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Dynamics

Brief Statement of Change:
ENGR 1410 has been a prerequisite of CE 2080. ENGR 1410 is being restructured into a series of courses, and the prerequisite for CE 2080 needs to be updated to reflect this change.

Last Term taught: 201308 Effective Term: 05/2014	.. **Change Abbrev to:** .. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: Dynamics to:

.. **Change of Credit**	From: Fixed Credit: 2 (2,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**

.. **Delete cross-listing with the following child course(s):**

.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**	.. **Change Course Modifier**	.. **Change General Education Designation**
from: to: X A-Lecture Only .. .. B-Lab (w/fee) .. .. D-Seminar .. .. E-Independent Study .. .. F-Tutorial (w/fee) .. .. G-Studio .. .. H-Field course .. .. I-Study Abroad .. .. L-Lab (no/fee) .. .. N/B-Lecture/Lab(w/fee) .. .. N/L-Lecture/Lab(no fee) ..	from: to: .. Pass/Fail Only .. X Graded .. .. Variable Title .. .. Creative Inquiry .. .. Repeatable .. maximum credits from: to:	from: to: .. Creative Inquiry .. .. English Composition .. .. Oral Communication .. .. Mathematics .. .. Natural Science w/Lab .. .. Natural Science w/Lab .. .. Math or Science .. .. A&H (Literature) .. .. A&H (Non-Literature) .. .. Social Science .. .. CCA .. .. STS ..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Preq: CE 2010 and ENGR 1410, each with a C or better, and MATH 2060.
to: Preq: CE 2010 and ENGR 1090, each with a C or better; and MATH 2060.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Baker,Kristin L **Date Form Created:** 4/9/2014
Form Last Updated by: KRISTI, Baker,Kristin L **Date Form Last Updated:** 4/9/2014
Form Number: 7392

Approval

	4/9/14	Barbara W. Williams	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
for James Martin	4/9/2014		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Madeline M. Agee	7/18/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

000238

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: CE- 3510**
Corresponding Lab Course: CE--3511
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Civil Engineering Materials

Brief Statement of Change:
ENGR 1410 has been a prerequisite of CE 3510. The course has been restructured into a series of courses, and the prerequisite for CE 3510 needs to be updated to reflect this change. Also, the statistics requirement has changed to MATH 3020.

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 05/2014	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: Civil Engineering Materials
to:	to:
.. **Change of Credit**	From: Fixed Credit: 4 (3,3) To: Fixed Credit: (,)
	Variable Credit: - (-), (-) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
X N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:
X **Change Prerequisite(s):**
from: Preq: ENGR 1410 and GEOL 1010 and GEOL 1030. Preq or concurrent enrollment: CE 2060; and STAT 2300. Coreq: CE 3511.
to: Preq: GEOL 1010 and GEOL 1030 and ENGR 1090. Preq or concurrent enrollment: CE 2060; and MATH 3020. Coreq: CE 3511.
Learning Objectives:
Topical Outline:
Evaluation:
Form Originator: KRISTI, Baker,Kristin L **Date Form Created:** 4/9/2014
Form Last Updated by: KRISTI, Baker,Kristin L **Date Form Last Updated:** 4/14/2014
Form Number: 7393

Approval

Chair, Department Curriculum Committee	Date 4/14/14	Chair, Undergraduate Curriculum Committee	Date 5/8/2014
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	Date 4/14/2014	Provost	Date 7/18/14
College Dean	Date 4/24/14	President	Date 7/11/14
Director, Calhoun Honors College	Date 4/24/14		

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

000239

X **Change a Course - Abbrev & Number: EES- 2010**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Environ Engr Fundamentals I

Brief Statement of Change:
The course sequence change in General Engineering necessitates this change to agree with the new course numbers. The old courses are supposed to be in the "background."

Last Term taught: 201308
Effective Term: 05/2014

.. **Change Abbrev to:**
.. **Change Number to:**

.. **Change Catalog Title:**
from:
to:

.. **Change Transcript Title:**
from: Environ Engr Fundamentals I
to:

Change of Credit
From: Fixed Credit: 3 (3,0) To: Fixed Credit: (,)
Variable Credit: - (-), (-) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**

from:	to:
X A-Lecture Only	..
.. B-Lab (w/fee)	..
.. D-Seminar	..
.. E-Independent Study	..
.. F-Tutorial (w/fee)	..
.. G-Studio	..
.. H-Field course	..
.. I-Study Abroad	..
.. L-Lab (no/fee)	..
.. N/B-Lecture/Lab(w/fee)	..
.. N/L-Lecture/Lab(no fee)	..

