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

X Change a Course - Abbrev & Number: CH- 2015 2011

Corresponding Lab Course: CTF-2013

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:

|From: Fixed Credit: 1 (0,3)|To: Fixed Credit: (,)

Change of 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 M	lodifier	Change General Educ	cation Designation
A-Lecture Only X B-Lab (w/fee) D-Seminar E-Independent Study	o: from: Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits from: to:		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	

.. Change Catalog Description:

from:

to:

.. Change Prerequisite(s):

from:

to:

Learning Objectives:

**Topical Outline:** 

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

Approvai		1	1 . 1 . 1
BA	2/14/2014	Parice W. Murkouse	5/2/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
R. Xul Dieter	2/14/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
274	3/31/14	Nadi M. Avi	7/8/14
Chair College Qurriculum Committee	Date	Provost	Date
allen	3/31/10	James P. Clemente	7/11/14
College Dean	Date	Predent	Date
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CLEMSON		Duint (	Change/Delete	Course Form		
CLEMSON Curriculum and	Course Change System	1 - Print C	Jilalige/ Delete			
Y Change a Course - Abbrev & Num	ber: CH- 3320					
Corresponding Lab Course;						
Corresponding Honors course: CH332 Add Honors course:	.0					
Corresponding Graduate course:						
Add Graduate course:						
Course Title: Physical Chemistry						
of Change			1		•	
Brief Statement of Change: The prerequisites have been broadened	d to include CHE 2200, al	lowing ch	emicai s CH3310 (a			
engineering students to register for Ci	1 JJ20; Carrotty,	oaring stu	dents take an			
engineering students to register for Ch course in thermodynamics) as the prei alternative thermodynamics course (C	requisite. Chemical engin HE 2200), rather than CH	3310, an	nd historically			
L Formod Well ID LD 332Vi						
	Abbrev to:					
Torm, 08/2014 L. Change	Mulliper co.					
Change	Transcript Title:					
from: Physical to:	ical Chemistry					
10:	: 3 (3,0) To: Fixed Credit	: (,)				
" r a	-) (-) [Variable Cledita	- (-),(-)				
Dolote cross-listing with the fol	lowing clind course(5)	_				
Reverse Parent/Child relations	ווף איונווי ,	Change	General Educa	ation Designation		
Change Method	nge Course Modifier	0.,	The state of the s			
of Instruction to: from:	to:	from:		to:		
Trom:	s/Fail Only	Creative	e Inquiry	**		
X A-Lecture Only X Grad	ded ·· \	English Oral Co	Composition mmunication			•
D-Seminar van	able rice	Mathem	natics			
E-Independent Study Cre-	acive inquity	Matural	Science w/Lab	• •		
F-Tutorial (w/fee) Rep G-Studio maxir	avadita	Natural Math o	Science w/Lab			
H-Field course from:		j., Matri oi i A&H (l	iterature)			
I-Study Abroad  to:		l., A&H (N	lon-Literature)			
L-Lab (no/fee)		Social S	Science	••		
N/B-Lecture/Lab(w/fee) 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:	n N Deto Form Cr	eated: 2/	10/2014			
Evaluation:  Form Originator: DOMINY, Domin Form Last Updated by: DOMINY,	Dominy Brian N Date Form	orm Last	Updated: 3/18/	2014		
Form Number: 7083	, Domini,					
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Approval	12/	ارام	Can .	A. C. Mar.		15/8/001
13 15	9(1	0/14	/ Samo	N. Maryon In	nittee	Date
Chair, Department Curriculum Com	nmittee Date	Ch	air, Undergradua	ate Curriculum Comn	IIICCC	
Chair, Department Currection Con-		local (V				
R. Varl Dieter		18/14	· CA duato Ci	ırriculum Committee		Date
Department Chair	Date	: ICh	iair, Graduate Co	1/1 / -	and the second s	7/2/14
Department	3/	2//14	Nad	VI AV	*	11010
7607		11-1-	ovost	Control of the State of the Sta		Date
Chair, College Curriculum Commit	tee	=		P CO	-	17/11/14
411-	3/131	1114	Yames	<u>. [ , Clame</u>		Date
year	Date	e Pr	res dent			Date
College Dean	Date					
		1				

Date

Director, Calhoun Honors College

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100VI			Four	
CLEMSON Curriculum and Co	ourse Change System -	- Print Change/Delete (	Course Form	
V Change a Course - Abbrev & Number	er: CH- 4030			
Corresponding Lab Course: Corresponding Honors course: CH4030				
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	al and analytical chemist	try labs lack tile skins antly underperform in CH		
2400 or 4170) IS DEILU (OTITION) "Galler"		will aravide the		
	· · · · · · · · · · · · · · · · · · ·	Leamacter Selliol Sever		
the avactations diffilled in the out		7) In addition 10 0146		
chemistry BS majors (which are the stu- students more flexibility in meeting the	prerequisites for the cou	e for CH 2050.		
preparedness, we are adding change A	hbrev to:			
T 00/2014 1. Change 1	101112			
Change Catalog Title: Change T	'ranscript Title: worth Tech			
from:	71100	. ()		
to: From: Fixed Credit: - (- Change of Credit Variable Credit: - (-	2 (0,6) To: Fixed Credit:	: (,) - (-),(-)		
Add cross-listing with the follow	ing child course(s):	<u>-</u>		
Balata crossilisting with the lone	Ovving Cities	<u> </u>		
Reverse Parent/Child relationsin	ip with: nge Course Modifier	Change General Educa	ation Designation	
Change Method Chan	ige course mean		to:	
of Instruction to: from:				
A-Lecture Only Pass/	/ an Only	English Composition		
D-Seminar Varia	able Title	Mathematics		
F-Independent Study Crea	itive midan i	Natural Science W/Lab		
G-Studio maxim		Natural Science w/Lab Math or Science		
H-Field course [170111.	1	L A&H (Literature)		
I-Study Abroda		A&H (Non-Literature) Social Science		
N/B-Lecture/Lab(W/fee) ···		CCA		
N/L-Lecture/Lab(no fee)	•	STS	••	
Change Catalog Description:				
from:				
X Change Prerequisite(s):	— 3550 or 3170 or 3390)			
X Change Prerequisite(s): from: CH 2050, 2270, 2280, and (3 to: CH 2050 (or 4020), 2270, 2280,	, and (3400 or 4120)			
Learning Objectives:				
Topical Outline:				
Evaluation: Form Originator: ATENNYS, Tenny	vson, Andrew Gregory Da	ate Form Created: 2/2/2	014 tated: 2/27/2014	
Form Last Updated by ATLINITO	, Tennyson,Andrew Greg	gory Date Form Last Opt		1
Form Number: 7048				1 - 12 half
Approval	101	المام		15/3/0011
13 F D	3/1	Chair Undergradu	ate Curriculum Condittee	Date
Chair, Department Curriculum Com	nmittee Date			
02100 .t.	03/1	18/14	La Committee	Date
K. Karl Dille	Date	e Chair, Graduate C	urriculum Committee	7/8/14
Department Chair	3/	31/14 Nad	Me AVA	Date
774		7 7 7	- V	
Chair College Curriculum Commit	Titee 33	illy O	Y. Clemente	<u>''''''</u> ''
Much		te President		Date
College Dean	Date	le Frenche		
Director, Calhoun Honors College	Dat	te		
Director/				

N I V E R S I T Y Curricu	lum and Course Cha	inge Systen L10	n - Print Change/Delete Course For	
Change a Course - Abbre	V & Italia			
orresponding Lab Course:	•			
orresponding Honors course  Add Honors course:	•			
orresponding Graduate cour	se: CH6110			
Add Graduate course:				
Course Title: Instrumental	I Analy			
			- a cominglym as CH	
Brief Statement of Change CH 3320 is taught at the sam	ne time in the suggest	ed Chemistr	y B.S. curriculum as Cit	
CH 3320 is taught at the same	s have typically been	taking CH 33	anartment would like to	
1110. Consequency stand	ell. Based on this, the	chemistry u	eguire concurrent	
4110 and have performed we remove the prerequisite requ	uirement of CH 3320 a	and instead i	equile contain = 1	
	Change Abbrev to:			
		1		
- · · · · · · · · · · · ·	Change Transcript	Title:		
from:	rom: Instrumental Ana	aly		
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to:	a (a a)iTa	: Fixed Credit	t: (,)	
From: Fix	xed Credit: 3 (3,0) To		t: (,) : - (-),(-)	
From: Fix Change of Credit Variable	xed Credit: 3 (3,0) To Credit: - (-), (-) Va	ourse(s):		
Change of Credit Variable  Add cross-listing with the cross-list	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child c th the following chil	course(s): d course(s)	<u>):</u>	
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child r	xed Credit: 3 (3,0) To Credit: - (-), (-)  Va the following child ( th the following chil relationship with:	course(s): d course(s)	<u>):</u>	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child r Change Method	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child c th the following chil	course(s): d course(s)	Change General Education Desig	natio
Change of Credit Variable  Add cross-listing with the cross-list	xed Credit: 3 (3,0) To Credit: - (-), (-)  Va the following child on th the following child relationship with:   Change Course	course(s):  d course(s)  e Modifier	Change General Education Desig	natio
Change of Credit Variable Add cross-listing with 1 Delete cross-listing wit Reverse Parent/Child 1 Change Method of Instruction	xed Credit: 3 (3,0) To Credit: - (-), (-)  Va the following child on the following child relationship with:   Change Course to: from:	course(s): Id course(s) e Modifier	Change General Education Design from: to:	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child r Change Method of Instruction from: X A-Lecture Only	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of th the following child relationship with:   Change Course to: from:   Pass/Fail Only	course(s):  Id course(s):  Modifier  to:	Change General Education Design from: to: Creative Inquiry Fnglish Composition	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with t Reverse Parent/Child t Change Method of Instruction from: X A-Lecture Only B-Lab (w/fee)	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of the the following child relationship with:	course(s): Id course(s) e Modifier	Change General Education Design from: to: Creative Inquiry English Composition Oral Communication	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child r Change Method of Instruction from:  X A-Lecture Only B-Lab (w/fee) D-Seminar	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of the the following child relationship with: Change Course to: from: Pass/Fail Only X Graded Variable Title	course(s): id course(s) e Modifier to:	Change General Education Design from: to: Creative Inquiry English Composition Oral Communication Mathematics	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child r Change Method of Instruction from:  X A-Lecture Only B-Lab (w/fee) D-Seminar E-Independent Study	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of the the following child relationship with: Change Course to: from: Pass/Fail Only X Graded Variable Title Creative Inquir	course(s): id course(s) e Modifier  to:	In Change General Education Design from:  In Creative Inquiry  In English Composition  In Oral Communication  In Mathematics  In Mathematics  In Mathematics  In Mathematics In Mathematics  In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematics In Mathematical Inc.  In Mathema	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with t Reverse Parent/Child r Change Method of Instruction from:  X A-Lecture Only B-Lab (w/fee) D-Seminar E-Independent Study F-Tutorial (w/fee)	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of th the following child relationship with: Change Course to: from: Pass/Fail Only Variable Title Creative Inquir Repeatable	course(s): Id course(s)  e Modifier  to: y	In Change General Education Design from:  In Creative Inquiry  In English Composition  In Oral Communication  In Mathematics  In Natural Science w/Lab	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child t Change Method of Instruction from:  X A-Lecture Only B-Lab (w/fee) D-Seminar E-Independent Study F-Tutorial (w/fee) G-Studio	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of the the following child of relationship with:  Change Course to: from: Pass/Fail Only X Graded Variable Title Creative Inquir Repeatable maximum credits	course(s): Id course(s)  e Modifier  to: y	In Change General Education Design   Ifrom: to: In Creative Inquiry	natio
Change of Credit Variable Add cross-listing with t Delete cross-listing with Reverse Parent/Child t Change Method of Instruction from: X A-Lecture Only B-Lab (w/fee) D-Seminar E-Independent Study F-Tutorial (w/fee) G-Studio H-Field course	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of the following child of relationship with:  Change Course to: from: Pass/Fail Only X Graded Variable Title Creative Inquir Repeatable maximum credits from:	course(s): Id course(s)  e Modifier  to: y	from: to: Creative Inquiry English Composition Oral Communication Mathematics Natural Science w/Lab Natural Science w/Lab Math or Science ARH (Literature)	natio
Change of Credit Variable  Add cross-listing with t  Delete cross-listing with t  Reverse Parent/Child t  Change Method of Instruction  from:  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	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of th the following child relationship with:  Change Course to: from: Pass/Fail Only X Graded Variable Title Creative Inquir Repeatable maximum credits from: to:	course(s): Id course(s)  e Modifier  to: y	In Change General Education Design    from: to:  In Creative Inquiry to:  In Oral Communication to:  In Mathematics to:  In Natural Science w/Lab to:  In Math or Science to:  In A&H (Literature) to:  In A&H (Non-Literature) to:  In A&H (Non-Literat	natio
Change of Credit Variable  Add cross-listing with t  Delete cross-listing with t  Reverse Parent/Child t  Change Method of Instruction from:  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  I-Iah (no/fee)	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of th the following child relationship with: Change Course to: from: Pass/Fail Only Variable Title Creative Inquir Repeatable maximum credits from: from: to:	course(s): Id course(s)  e Modifier  to: y	from: to: Creative Inquiry English Composition Oral Communication Mathematics Natural Science w/Lab Math or Science A&H (Literature) A&H (Non-Literature) Social Science	natio
Change of Credit Variable  Add cross-listing with t  Delete cross-listing with t  Reverse Parent/Child t  Change Method of Instruction  from:  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	xed Credit: 3 (3,0) To Credit: - (-), (-) Va the following child of th the following child relationship with:  Change Course to: from: Pass/Fail Only X Graded Variable Title Creative Inquir Repeatable maximum credits from: to:	course(s): Id course(s)  e Modifier  to: y	In Change General Education Design    from: to:  In Creative Inquiry to:  In Oral Communication to:  In Mathematics to:  In Natural Science w/Lab to:  In Math or Science to:  In A&H (Literature) to:  In A&H (Non-Literature) to:  In A&H (Non-Literat	natio