.. **Change Course Modifier**

from:	to:
.. .. Pass/Fail Only	..
.. X Graded	..
.. .. Variable Title	..
.. .. Creative Inquiry	..
.. .. Repeatable	..
.. maximum credits	
.. from:	
.. to:	

.. **Change General Education Designation**

from:	to:
.. Creative Inquiry	..
.. English Composition	..
.. Oral Communication	..
.. Mathematics	..
.. Natural Science w/Lab	..
.. Natural Science w/Lab	..
.. Math or Science	..
.. A&H (Literature)	..
.. A&H (Non-Literature)	..
.. Social Science	..
.. CCA	..
.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Preq: CH 1010 and MATH 1080 and ENGR 1020, each with a grade of C or better. Preq or concurrent enrollment: CHE 1300 or ENGR 1300 or ENGR 1410.
to: CH 1010 and MATH 1080 and ENGR 1060, each with a grade of C or better. Preq or concurrent enrollment: CHE 1300 or ENGR 1070.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: TJVRC, Overcamp,Thomas J **Date Form Created:** 4/1/2014
Form Last Updated by: TJVRC, Overcamp,Thomas J **Date Form Last Updated:** 4/2/2014
Form Number: 7329

Approval

Thomas J. Overcamp	8 April 2014	Janice W. Morrison	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
David L. Freedman	4/7/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/24/14	James P. Clements	7/11/14
College Dean	Date	President	Date

000240

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: EES- 2020**
Corresponding Lab Course: EES--2021
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: Environ Engr Fundamentals II

Brief Statement of Change:
The course sequence change in General Engineering necessitates this change to agree with the new course numbers. The old courses are supposed to be in the "background."

Last Term taught: 201301 .. **Change Abbrev to:**
Effective Term: 05/2014 .. **Change Number to:**

.. **Change Catalog Title:**
from:
to:

.. **Change Transcript Title:**
from: Environ Engr Fundamentals II
to:

.. **Change of Credit** From: Fixed Credit: 4 (3,3) To: Fixed Credit: (,)
Variable Credit: - (-), (-) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**

from:
.. A-Lecture Only
.. B-Lab (w/fee)
.. D-Seminar
.. E-Independent Study
.. F-Tutorial (w/fee)
.. G-Studio
.. H-Field course
.. I-Study Abroad
.. L-Lab (no/fee)
X N/B-Lecture/Lab(w/fee)
.. N/L-Lecture/Lab(no fee)

to:

.. **Change Course Modifier**

from:
.. .. Pass/Fail Only
.. X Graded
.. .. Variable Title
.. .. Creative Inquiry
.. .. Repeatable
.. maximum credits
.. from:
.. to:

to:
..
..
..
..
..

.. **Change General Education Designation**

from:
.. Creative Inquiry
.. English Composition
.. Oral Communication
.. Mathematics
.. Natural Science w/Lab
.. Natural Science w/Lab
.. Math or Science
.. A&H (Literature)
.. A&H (Non-Literature)
.. Social Science
.. CCA
.. STS

to:
..
..
..
..
..
..
..
..
..
..
..
..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Preq: CH 1020 and EES 2010; and CHE 1300 or ENGR 1300 or ENGR 1410 with a grade of C or better.
to: CH 1020 and EES 2010; and CHE 1300 or ENGR 1090, with a C or better.

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: TJVRC, Overcamp,Thomas J **Date Form Created:** 4/1/2014
Form Last Updated by: TJVRC, Overcamp,Thomas J **Date Form Last Updated:** 4/2/2014
Form Number: 7330

Approval

Thomas J Overcamp	3 April 2014	Patricia W. Murdoch	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
David L. Freedman	4/7/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date

000241

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1150
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 06/2014
Catalog Title: Engineering Design & Modeling
Transcript Title: Engineering Design & Modeling
Fixed Credit Course: 3 (2,2)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
.. A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
X N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: Introduction to engineering graphics and machine design. Hand sketching and CAD tools are used to visualize, communicate, rapid prototype and analyze engineering problems. Uses SOLIDWORKS software. Credit toward a degree will be given for only one of ENGR 1150, 1160, 2080, 2090, 2100.

Prerequisite(s): Co-requisite: ENGR 1151.

Projected Enrollment:
Year 1 - 40 Year 2 - 50 Year 3 - 60 Year 4 - 70

Required course for students in: GSSM Accelerate Program

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics Accelerate Program. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.