111/4 = ==
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	3/18/14 Parice W. Murhosen	5/2/2014
Chair, Department Curriculum Committee	Date Chair, Undergraduate Curriculum Committee	Date
R. Harl Duter	Date Chair, Gyaduate Curriculum Committee	Date
Department Chair	3/31/14 Nad Me Agg	//8/14  Date
Chair College Curriculum Committee	Bate Provost P. Clement	- 7/11/4
College Dean	Date Prevident	Date
Director, Calhoun Honors College	Date	

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4/2014				
$\underset{U-N-1-V-E-R-S-1-T-V}{\text{CLEMSON}} \text{ Curriculo}$	and Course Chang	e Svstei	n - Print Change/Delete	Course Form
UNIVERSITY Curricul	um and Course Chang			
Y Change a Course - Abbrev	& Number: CH- 4430			
Carroon and Ind Lah Course: ""				
Corresponding Honors course:	CH4430			
Add Honors course:	Δ'			
Corresponding Graduate cours Add Graduate course:	C.			
Add Graduate Course. Course Title: Research Prob	lems			
Brief Statement of Change: The Department of Chemisty	would like to make this	course m	ore accessible to current	
The Department of Chemistry Chemistry majors and non-ma	iors.			
Lbt. 2013011	Change Apple 4 co.			
Towns NV//III4 lo	Change ivenile			
Lile Title	Change Transcript Titl	e:		
	om: Research Problems			
Ironi.				
ιο:	To Fi	xed Cred	nt: (,)	
'' III V- mobile C	radit · 1-6 (-), (-) Varial	le Creak	:: - (-),(-)	
Delete cross-listing With	the following cima of	urse(s)		
Reverse Parent/Child re	NATIONS(IID WILLI		Change General Educ	ation Designation
Change Method	Change Course M	odifier	Change Gelleral Educ	
of Instruction				to:
+	o: from:	to:	from: Creative Inquiry	11
from: 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)	X Repeatable maximum credits		Natural Science w/Lab	11
G-Studio			Math or Science	**
H-Field course	from: to:		A&H (Literature)	11
I-Study Abroad			A&H (Non-Literature)	••
X L-Lab (no/fee)			Social Science	
N/B-Lecture/Lab(w/fee) N/L-Lecture/Lab(no fee)			CCA	
N/L-Lecture/Lab(no 1997			STS	
Change Catalog Descri	ption:			
from:				
to:				
V Change Prerequisite(s	<b>):</b>			
Europe Conjor standing in U	Hemsuy.			
to: Consent of Instructor	equired.			
Learning Objectives:				
Topical Outline:	and the second s			
Evaluation:	•		tod: 2/10/2014	
Evaluation: Form Originator: CRISP,	Crisp, Ashley E Date Fo	rm Crea	n Last Undated: 2/14/20:	14
Form Last Updated by:	CRISP, Crisp, Ashley E D	ate rom	n Last Updated: 2/14/20	
70111 East Option 7091				

Form Number: 7081 Approval	Date Chair, Undergraduate Curriculum Com	5/3/30/4 Date
Chair, Department Curriculum Committee  R. Youl Dulu  Department Chair  Chair, College Curriculum Committee  College Dean	Date Chair, Ordergraducte sample of Silving Chair, Graduate Curriculum Committee Silving Chair, Graduate Curriculum Committee Provost  331   Yarahara P. Clauding Chair, Graduate Curriculum Committee Provost  331   Yarahara P. Clauding Chair, Graduate Curriculum Committee Provost  Date President	The second secon
		All the second of the second o

4/2014	C	Curriculum	and Course Change System	
CLEMSON Curricul	um and Course Change	e Syste	m - Print Change/Delete	e Course Form
X Change a Course - Abbre	& Number: CH- 4440			
Corresponding Lab Course:				
Corresponding Honors course:	CH4440			
Add Honors course:				
Corresponding Graduate cours	se:			
Add Graduate course:				
Course Title: Research Prof	olems			
Brief Statement of Change The Department of Chemistry Chemistry majors and non-ma Last Term taught: 201301 Effective Term: 08/2014	ajors.  Change Abbrev to: Change Number to:	ASSESSMENT	nore accessible to current	
Change Catalog Title:	Change Transcript Title	e:		
from:	om: Research Problems			
to:  to		xed Cred	it: ( )	
From: Fixe	ed Credit: (,) To: Fix	xeu Crodit	· - (-) (-)	
Change of Credit Variable C	redit: 1-6 (-), (-) Variab	- (-)-	. ( )/( )	
Add oroce-listing with th	e following china coars	C(5).		
Delete cross-listing with	the following child col	urse(s):	<u>-</u>	
Reverse Parent/Child re	lationship With:	,	Change General Educ	ation Designation
Change Method	Change Course Mo	difier	Change dellerar Lauce	
of Instruction				to:
from:	o: from:	to:	from:	
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 Natural Science w/Lab	
F-Tutorial (w/fee)	X Repeatable	••	Natural Science w/Lab	
G-Studio	maximum credits		Natural Science W/Ldb	**
H-Field course	from:		Math or Science	
I-Study Abroad	to:		A&H (Literature) A&H (Non-Literature)	••
X L-Lab (no/fee)			A&H (NOII-Literature)	
N/B-Lecture/Lab(w/fee)	, ,		Social Science	.,
N/L-Lecture/Lab(no fee)			CCA STS	
Change Catalog Descri	ption:			
from:				
to:				
X Change Prerequisite(s	):			
from: Senior standing in Cl	nemistry.			

to: Consent of Instructor. Learning Objectives: **Topical Outline:** 

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

Form Number: 7082			1 1
Approval	1,1	A A Can	12b014
PNO	2/14/2014	Basice W. Murkosk	Date
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	
R. Warl Deiter	02/14/14	Combaulum Committee	Date
Department Chair	Date	Chair, Graduate Curriculum Committee	7/18/111
0.1.1	3/31/14	Nad M. Aya	
Chair, Gollege Curriculum Committee	Date	Provost	Date
Chair, Whiege Carriedium Service	3/21/14	James P. Clemente	1111114
Web	Date	Presi	Date
College Dean	Date		
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			1/2

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(CON)	- L. Change / Delete Course Form	
CLEMSON Curriculum and Course Change System  Abbrev & Number: CPSC- 1990	m - Print Change, Doisis	
X Change a Course - Abbrev & Number: CPSC- 1990		
Carrochonding Hollois coulds.		
Corresponding Graduate Courses		
Add Graduate course: Course Title: Selected Topics		
Course little: Selected 14.		
<b>Brief Statement of Change:</b> Drop consent of instructor to allow student to enroll without in the consent of th	requiring a prerequisite	
Drop consent of instructor to allow student to small		
override. Change Abbrev to:		
Last Term taught: 201308 Change Number to:  Effective Term: 08/2014 Change Transcript Title:	•	
Change Transcript Itte.		
from: Selected Topics		
lio, In Flored Cree	edit: (,)	
From: Fixed Credits (7) (-) Variable Cred	iit: - (-),(-)	
to:   From: Fixed Credit: (,)   10: Fixed Credit: Change of Credit   Variable Credit: 1-8 (-), (-)   Variable Credit: 1-8 (-),	1	
Add cross-listing with the following child course(	<u>(s):</u>	
Reverse Parent/Child relationship with: Reverse Parent/Child relationship with:	Change General Education Designation	
Reverse Parent/Child relationship to the course Modifier		
., Change Method	to:	
to:ifrom:	1 Creative Induity "	
x A-Lecture Only   Pass/Fall Only	English Composition Oral Communication	
., B-Lab (w/fee) " Variable Title "	Mathematics ''	
D-Seminar Creative Inquiry	l Natural Science W/Ldu "	
E-Independent State / ly geneatable	Natural Science W/Lab	
G-Studio " Islam.	Math or Science "	
H-Field course	A&H (Literature) A&H (Non-Literature)	
T-Study Abroad	Social Science	
L-Lab (no/ree)	l., CCA	
N/L-Lecture/Lab(no fee)	., STS "	
i i		
Change Catalog Description:		
from:		•
X Change Prerequisite(s):		
from: Consent of Instructor.		
to: (none)		
Learning Objectives:		
Topical Outline:	. 2/10/2014	
Form Criginator: MARK, Smotherman, Mark K Date Form Last Updated by: MARK, Smotherman, Mark K I	form Created: 3/18/2014	
Form Originator: MARK, Smotherman, Mark K I	Date Form East of	,
Form Number: 7300		1272/201
	1 As As Called and a	2/9/001
Approval .	3/18/14 Rassea W. Markos S.	Date '
Mad Sinte	Date Chair, Undergraduate Curriculum Committee	}
Chair, Department Curriculum Committee		
	3/18/14	Date
M. Xx	Date Chair, Graduate Curricular	17/8/
Department Chair	12/2014 /20 /6 ATA	Date
715/		- 301.10
Committee	Date / Provost P Co. T.	171111
Chair College Curriculum Committee	3 31 14 James 1, Clementer	Date
/// Ch		
- U	Date President	
College Dean		
	Date	
Callage	logic ,	

Director, Calhoun Honors College

000221 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** Drop consent of instructor to allow student to enroll without requiring a prerequisite Last Term taught: 201308 .. Change Abbrev to: Effective Term: 08/2014 ... Change Number to: .. Change Catalog Title: .. Change Transcript Title: from: Selected Topics from: to: To: Fixed Credit: (,) to: From: Fixed Credit: (,) Change of 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): .. Change General Education Designation .. Reverse Parent/Child relationship with: .. Change Course Modifier .. Change Method to: to:|from: of Instruction .. Creative Inquiry to: from: .. Pass/Fail Only . English Composition from: X A-Lecture Only .. .. Oral Communication .. X Graded .. B-Lab (w/fee) .. Variable Title Mathematics .. D-Seminar .. Creative Inquiry ., Natural Science w/Lab .. .. E-Independent Study .. Natural Science w/Lab .. X Repeatable .. F-Tutorial (w/fee) maximum credits .. Math or Science .. G-Studio .. A&H (Literature) from: .. H-Field course .. A&H (Non-Literature) to: .. I-Study Abroad .. Social Science .. L-Lab (no/fee) .. N/B-Lecture/Lab(w/fee) ., CCA .. N/L-Lecture/Lab(no fee) .. STS .. Change Catalog Description: from: to: X Change Prerequisite(s): from: Junior standing and consent of instructor. to: Junior standing. Learning Objectives: Topical Outline: 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, Undergraduate Curriculum Committee Date Department Curriculum Committee Chair, Date Graduate Curriculum Committee Chair, Date Department Chair Date Provost pate College Curriculum Committee Chaig Date

Date

Date

College Dean

Director, Calhoun Honors College



# $\overline{\hat{Y}}$ Curriculum and Course Change System - Print Change/Delete Course

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** 

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

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

to:

From: Fixed Credit: 5 (3,4) To: Fixed Credit: (,)

Change of Credit Variable Credit: - (-), (-) | Variable Credit: - (-),(-)

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

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

Delete cross-listing with Reverse Parent/Child re	lationship with:	odifier	Change General Educ Designation	ation
change Method of Instruction from: to: A-Lecture Only B-Lab (w/fee) D-Seminar E-Independent Study F-Tutorial (w/fee) G-Studio	from: to: Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits from: to:		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:

### from:

from: Prereq: Mths 1060, 1080; phys 1220 each with a C or betterprereq or Concurrent enrollemnt: to: X Change Prerequisite(s): 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:**

Form Originator: JANEEN, Putman, Janeen Marie Date Form Created: 2/20/2014 **Evaluation:** 

Form Last Updated by: JANEEN, Putman, Janeen Marie Date Form Last Updated: 4/8/2014

Form Number: 7156

### Approval

Director, Calhoun Honors College

		- · · · · ·
Curriculum and Course Change System	I	5/2/2014
Committee	Date	Chair, Undergraduate Curriculum Comn
Chair, Department Curriculum Committee	4/9/14	Chair, Graduate Curriculum Committee
Department Chair	Date 4-9-14	Vad Ma Agrif 1/8/1
Chair, College Curriculum Committee	Date 4/2 4/19	Qames P. Clauster 7/11/18
College Dean	Date	esident
	110111	