Textbook(s): A Comprehensive Introduction to SolidWorks 2012 by Godfrey Onwubolu, Ph.D., SDC Publications, 2012 (ISBN: 978-1-58503-707-0)

Learning Objectives: Communicate technical information effectively by correctly applying standards and conventions to produce engineering drawings with proper dimensions and tolerances
Communicate engineering graphics information within a team structure
Understand and use the engineering design cycle; sketch, computer model, engineering analysis, rapid prototyping, refine design, production drawings
Develop and use visualization skills through standard engineering graphical presentations
Use modeling software to transform ideas into models, engineering drawings, pictorial representations, and parts

Topical Outline: Graphical Basics – 5 hours
Course Introduction 1
Visualization techniques 1
Design Intent/Engineering Standards 2
Hand sketching 1

SolidWorks – 25 hours
SolidWorks Interface 1
Sketch entities and tools 2
Solid Modeling (basic features and tools, advanced features, patterns, lofts, shells, sweeps, helical sweeps and cuts, curves, surfaces) 5
Assembly Modeling (parts, sub-assemblies, standard mates, advanced mates, mechanical mates, interference checking) 5
Engineering Drawings (introduction, templates, basic views, orthographic projections, projected, auxiliary, section, detail, aligned, break, and exploded views, bill of materials, hole tables, assembly) 5
Design Library (toolbox) 2
Animation and motion studies 1
Design tables 1
Sheet metal 1
Weldments 1
Finite Element Analysis 1

000242

CSWA certification – 15 hours
Introduction to the CSWA exam 2
In class practice activities 10
Testing 3

Projects – 15 hours
Rapid Prototyping 2
Troubleshooting 3
Reverse Engineering 10

Evaluation: Projects (3 @ 15% each) 45%
CSWA certification 15%
Assignments 40%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7382

Approval

E Stephan	4/9/14	Erica W. Harris	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/18/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadia M. Ajji	7/18/14
Chair, College Curriculum Committee	Date	Provost	Date
		James P. Clements	7/11/14
College Dean	Date	President	Date
	4/21/14		
Director, Calhoun Honors College	Date		

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1160
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 06/2014
Catalog Title: Engineering Graphics and Computer-Aided Design
Transcript Title: ENGR Graphics and CAD
Fixed Credit Course: 3 (2,2)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
.. A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
X N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: 2-D and 3-D drawings used to visualize and analyze engineering problems. 2D applications include site plans, contour maps, watershed, floodplains, road design, and architectural drawings. 3D applications include models, orthographic views, and rapid prototype. Credit toward degree given for for only one of ENGR 1150, 1160, 2080, 2090, 2100.

Prerequisite(s): Co-requisite: ENGR 1161.

Projected Enrollment:
Year 1 - 20 Year 2 - 30 Year 3 - 40 Year 4 - 50

Required course for students in: GSSM Accelerate Program; will fulfill requirements for Civil / Environmental / Biosystems Engineering.

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics Accelerate Program. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.
In addition, course will open enrollment to students at other schools (tech, 4-year) who need a 3-credit graphics course to fulfill requirements. Course will be offered online, in summer; initiated as part of 2014 CES Online Developement Proposal.

Textbook(s): Introduction to AutoCAD 2014 for Civil Engineering Applications by Nighat Yasmin, SDC Publications 2013 (ISBN: 978-1-58503-789-6)

Learning Objectives: Communicate technical information effectively by correctly applying standards and conventions to produce engineering drawings with proper dimensions and tolerances
Communicate engineering graphics information within a team structure
Understand and use the engineering design cycle; sketch, computer model, engineering analysis, rapid prototyping, refine design, production drawings
Develop and use visualization skills through standard engineering graphical presentations
Use modeling software to transform ideas into models, engineering drawings, pictorial representations, and parts

Topical Outline: Course Introduction 1
Getting started with AutoCAD 2
Basics of 2- dimensional drawing commands 4
Basics of 2- dimensional drawing's editing commands 4
Freehand sketching 1
Project #1 2
Report writing and PowerPoint presentation 2
Layers 2
Blocks 1
Dimensioning techniques 2
Project #2 2
Land Survey (contour map, site plan) 4
Hydrology (drainage basin, floodplain) 4
Road Design (plan, profile, cross-section, earthwork) 4
Architectural Drawing (floor plan, roof plan, elevations) 5
Working Drawings 1
Project #3 2
Basics of 3-dimensional drawing command 5
Basics of 3-dimensional drawing's editing command 4

Orthographic Projections 4
3D visualization 1
Project #4 2
Rapid Prototyping 1

Evaluation: Projects (4 @ 15% each) 60%
Assignments 40%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7383

Approval

E Stephan	4/9/14	Alice W. Thurmond	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/18/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Asif	7/18/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

000245

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Delete a Course - Abbrev & Number: ENGR- 1200**
Corresponding Graduate Course: --
X **Corresponding Honors course:** ENGR--1200

Course Title: Engr Prob Slv

Brief Statement of Change:
Course was replaced by CES 102, which became ENGR 1020. Course was used as placeholder for Project Lead the Way credit; in Fall 2014 this credit will no longer be awarded. Delete lecture (ENGR 1200), lab (ENGR 1201), and corresponding honors (ENGR H 1200)

Last Term taught: 200308
Effective Term: 05/2014
Form Originator: BETHSTE, Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7380

Approval

E Stephan	4/9/14	Rebecca W. Murdock	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/18/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

000246

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1500
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 05/2014
Catalog Title: Introduction to Engineering
Transcript Title: Introduction to Engineering
Fixed Credit Course: 2 (2,0)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
X A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
.. N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: Introduction to the engineering profession and engineering disciplines, highlighting the industries based in South Carolina, for the purpose of assisting students in their selection of an engineering major. Introduces professional, ethical and societal issues appropriate to engineering. Various forms of technical communication are emphasized.