Page 1 of 1 Curriculum and Course Change System 000224  $\frac{\sqrt{k-3}}{3}$  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 ... Change Abbrev to: Effective Term: 05/2014 .. Change Number to: .. Change Catalog Title: .. Change Transcript Title: from: Thermo/Heat Transfer from: From: Fixed Credit: 3 (3,0) To: Fixed Credit: (,) to: Change of Credit Variable Credit: - (-), (-) Variable Credit: - (-),(-) .. Add cross-listing with the following child course(s): .. Delete cross-listing with the following child course(s): .. Change Course Modifier |.. Change General Education Designation .. Reverse Parent/Child relationship with: .. Change Method to: of Instruction to: from: to:|from: .. Creative Inquiry .. Pass/Fail Only from: .. English Composition X A-Lecture Only .. Oral Communication X Graded .. B-Lab (w/fee) .. Variable Title ,, Mathematics .. D-Seminar .. Natural Science w/Lab .. .. |.. Creative Inquiry .. E-Independent Study .. Natural Science w/Lab .. .. Repeatable .. F-Tutorial (w/fee) .. maximum credits .. Math or Science .. G-Studio .. A&H (Literature) from: .. H-Field course .. A&H (Non-Literature) .. |to: .. I-Study Abroad .. Social Science .. L-Lab (no/fee) .. N/B-Lecture/Lab(w/fee) .. CCÀ .. N/L-Lecture/Lab(no fee) .. .. STS .. Change Catalog Description: from: to: X Change Prerequisite(s): to: Junior standing in an engineering curriculum. Not open to Mechanical Engineering majors. Learning Objectives: Topical Outline: 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 Evaluation: Lasboul Form Number: 7293 Approval

Form Number: 7293	·	12 1XD14
Approval	Marie W. Murbos L. Committee	Date
Chair, Department Curriculum Committee Da	ate Chair, Undergraduate Curriculum Committee	
1 All 1	Chair, Graduate Curriculum Committee	Date 7/8/14
Department Chair	TILL N. HVA	Date
Chair, College Curriculum Committee	Provost  P Clamate	7/11/14
11/16/1	Date Product	Date
College Dean		
Director, Calhoun Honors College	Date	
Director, Camoun Hones		

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000225
                   Curriculum and Course Change System - Print Change/Delete Course Form
X Change a Course - Abbrev & Number: ME- 202
Corresponding Lab Course: --
Corresponding Honors course: --
.. Add Honors course: -
Corresponding Graduate course: --
 .. Add Graduate course: --
Course Title: Founda Mech Syst
 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: Founda Mech Syst
                   From: Fixed Credit: 3 (3,0) To: Fixed Credit: (,)
  to:
  Change of Credit Variable Credit: - (-),(-)
  .. Add cross-listing with the following child course(s):
  .. Delete cross-listing with the following child course(s):
                                .. Change Course Modifier \mid .. Change General Education Designation
  .. Reverse Parent/Child relationship with:
   .. Change Method
                                                                                       to:
   of Instruction
                                                          to: from:
                                                              ., Creative Inquiry
                             to:|from:
                                 .. Pass/Fail Only
   from:
                                                                English Composition
   X A-Lecture Only
                              .. X Graded
                                                        ..
                                                              .. Oral Communication
   .. B-Lab (w/fee)
                                .. Variable Title
                                                              .. Mathematics
   .. D-Seminar
                                 .. Creative Inquiry
                                                              .. Natural Science w/Lab ..
                                                        ..
   .. E-Independent Study
                                                               .. Natural Science w/Lab ..
                                 .. Repeatable
    .. F-Tutorial (w/fee)
                                 maximum credits
                                                               .. Math or Science
    .. G-Studio
                                                               .. A&H (Literature)
                                 from:
    .. H-Field course
                                                               .. A&H (Non-Literature)
                                 Ito:
    .. I-Study Abroad
                                                               .. Social Science
    .. L-Lab (no/fee)
    .. N/B-Lecture/Lab(w/fee) ..
                                                               .. CCA
     .. N/L-Lecture/Lab(no fee)
     from: Introduction to basic physical elements of mechanical engineering systems. Problem solving, design, and resourceful application of
                                                               .. STS
    X Change Catalog Description:
     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.
      from: Preq: ME 2010, and ME 2040 (formerly ME 3020) each with a C or better.
     X Change Prerequisite(s):
     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
      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
       7.Students will write technical reports and communicate how mechanical systems function, how they are made, and design improvements
       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%
         Form Originator: MBFREE, Freeman Jr, Michael B Date Form Created: 3/17/2014
         Final Exam = 15%
         Form Last Updated by: MBFREE, Freeman Jr, Michael B Date Form Last Updated: 4/17/2014
          Form Number: 7291
          Approval
```

m and Course Change System	1		
	1 (	00022	6
	4/18/14 Carrier W. M.	relication	5/2/20/1
Chair, Department Curriculum Committee	Date Chair, Undergraduate Currio	culum Committee	Date
	Date Chair, Graduate Curriculum	Committee	Date
Department Chair	Date Chair, graduate curriculum	Avi	7/8/10
Chair College Curriculum Committee	Date / Provost		Date
WECH	4/2/14 James P.	Clemente	Date
College Dean	Date President		
Director, Calhoun Honors College	Date		



# $\tilde{\gamma}$ 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)

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)	Course Modifier  Pass/Fail Only Graded Variable Title Creative Inquiry Repeatable maximum credits:	General Education Designation  Creative Inquiry  English Composition  Oral Communication  Mathematics   Natural Science No  Lab  Natural Science w/Lab  Math or Science  A&H (Literature)  A&H (Non-Literature)  Social Science  CCA  STS
with t	he following child co	ourse(s).

Catalog Description: The course develops the aspects involved in the conceptual design of an aircraft. Add cross-listing with the following child course(s): The focus is on the interplay between goals and constraints in the process of the design of a subsonic

Prerequisite(s): ME 308

# **Projected Enrollment:**

Year 1 - 25 Year 2 - 30 Year 3 - 35 Year 4 - 40

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

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

- 1. You will be able to outline and explain the major steps involved conceptual design process of an Learning Objectives: Course Objective 1:
- 2. You will be able to make reasonable judgements on design values and show reason for such
- 3. You will show initiative and be able to make use of all available resources (text, notes, references, library, internet, phone calls).
- 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
- 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.
- 1. You will generate and justify an original design analysis of a light aircraft that meets at least 90% of Course Objective 3: the performance criteria specified in the problem definition. 3/31/201

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

Chair, Department Curriculum Committee

Date

Chair, Undergraduate Curriculum Committee

Date

Chair, Graduate Curriculum Committee

Chair, Graduate Curriculum Committee

Chair, College Curriculum Committee

Date

Provost

College Dean

Date

Tourriculum 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)

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)	Pass/Fail Only Pass/Fail Only Graded Variable Title Creative Inquiry Repeatable maximum credits:	General Education Designation  Creative Inquiry  English Composition  Oral Communication  Mathematics  Natural Science No  Lab  Natural Science w/Lab  Math or Science  A&H (Literature)  A&H (Non-Literature)  Social Science  CCA  STS
** 1. #le	o following child co	il the mechanical

Catalog Description: The main objective of this course is to provide the mechanical engineer with the Add cross-listing with the following child course(s): 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

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.

- to define the principal variables used to describe the thermal-hydraulic behavior of a nuclear reactor Learning Objectives: Students will be able:
- to explain the essential physical phenomena encountered in the thermal-hydraulic design of a nuclear
- to approach a thermal-hydraulic problem in a rational, efficient and professional way, reactor (e.g. boiling crisis, choked flow),
- 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%

\*The third project will be a graduate level thermalhydraulic design of a steam generator. Final exam: 20%

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

Approval			Parice W.	Mulare	5/2/2014
Chair, Department Curriculu  Department Chair  Chair, College Curriculum (  College Dean  Director, Calhoun Honors	Committee	Date  3/3/// Date  3/3/// Date  Date  Date	Chair, Undergra	duate Curriculu	m Comn
Directory					

# $\widehat{\overline{R}}$ $\widehat{\overline{S}}$ $\widehat{\overline{T}}$ $\widehat{\overline{Y}}$ Curriculum and Course Change System - Print Change/Delete Course

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: Mech of Materials

to:

to:

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

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

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

Delete cross-listing with Reverse Parent/Child re Change Method	elationship with:   Change Course Mod	ifier	Change General Educ Designation	ation 
from: to: X A-Lecture Only B-Lab (w/fee) D-Seminar E-Independent Study	from: to: Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits from: to:		from: Creative Inquiry	

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

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):

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.

2.Students will be able to determine the stresses and deformations in members that have various cross statically determinate analysis, etc. -sectional shapes and are subject to given loads.

- 3. Students will be able to analyze statically determinate and statically indeterminate members and
- 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%

Add course requirements for honors and/or 600-level courses (if applicable): Honors students Final Exam = 30% 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	,
Chair, Department Curricultum Committee	Date Chair, Undergraduate Curriculum Comn
Department Committee  Chair, Department Committee	9/24/19 Date Chair, Graduate Curriculum Committee  1/21/14 Nach May 7/8/1  Date Provost  Provost
College Dean  Director, Calhoun Honors College	Date Pasident  Date

### $\widehat{\mathsf{T}_{-1}}$ Curriculum and Course Change System - Print Change/Delete Course Form imes 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** 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: Chemical Eng Tools from: From: Fixed Credit: 2 (1,2) To: Fixed Credit: (,) to: Change of Credit Variable Credit: - (-), (-) Variable Credit: - (-),(-) .. Add cross-listing with the following child course(s): .. Delete cross-listing with the following child course(s): .. Change Course Modifier |.. Change General Education Designation .. Reverse Parent/Child relationship with: .. Change Method to: to:|from: of Instruction .. Creative Inquiry to: from: ...... Pass/Fail Only . English Composition .. A-Lecture Only .. Oral Communication ..|X Graded ..... Variable Title .. B-Lab (w/fee) . . .. Mathematics ...... Creative Inquiry ., D-Seminar .. Natural Science w/Lab .. .. E-Independent Study .. Natural Science w/Lab .. ..... Repeatable

..|maximum credits