Prerequisite(s): Pre-requisite or concurrent enrollment: MTHS 1050

Projected Enrollment:
Year 1 - 50 Year 2 - 60 Year 3 - 70 Year 4 - 80

Required course for students in: GSSM Accelerate Program

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics Accelerate Program. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.

Textbook(s): Thinking like an Engineer: An Active Learning Approach – Third Edition ValuePak (includes MyEngineeringLab) by Stephan, Bowman, Park, Sill, and Ohland; Prentice Hall, 2015.

Learning Objectives: Develop an understanding of the scope, breadth and depth of the engineering profession. Discuss societal and ethical issues in terms of engineering impact. Relate engineering to current events.
Formulate and justify a solution to an engineering problem within a team structure.
Express technical information effectively by correctly applying graphing conventions and composing clear and concise descriptions of results.

Topical Outline: Course Introduction – 1 hour

Introduction to Engineering Skills – 11 hours
- Discussion of curriculum expectations and study skills 1 h
- Introduction to engineering ethics 2 h
- Introduction to design process 2 h
- Develop teamwork skills 2 h
- Introduction to various forms of technical communication 4 h

Introduction to Engineering Profession – 18 hours
The course will be arranged to highlight five focus areas:
• Biomedical and Health
• Advanced Materials and Manufacturing
• Transportation
• Energy and Sustainable Environment
• Big Data, Simulation, Visualization, and Cyber-security
For each area, the following topics will be discussed. Total time during term is listed for topic.
- Discussion of NAE Grand Challenges, current events impacting engineering 10 h
- Opportunities in engineering students (Co-op, Internship, Study Abroad) 2 h
- Opportunities for careers other than engineering (medicine, law, etc) 2 h
- Discussion of various career pathways (research, industry, management, etc) 2 h
- Introduction to engineering majors at all South Carolina Universities 2 h

Evaluation: Projects (5, 10% each) = 50%

Assignments = 50%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7384

Approval

E Stephan	4/9/14	Jessica W. Thomas	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
Department Chair	4/18/14 Date	Chair, Graduate Curriculum Committee	Date
Chair, College Curriculum Committee	4/24/14 Date	Wade M. Agee Provost	7/8/14 Date
College Dean	4/21/14 Date	James P. Clements President	7/11/14 Date
Director, Calhoun Honors College	Date		

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

000248

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1510
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 05/2014
Catalog Title: Engineering Skills
Transcript Title: Engineering Skills
Fixed Credit Course: 2 (1,2)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
.. A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
X N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: Provides solid foundation of skills to solve engineering problems. Students demonstrate problem solving techniques with dimensions and units; use modeling techniques and interpret validity of experimental results. Students design projects on multi-discipline teams.

Prerequisite(s): Pre-requisite or concurrent enrollment: MATH 1040 or 1060; Co-requisite: ENGR 1511. DX 10/10

Projected Enrollment:
Year 1 - Year 2 - Year 3 - Year 4 -

Required course for students in: GSSM Accelerate Program

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics Accelerate Program. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.

Textbook(s): Thinking like an Engineer: An Active Learning Approach – Third Edition ValuePak (includes MyEngineeringLab) by Stephan, Bowman, Park, Sill, and Ohland; Prentice Hall, 2015.

Learning Objectives: Identify basic and derived dimensions and units; Express observations in appropriate units and perform conversions when necessary; Apply basic principles from mathematical and physical sciences to analyze engineering problems. Use graphical techniques to create "proper" plots, sketch functions, and determine graphical solutions to problems. Express technical information effectively by correctly applying graphing conventions and composing clear and concise descriptions of results.
Describe and interpret mathematical models in terms of physical phenomena. Determine an appropriate mathematical model to describe experimental data using physical knowledge and logarithmic plots, then apply the model to form graphical solutions to engineering problems.
Formulate and justify a solution to an engineering problem within a team structure.