..|from:

..|to:

.. N/L-Lecture/Lab(no fee) .. Change Catalog Description:

.. G-Studio

from: Preq: CH 1010 and ENGR 1020, each with a C or better. Preq or concurrent enrollment: MATH 1060 or MATH 1070; and from: X Change Prerequisite(s):

.. CCA

.. sts

.. Math or Science

.. A&H (Literature)

.. Social Science

.. A&H (Non-Literature)

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:** 

., F-Tutorial (w/fee)

.. H-Field course

.. I-Study Abroad

.. L-Lab (no/fee)

X N/B-Lecture/Lab(w/fee)

Form Originator: CKITCHE, Kitchens, Christopher L Date Form Created: 4/7/2014 Evaluation:

Form Last Updated by: CKITCHE, Kitchens, Christopher L Date Form Last Updated: 4/18/2014

Form Last Updated by: CKITCHE, NICHERS/SIMB Form Number: 7373		S12 20
Approval	4/18/14 Parsice W. Merchants	Date
	Chair Undergraduate Curriculum Committee	Date
Chair, Department Curriculum Committee	/	
<u> </u>	Y 18 14 Committee	Date
N-V	Date Chair, Graduate Curriculum Committee	17/8/
Department Chair	4/24/14 Nad M. ATA	Date
211	Date Provost	7/11/
Chair, College Curriculum Committee	P Commande	
	9/21/17/ James 1, James	Date
4(00)	Date Posident	
College Dean		•
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 $\frac{1}{1-\gamma}$  Curriculum and Course Change System - Print Change/Delete Course Form imes 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 Change of Preq to remove ENGR 1300 course that is no longer offered. Last Term taught: 201308 .. Change Abbrev to: .. Change Number to: Effective Term: 05/2014 .. Change Catalog Title: |.. Change Transcript Title: from: Intro to Chem Eng from: From: Fixed Credit: 4 (3,2) To: Fixed Credit: (,) to: Change of Credit Variable Credit: - (-), (-) Variable Credit: - (-),(-) .. Add cross-listing with the following child course(s): .. Delete cross-listing with the following child course(s): ... Change General Education Designation .. Reverse Parent/Child relationship with: .. Change Course Modifier .. Change Method to: of Instruction to:lfrom: .. Creative Inquiry .. Pass/Fail Only from: .. English Composition .. A-Lecture Only .. Oral Communication ..|X Graded .. B-Lab (w/fee) .. Variable Title .. Mathematics ..... Creative Inquiry .. D-Seminar .. Natural Science w/Lab .. .. E-Independent Study ..... Repeatable .. Natural Science w/Lab .. .. F-Tutorial (w/fee) .. maximum credits .. Math or Science .. G-Studio .. A&H (Literature) ..|from: ., H-Field course .. A&H (Non-Literature) to: .. I-Study Abroad .. Social Science .. L-Lab (no/fee) .. N/B-Lecture/Lab(w/fee) .. CCA X N/L-Lecture/Lab(no fee) .. STS .. Change Catalog Description: from: from: Preq: CH 1020 and MTHS 1080 and PHYS 1220; and one of CHE 1300 or ENGR 1300. Coreq: CHE 2111. to: to: Preq: CH 1020, MATH 1080, PHYS 1220, and CHE 1300. Coreq: CHE 2111. **Learning Objectives: Topical Outline:** 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 **Evaluation:** Form Number: 7374 Approval Chair, Undergraduate Curnculum Committee Date Chair, Department Curriculum Committee Date ulighm Date Chair, Graduate Curriculum Committee Date Department Chair Date Próvost ate Committee Chair, College Curriculur 21 Date President

Date

Date

College Dean

Director, Calhoun Honors College

LLIVICUL Some and Course Change	
TVERSITY CUPPICUIUM and Course	system - Print Change/Delete Course Form
Change a Course - Abbrev & Number: CE- 2010	
	·
rresponding Lab Codison rresponding Honors course: CE2010 Add Honors course:	
responding Graduate Course.	
Add Graduate course:	
ourse Title: Statics	
rief Statement of Change: NGR 1410 has been a prerequisite (or concurrent enr	rollment) for Statics. This course
NGR 1410 has been a prerequisite (or concurrent enr being restructured into another series of coures, and	nd the prerequisite for Statics
being restructured into another being restructured into anothe	
Change Abbrev to:	
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Andres - Abbrev & Number: CE- 2000	
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ef Statement of Change:	
ef Statement of Change:  3R 1410 has been a prerequisite for CE 2060. This course is being restructured into eries of courses, and the prerequisite for CE 2060 needs to be updated to reflect	
eries of Courses, und and p	
Torm taught: 201308 Change Abbrev to	
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Change Catalog Title: from: Structural Mechanics	
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D. Seminar    Variable Title    Mathematics	
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to: Prereq:CE 2010 and Parent	
Learning Objectives:	
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Evaluation: Created: 4/9/2014	
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 Last Updated by: KRISTI, Baker, Kristin L Date Form Last Updated: 4/9/2014	
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Date Chair, Undergraduate Cur	riculum Committee Date
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Marie Chair, Graduate Curriculu	ım Committee Date
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IlChair, Chiege Carre	r. Clemente
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Director, Calhoun Honors College Date	

CLEMSON Curriculum and Course Cha	ange System - Print Change/Delete Course Form	
X Change a Course - Abbrev & Number: CE- 20 Corresponding Lab Course: Corresponding Honors course: Add Honors course: Corresponding Graduate course: Add Graduate course: Course Title: Dynamics	080	
Brief Statement of Change: ENGR 1410 has been a prerequisite of CE 2080. En a series of courses, and the prerequisite for CE 20 this change.  Last Term taught: 201308 Change Abbrev to Effective Term: 05/2014 Change Number to Change Catalog Title:  from: Change Catalog Title:	o: to: ot Title:	
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Reverse Parent/Child relationship with:  Change Method of Instruction  from:     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)     L-Lab (no/fee)     L-Lab (no/fee)     While Lockure/Lab(w/fee)	to: from: to: Creative Inquiry	
N/S-Lecture/Lab(no fee)  N/L-Lecture/Lab(no fee)  Change Catalog Description: from: to:  X Change Prerequisite(s): from: Preq: CE 2010 and ENGR 1410, each with the compact of the compact		
Form Originator: KRISTI, Baker,Kristin L D Form Last Updated by: KRISTI, Baker,Kris Form Number: 7392  Approval  Chair, Department Curriculum Committee  Department Chair  Chair, College Curriculum Committee  College Dean	Date Form Created: 4/9/2014 Stin L Date Form Last Updated: 4/9/2014  Date   Chair, Undergraduate Curriculum Committée    Wath	Date Date Date Date Date Date Date
Director, Calhoun Honors College	1	

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CLEMSON Curriculum and Course Change Sys	tem - Print Change/Delete Course Form	UUUMUU
UNIVERSITY CUPPICUION and Course		
X Change a Course - Abbrev & Number: CE- 3510 Corresponding Lab Course: CE3511		
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 series of courses, and the prerequisite for CE 3510 needs to change. Also, the statistics requirement has changed to MA	has been restructured into a o be updated to reflect this ITH 3020.	
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H-Field course rrom:	A&H (Literature)	
I-Study Abroad lto:	A&H (Non-Literature)	
L-Lab (no/fee) X N/B-Lecture/Lab(w/fee)	Social Science	
N/L-Lecture/Lab(no fee)	CCA	
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Change Catalog Description:		
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X Change Prerequisite(s):	0. Preq or concurrent enrollment: CE 2060; and STAT 2300 Preq or concurrent enrollment: CE 2060; and MATH 3020. (	Coreq: CE 3511.
from: Preq: ENGR 1410 and GEOL 1010 and GEOL 1090. F	Preq or concurrent enrollment: CE 2060; and MATH 99200	
to: Preq: GEOL 1010 and GEOE 2001	·	
Learning Objectives: Topical Outline:		
Evaluation: Form Originator: KRISTI, Baker, Kristin L Date Form	Created: 4/9/2014	
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Approval		15/12/18014
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- Committee	Date / Chair, Undergraduate Curriculum Committee	
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5-66	19/24/19 James 1, Comment	Date
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	rev & Number: EES- 2010			
Corresponding Lab Course:				
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Add Honors course:	urco:			
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Course Title: Environ Eng	r Fundamentals I			
Course mile. Environ 2.15				
Brief Statement of Chang The course sequence chan	ge in General Engineering ned	essitates this change to agree	<u> </u>	
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F-Tutorial (w/fee)		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)	••	
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V Change Prerequisite(s	)·			
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Approval				1
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Chair, Department Curricul	um Committee Dai	ce Chair, Undergraduate	Curriculum Committee	Date
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Department Chair	Da	te Chair, Graduate Curric	ulum Committee	Date
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CLEMSON UNITED TO Curriculum and Course Change Syst	tem - Print Change/Delete Course Form	
UNIVEXSITY Curriculum and Course Change 5950		
V Change a Course - Abbrev & Number: EES- 2020		
Corresponding Lab Course: EES2021		
Corresponding Honors course:		
Add Honors course:		
Corresponding Graduate course: Add Graduate course:		
Course Title: Environ Engr Fundamentals II		
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D-Seminar Variable Title	Mathematics	
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F-Tutorial (w/fee) Repeatable	Natural Science w/Lab	
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H-Field course from: I-Study Abroad to:	A&H (Literature) A&H (Non-Literature)	
L-Lab (no/fee)	Social Science	
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to: CH 1020 and LLS 20197		
Learning Objectives:	The state and small control to the state of	
Topical Outline:		
Evaluation: Form Originator: TJVRC, Overcamp, Thomas J Date Form Originator: TJVRC, Overcamp, TDVRC, Ov	rm Created: 4/1/2014	