Topical Outline: Course Introduction and Mechanics – 5 hours
- Course Introduction
- Exam Review

Dimensions & Units – 16 hours
- Use of estimation and reasonableness in problem solving
- Fundamental and derived dimensions; base and derived units
- Conversion of units as single values and within equations
- Understanding the relationship and importance of units in solving complex equations
- Equations and problems related to density, energy, force, mass, moles, power, pressure, specific gravity, temperature, voltage and weight

Plotting (by hand) – 12 hours
- Graphical representation and interpretation of data using proper plot rules
- Creating a figure with multiple data series using experimental data
- Creating a figure with multiple data series using a theoretical model
- Project: Breakeven Analysis

Mathematical Models, Trendlines and Data Analysis – 12 hours

000249

- Choice of trendlines based on physical properties, R2, and logarithmic plots
- Introduction to semi-log and log-log plots
- Introduction to three trend types (linear, power and exponential)
- Project: Trendline Analysis (Hooke's Law, Pendulums, Bouncing Springs)

Evaluation: Exams (4 @ 15% each) 60%
Projects (2 @ 5% each) 10%
Assignments 30%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7385

Approval

E Stephan	4/9/14	Jessica W. Morrison	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/16/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	5/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

000250

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1520
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 05/2014
Catalog Title: Engineering Computer Skills
Transcript Title: Engineering Computer Skills
Fixed Credit Course: 2 (1,2)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
.. A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
X N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: Continuation of ENGR 1510. Students demonstrate problem solving techniques using modeling and by using computer software Microsoft Excel and MATLAB. Course focuses on algorithms; interpreting validity of experimental results using computer software Microsoft Excel and MATLAB; introduction to matrices; estimation of answers; reading, interpreting and writing instructions and in both Excel and MATLAB; introduction to matrices, estimation of answers; reading, interpreting and writing instructions and in both Excel and MATLAB; introduction to matrices; estimation of answers; reading, interpreting and writing instructions and in both Excel and MATLAB; introduction to matrices; estimation of answers; reading, interpreting and writing instructions and in both Excel and MATLAB; introduction to matrices FDND

Prerequisite(s): Pre-requisite: ENGR 1510 with a grade of C or higher; Pre-requisite or concurrent enrollment: MATH 1060; Co-requisite: ENGR 1521.

Projected Enrollment:
Year 1 - 40 Year 2 - 50 Year 3 - 60 Year 4 - 70

Required course for students in: GSSM Accelerate Program

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics Accelerate Program. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.

Textbook(s): Thinking like an Engineer: An Active Learning Approach – Third Edition ValuePak (includes MyEngineeringLab) by Stephan, Bowman, Park, Sill, and Ohland; Prentice Hall, 2015.

Learning Objectives: Use graphical techniques to create "proper" plots, sketch functions, and determine graphical solutions to problems. Create graphs using Microsoft Excel and MATLAB.
Describe and interpret mathematical models in terms of physical phenomena. Determine an appropriate mathematical model to describe experimental data using physical knowledge and logarithmic plots, then apply the model to form graphical solutions to engineering problems. Use Microsoft Excel and MATLAB to model experimental data with a trendline and create logarithmic plots.
Use Microsoft Excel and MATLAB to enhance problem solution techniques, including: enter, sort and format data; apply built-in functions; read, write, and predict conditional statements, data validation statements, errors and warnings. In MATLAB, use looping structures and recursion. Transfer data between Excel and MATLAB.
Generate a written (numbered list/pseudo code) description and sketch a flowchart/concept map of an algorithm of a problem or process.
Read, write, interpret, and debug Excel workbooks and MATLAB programs and functions. Verify output against a published or manually calculated solution.
Describe and interpret mathematical models in terms of physical phenomena. Determine an appropriate mathematical model to describe experimental data using physical knowledge and logarithmic plots, then apply the model to form graphical solutions to engineering problems.
Formulate and justify a solution to an engineering problem within a team structure.

Topical Outline: Course Introduction and Mechanics – 5 hours
Course Introduction
Exam Review

Excel Workbooks and Problem Solving Procedures – 8 hours
Basic worksheet structure and organization, including data entry, sorting, formatting
Functions, including mathematical, statistical, trigonometry, lookup
Conditional statements in Excel

Algorithms – 3 hours
Creating algorithms by hand
Drawing a flowchart of a given algorithm

000251

Matrix Operations – 4 hours
Applying a built-in function to an array or matrix
Building and entering arrays and matrices in MATLAB
Definition and manipulation of arrays and matrices
Discussion of matrix arithmetic (addition, subtraction, multiplication)
Term-by-term operations (multiplication, raising to a power) of matrices
Transposing matrices: definition and MATLAB operator

Programs in MATLAB – 4 hours
Creating a program / function with proper documentation
Handling functions with multiple input and/or output variables
Syntax and order of execution for MATLAB commands
Variable data types (string / number / array / matrix / cell)

Input & Output – 3 hours
Definition and discussion of input and menu functions
Definition and discussion of fprintf and sprint functions

Plotting (using Excel and MATLAB) – 9 hours
Creating a figure with multiple data series using experimental data in Excel
Creating a figure with multiple data series using a theoretical model in Excel
Using plot, fplot, subplot in MATLAB
Project: Breakeven Analysis

Mathematical Models, Trendlines and Data Analysis (using Excel and MATLAB) – 9 hours
Introduction to semi-log and log-log plots in Excel and MATALB
Adding trendlines to a data series in Excel
Discussion of polyfit function in MATLAB
Project: Trendline Analysis (Hooke's Law, Pendulums, Bouncing Springs)

Evaluation: Exams (4 @ 15% each) 60%
Projects (2 @ 5% each) 10%
Assignments 30%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7386

Approval

E Stephan	4/9/14	Patricia W. Mirosh	5/8/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	7/16/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

000252

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1530
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 05/2014
Catalog Title: Engineering Foundation Skills
Transcript Title: Engineering Foundation Skills
Fixed Credit Course: 4 (3,2)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
.. A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
X N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: Provides solid foundation of skills to solve engineering problems. Students demonstrate problem solving techniques with dimensions and units, using modeling, interpreting experimental results using Microsoft Excel and MATLAB. Course focuses on algorithms; estimation of answers; reading, interpreting and writing instructions and in both Excel and MATLAB; introduction to matrices.

Prerequisite(s): Pre-requisite or concurrent enrollment: MATH 1040 or 1060; Co-requisite: ENGR 1531.

Projected Enrollment:
Year 1 - 40 Year 2 - 50 Year 3 - 60 Year 4 - 70

Required course for students in: GSSM Engineering-Track

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics students interested in engineering. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.

Textbook(s): Thinking like an Engineer: An Active Learning Approach – Third Edition ValuePak (includes MyEngineeringLab) by Stephan, Bowman, Park, Sill, and Ohland; Prentice Hall, 2015.

Learning Objectives: Identify basic and derived dimensions and units; Express observations in appropriate units and perform conversions when necessary; Apply basic principles from mathematical and physical sciences to analyze engineering problems. Use graphical techniques to create "proper" plots, sketch functions, and determine graphical solutions to problems. Create graphs using Microsoft Excel and MATLAB.
Express technical information effectively by correctly applying graphing conventions and composing clear and concise descriptions of results.
Describe and interpret mathematical models in terms of physical phenomena. Determine an appropriate mathematical model to describe experimental data using physical knowledge and logarithmic plots, then apply the model to form graphical solutions to engineering problems. Use Microsoft Excel and MATLAB to model experimental data with a trendline and create logarithmic plots.
Use Microsoft Excel and MATLAB to enhance problem solution techniques, including: enter, sort and format data; apply built-in functions; read, write, and predict conditional statements, data validation statements, errors and warnings. In MATLAB, use looping structures and recursion. Transfer data between Excel and MATLAB.
Generate a written (numbered list/pseudo code) description and sketch a flowchart/concept map of an algorithm of a problem or process.
Read, write, interpret, and debug Excel workbooks and MATLAB programs and functions. Verify output against a published or manually calculated solution.
Formulate and justify a solution to an engineering problem within a team structure.

Topical Outline: Course Introduction and Mechanics – 5 hours
Course Introduction
Exam Review

Dimensions & Units – 16 hours
Use of estimation and reasonableness in problem solving
Fundamental and derived dimensions; base and derived units
Conversion of units as single values and within equations
Understanding the relationship and importance of units in solving complex equations
Equations and problems related to density, energy, force, mass, moles, power, pressure, specific gravity, temperature, voltage and weight

000253

Plotting – 20 hours
Graphical representation and interpretation of data using proper plot rules
Creating a figure with multiple data series using experimental data in Excel
Creating a figure with multiple data series using a theoretical model in Excel
Using plot, fplot, subplot in MATLAB
Project: Breakeven Analysis

Excel Workbooks and Problem Solving Procedures – 8 hours
Basic worksheet structure and organization, including data entry, sorting, formatting
Functions, including mathematical, statistical, trigonometry, lookup
Conditional statements in Excel
Reinforcement of concepts of units through data analysis

Mathematical Models, Trendlines and Data Analysis – 20 hours
Adding trendlines to a data series in Excel
Choice of trendlines based on physical properties, R2, and logarithmic plots
Discussion of polyfit function in MATLAB
Introduction to semi-log and log-log plots
Introduction to semi-log and log-log plots in Excel and MATALB
Introduction to three trend types (linear, power and exponential)
Project: Trendline Analysis (Hooke's Law, Pendulums, Bouncing Springs)