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		1/12/2
Approval	Down O . A Com.	15/2/20
Thomas (Sillenso) 3A1	Dul 2014 Basica M. Merchoses	Date
Date of the Committee Date	e Chair, Undergraduate Curriculum Committee	
Chair, Department Curriculum Committee	and the second of the second o	
$A' 1 2 \rightarrow 1$	1/7/14 Committee	Date
Naur O Justin		Date
Department Chair	1 1 / / / / / /	17/8/
7 961	124119 Nad /6 11/1	Date
Da Da	te Provost	Date
Chair, College Curriculum Committee	O Pro T	71n1 <i>i</i>

Date

College Dean

 $\tilde{\mathbf{Y}}$  Curriculum and Course Change System - Print New Course Form

000241

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: - (-), (-)

CCA STS	Method of Instruction  A-Lecture Only  B-Lab (w/fee)  D-Seminar  E-Independent Study  E-Tutorial (w/fee)	Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits:	1
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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:

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

Solid Modeling (basic features and tools, advanced features, patterns, lofts, shells, sweeps, helical sweeps and cuts, curves,

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

4/9/2014

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

000242

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

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Approval	4/9/14	Barica W. Murhoss	15/2/2019
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Chair, College Curriculum Committee		James P. Clemente	1111114
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College Dean	Date	President	
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Director, Calhoun Honors College	Date		-
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# $\widetilde{\mathfrak{t}}$ $\widetilde{\mathfrak{t}}$ $\widetilde{\mathfrak{t}}$ 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: - (-), (-)

A-Lecture Only	(-), (-) Course Modifier Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits:	General Education Designation  Creative Inquiry English Composition Oral Communication Mathematics Natural Science No Lab Natural Science w/Lab Math or Science A&H (Literature) A&H (Non-Literature) Social Science CCA STS
		•

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:**

Required course for students in: GSSM Accelerate Program; will fulfill requirements for Civil / Environmental / Biosystems Year 1 - 20 Year 2 - 30 Year 3 - 40 Year 4 - 50

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

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:

Learning Objectives: Communicate technical information effectively by correctly applying standards and conventions to produce engineering drawings with proper dimensions and tolerances

Understand and use the engineering design cycle; sketch, computer model, engineering analysis, rapid prototyping, refine design,

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 #12

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 urseForm asnx?hfformnum=7383

### 4/9/2014

Orthographic Projections 4 3D visualization 1 Project #42 Rapid Prototyping 1

000244

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

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College Dean	Date President	
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imes Delete a Course - Abbrev & Number: ENGR- 1200

Corresponding Graduate Course: --

X Corresponding Honors course: ENGR--1200

Course Title: Engr Prob Siv

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			أربه والبرا
Approval	4/9/14	Parice W. Merhos &	5/2/2014
E Stylan	714 Date	Chair, Undergraduate Curriculum Committee	Date
Chair, Department Curriculum Committee	4/18/11		Date
Department Chair	Date	Chair, Graduate Curriculum Committee	7/8/1
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acco	Date	President	Date
College Dean			
Director, Calhoun Honors College	Date		•

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000246

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)

Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits:	General Education Designation  Creative Inquiry English Composition Oral Communication Mathematics Natural Science No Lab Natural Science w/Lab Math or Science A&H (Literature) A&H (Non-Literature) Social Science CCA
	sts
,	(-), (-)  Course Modifier  Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable

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

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

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%

4/9/2014

000247

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

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Approval	4/9/14	( and w. munoss	5/2/2014
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Department Chair	Date	Chair, Graduate Curriculum Committee	7/8/14
724	9//9// Date	Provost	Date
Chair, College Curriculum Committee	12010	James P. Clemento	7/11/14 Date
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

 $\widetilde{Y}$  Curriculum and Course Change System - Print New Course Form

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

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.

**Projected Enrollment:** 

Year 1 - Year 2 - Year 3 - Year 4 -

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

Textbook(s): Thinking like an Engineer: An Active Learning Approach – Third Edition ValuePak (includes MyEngineeringLab) by

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

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

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

- Graphical representation and interpretation of data using proper plot rules Plotting (by hand) - 12 hours
- 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

000248

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### 4/9/2014

- Choice of trendlines based on physical properties, R2, and logarithmic plots

000249

- 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

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E Stephan	4/9/14	Carica W. Murlose	Date Date
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Department Chair	Date	Chair, Graduate Curriculum Committee	7/0/11
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## $\hat{Y}$ 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: - (-), (-)

(-), (-) Course Modifier	General Education Designation
Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits:	Creative Inquiry English Composition Oral Communication Mathematics   Natural Science No Lab Natural Science w/Lab Math or Science A&H (Literature) A&H (Non-Literature) 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 interpreting validity of experimental results using computer software 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: 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

. Read, write, interpret, and debug Excel workbooks and MATLAB programs and functions. Verify output against a published or

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

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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

000251

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

Transposing matrices: definition and MATLAB operator

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

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Department Chair	Date	Chair, Graduate Curriculum Committee	Date
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College Dean	Date	President	Date
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Director, Calhoun Honors College	Date		
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 $\overrightarrow{\tau}$  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 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)	Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits:	Creative Inquiry English Composition Oral Communication Mathematics Natural Science No Lab Natural Science w/Lab Math or Science A&H (Literature) A&H (Non-Literature) 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

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

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

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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

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Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
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Department Chair	Date	Chair, Graduate Curriculum Committee	Date
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Chair, College Pupiculum Committee	Date	Provost ( V	Date
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College Dean	Date '	President	Date
Director, Calhoun Honors College	Date		
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 $\dot{\gamma}$  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	<b>General Education Designation</b>
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)	Pass/Fail Only X Graded Variable Title Creative Inquiry Repeatable maximum credits:	Creative Inquiry English Composition Oral Communication Mathematics Natural Science No Lab Natural Science w/Lab Math or Science A&H (Literature) A&H (Non-Literature) 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

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

https://ucc.app.clemson.edu/PNewCourseForm.aspx?hfformnum=7389

Recursion

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

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College Dean	Date	Pretent	Date
Director, Calhoun Honors College	Date		
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Corresponding Lab Course: ENGR--2101 Corresponding Honors course: ENGR--2100

.. Add Honors course: --

Corresponding Graduate course: --

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**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.			

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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:** 

**Approval** 

College Dean

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

E Stephan	4/9/14	Ministry, Merchant	5/8/2014
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	71/8/14		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
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College Dean

Director, Calhoun Honors College

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