Algorithms – 3 hours
Creating algorithms by hand
Drawing a flowchart of a given algorithm

Matrix Operations – 4 hours
Applying a built-in function to an array or matrix
Building and entering arrays and matrices in MATLAB
Definition and manipulation of arrays and matrices
Discussion of matrix arithmetic (addition, subtraction, multiplication)
Term-by-term operations (multiplication, raising to a power) of matrices
Transposing matrices: definition and MATLAB operator

Programs in MATLAB – 4 hours
Anatomy of a proper function / program
Creating a program / function with proper documentation
Handling functions with multiple input and/or output variables
Syntax and order of execution for MATLAB commands
Variable data types (string / number / array / matrix / cell)

Input & Output – 3 hours
Definition and discussion of input and menu functions
Definition and discussion of fprintf and sprint functions

Evaluation: Exams (4 @ 15% each) 60%
Projects (2 @ 5% each) 10%
Assignments 30%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7387

Approval

E Stephan	4/9/14	Jessica W. Middlebrooks	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/18/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadim M. Ayoub	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print New Course Form**

000254

Course Abbreviation & Number:
X **New Undergraduate Course:** ENGR- 1640
.. **New Honors Course:** --
.. **New Graduate Course:** -

Effective Term: 05/2014
Catalog Title: Engineering MATLAB Programming
Transcript Title: Engineering MATLAB Programming
Fixed Credit Course: 3 (2,2)
Variable Credit Course: - (-), (-)

Method of Instruction	Course Modifier	General Education Designation
.. A-Lecture Only	.. Pass/Fail Only	.. Creative Inquiry
.. B-Lab (w/fee)	X Graded	.. English Composition
.. D-Seminar	.. Variable Title	.. Oral Communication
.. E-Independent Study	.. Creative Inquiry	.. Mathematics
.. F-Tutorial (w/fee)	.. Repeatable	Natural Science No
.. G-Studio	maximum credits:	.. Lab
.. H-Field course		.. Natural Science w/Lab
.. I-Study Abroad		.. Math or Science
.. L-Lab (no/fee)		.. A&H (Literature)
X N/B-Lecture/Lab(w/fee)		.. A&H (Non-Literature)
.. N/L-Lecture/Lab(no fee)		.. Social Science
		.. CCA
		.. STS

Add cross-listing with the following child course(s):

Catalog Description: Continuation of topics introduced in ENGR 1520 or 1530. Students formulate and solve engineering problems using MATLAB. Coverage includes conditional statements, iteration and recursion using looping structures. Students formulate and solve engineering problems on multi-discipline teams using MATLAB. Various forms of technical communication are emphasized.

Prerequisite(s): Pre-requisite: ENGR 1520 or 1530 with a grade of C or higher. Pre-requisite or concurrent enrollment: MATH 1040 or 1060; Co-requisite: ENGR 1631.

Projected Enrollment:
Year 1 - 30 Year 2 - 40 Year 3 - 50 Year 4 - 60

Required course for students in: GSSM Engineering-Track

Statement of need and justification based on assessment results of student learning outcomes: Provide engineering course sequence for Governor's School of Science and Mathematics students interested in engineering. Course content must be transferable to three main SC institutions (Clemson, USC, Citadel), so course content and topic sequence differs from current first-year engineering curriculum available at Clemson.

Textbook(s): Thinking like an Engineer: An Active Learning Approach – Third Edition ValuePak (includes MyEngineeringLab) by Stephan, Bowman, Park, Sill, and Ohland; Prentice Hall, 2015.

Learning Objectives: Use graphical techniques to create "proper" plots, sketch functions, and determine graphical solutions to problems. Create graphs using Microsoft Excel and MATLAB.
Describe and interpret mathematical models in terms of physical phenomena. Determine an appropriate mathematical model to describe experimental data using physical knowledge and logarithmic plots, then apply the model to form graphical solutions to engineering problems. Use Microsoft Excel and MATLAB to model experimental data with a trendline and create logarithmic plots.
Use Microsoft Excel and MATLAB to enhance problem solution techniques, including: enter, sort and format data; apply built-in functions; read, write, and predict conditional statements, data validation statements, errors and warnings. In MATLAB, use looping structures and recursion. Transfer data between Excel and MATLAB.
Generate a written (numbered list/pseudo code) description and sketch a flowchart/concept map of an algorithm of a problem or process.
Read, write, interpret, and debug Excel workbooks and MATLAB programs and functions. Verify output against a published or manually calculated solution.
Formulate and justify a solution to an engineering problem within a team structure.

Topical Outline: Course Introduction and Mechanics – 4 hours
Course Introduction
Exam Review

Algorithms – 4 hours
Creating algorithms by hand
Drawing a flowchart of a given algorithm

Logic & Conditional Statements – 10 hours
Conditional statements in Excel and MATLAB

Looping Structures – 16 hours
Arithmetic of looping structures – calculating number of times for loop will execute
Definition and discussion of for and while operators

Recursion

000255

Input & Output in MATLAB – 6 hours
Definition and discussion of fprintf, sprintf, input, and menu functions
Importing data (CSV, Excel, text) into MATLAB
Writing data from programs into Microsoft Excel worksheets

Projects – 20 hours
Introduction to design process
Develop teamwork skills

Evaluation: Exams (3 @ 20% each) 60%
Projects (3 @ 10% each) 20%
Assignments 10%

Form Originator: BETHSTE,Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7389

Approval

E Stephan	4/9/14	Alice W. Warnock	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	4/18/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadine M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

000256

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

X **Change a Course - Abbrev & Number: ENGR- 2100**
Corresponding Lab Course: ENGR--2101
Corresponding Honors course: ENGR--2100
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: CAD & Engineering Apllications

Brief Statement of Change:
Pre-requisite wording in current catalog was incorrectly entered. Wording should apply to HONORS sections only.

Last Term taught: 201308	.. **Change Abbrev to:**
Effective Term: 05/2014	.. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: CAD & Engineering Apllications to:

.. **Change of Credit**	From: Fixed Credit: 2 (1,2) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
.. E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	.. Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
X N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Preq or concurrent enrollment: ENGR 1410 and MTHS 1080. Coreq: ENGR 2101.
to: Coreq: ENGR 2101

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: BETHSTE, Stephan,Elizabeth Anne **Date Form Created:** 4/9/2014
Form Last Updated by: BETHSTE, Stephan,Elizabeth Anne **Date Form Last Updated:** 4/9/2014
Form Number: 7381

Approval

E Stephan	4/9/14	[signature]	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
[signature]	4/18/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
[signature]	4/24/14	Nadim M. Aziz	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
[signature]	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date

CLEMSON UNIVERSITY **Curriculum and Course Change System - Print Change/Delete Course Form**

000257

X **Change a Course - Abbrev & Number: IE- 4910**
Corresponding Lab Course: --
Corresponding Honors course: IE--4910
.. **Add Honors course:** --
Corresponding Graduate course: IE--6910
.. **Add Graduate course:** --
Course Title: Selected Topics-I E

Brief Statement of Change:
This course is used for new course development. While semester-wise, it could have different prerequisites that will have to be published and checked, it should not have "consent of instructor" as the prerequisite because it is onerous to provide overrides to all students at registration time. We will enforce prerequisites as needed at the department level.

Last Term taught: 201301	.. **Change Abbrev to:**	
Effective Term: 05/2014	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: Selected Topics-I E	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (3,0)	To: Fixed Credit: (,)
	Variable Credit: 1-6 (-), (-)	Variable Credit: - (-),(-)

.. **Add cross-listing with the following child course(s):**
.. **Delete cross-listing with the following child course(s):**
.. **Reverse Parent/Child relationship with:**

.. **Change Method of Instruction**		.. **Change Course Modifier**		.. **Change General Education Designation**	
from:	to:	from:	to:	from:	to:
.. A-Lecture Only	..	.. Pass/Fail Only	..	.. Creative Inquiry	..
.. B-Lab (w/fee)	..	X Graded	..	.. English Composition	..
.. D-Seminar	..	.. Variable Title	..	.. Oral Communication	..
X E-Independent Study	..	.. Creative Inquiry	..	.. Mathematics	..
.. F-Tutorial (w/fee)	..	X Repeatable	..	.. Natural Science w/Lab	..
.. G-Studio	..	maximum credits		.. Natural Science w/Lab	..
.. H-Field course	..	from:		.. Math or Science	..
.. I-Study Abroad	..	to:		.. A&H (Literature)	..
.. L-Lab (no/fee)	..			.. A&H (Non-Literature)	..
.. N/B-Lecture/Lab(w/fee)	..			.. Social Science	..
.. N/L-Lecture/Lab(no fee)	..			.. CCA	..
				.. STS	..

.. **Change Catalog Description:**
from:
to:

X **Change Prerequisite(s):**
from: Preq: consent of instructor.
to: None

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: MKURZ, Kurz,Mary Elizabeth **Date Form Created:** 4/10/2014
Form Last Updated by: MKURZ, Kurz,Mary Elizabeth **Date Form Last Updated:** 4/10/2014
Form Number: 7396

Approval

	4/10/14	Carice W. Mathews	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
Scott Mason	4/10/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	4/24/14	Nadia M. Ajji	7/8/14
Chair, College Curriculum Committee	Date	Provost	Date
	4/21/14	James P. Clements	7/11/14
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		