U00182

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

Change Major Name: Civil Engineering
Degree: BS
Effective Catalog Year: 2012
.. **Change Major Name to:**
.. **Change Degree to:** (CHE approval required)
X **Change Curriculum Requirements**
(Submit or upload Curriculum map in catalog format. CHE approval required for > 18 hours of changes)
.. **Change General Education Requirements**
(Must also submit a General Education Checklist)
.. **Add, Change or Delete Concentration(s)**
(Submit or upload Curriculum map in catalog format. CHE approval required)
.. **Add, Change or Delete Emphasis Area(s)**
Explanation: Several semester ago, the CE faculty voted to remove the minimum grade requirement of "C". After evaluations, the faculty realized that students with a "D" grade were ill-prepared for some of the higher-level courses. Therefore, the faculty voted to change the minimum grade for all prerequisite courses back to "C". The CE faculty voted to make CE 459 – Capstone Design Project an exception to this rule.

The note in the catalog should appear as follows: (Also, see the attached curriculum sheet.)

"Civil Engineering students enrolling in any CE course (except CE 459) must have a C grade or better in the prerequisites for that course."

Form Originator: KRISTI, Kristin Baker **Date Form Created:** 9/22/2011
Form Last Updated by: , Date Form Last Updated: 11/9/2011
Form Number: 4376

Approval

	11/9/11		12/8/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	11/9/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	11/11/11		12/20/11
Chair, College Curriculum Committee	Date	Provost	Date
	11/14/11		12/21/11
College Dean	Date	President	Date

Civil Engineering Curriculum Worksheet
2012-2013

Freshman Year (General Engineering)			
First Semester		**Second Semester**	
Course	**Taken**	**Course**	**Taken**
C H 101 General Chemistry (4)		GEOL 101 Physical Geology (3)	
ENGL 103 Composition I (3)		GEOL 103 Physical Geology Lab (1)	
CES 102 Engineering Disciplines and Skills (2)		Arts, Humanities or Social Science Reqmt.[1] (3)	
MTHSC 106 Calculus of One Variable I (4)		ENGR 130 Engineering Fundamentals (2)	
Arts, Humanities or Social Science Reqmt.[1] (3)		MTHSC 108 Calculus of One Variable II (4)	
		PHYS 122 Physics with Calculus I (3)	
		PHYS 124 Physics Lab (1)	

Sophomore Year		b	
First Semester		**Second Semester**	
Course	**Taken**	**Course**	**Taken**
C E 201 Statics (3)		C E 208 Dynamics (2)	
MTHSC 206 Calculus of Several Variables (4)		MTHSC 208 Intro to Ordinary Diff. Equations (4)	
Arts, Humanities or Social Science Reqmt.[1] (3)		C E 255 Geomatics (3)	
PHYS 221 Physics with Calculus II (3)		C E 206 Structural Mechanics (4)	
PHYS 223 Physics Lab (1)		C E 352 Economic Evaluation of Projects (2)	
E G 210 Intro to Engr/Computer Graphics (2)			

Junior Year		**Second Semester**	
First Semester	**Taken**	**Course**	**Taken**
Course		C E 353 Professional Seminar (1)	
C E 301 Structural Analysis (3)		C E 311 Transp Engr Planning & Design (3)	
C E 341 Intro to Fluid Mechanics (4)		C E 321 Geotechnical Engr (4)	
C E 351 C E Materials (4)		Design Technical Requirement[2] (3)	
C E 331 Construction Engr (3)		EE&S 401 Environmental Engr (3)	
EX ST 301 Intro to Statistics (3)		C E 342 Appl Hydraulics & Hydrology (3)	

Senior Year		**Second Semester**	
First Semester	**Taken**	**Course**	**Taken**
Course		C E 459 Capstone Design Project (3)	
Technical Requirement Restricted[3] (3)		Technical Requirement[3] (3)	
Design Technical Requirement[2] (3)		Arts and Humanities (Literature) Requirement[1] (3)	
Technical Requirement[3] (3)		Arts and Humanities/Social Science Reqmt.[1] (3)	
Technical Requirement[3] (3)		Elective (3)	
ENGL 314 Technical Writing (3)			

Arts, Humanities/Social Science Requirements

_____

_____

_____

Technical/Technical Design Requirements

_____ _____

_____ _____

_____ _____

_

Free Electives

_____

_____

_____

_____

Emphasis Area:_____

_____

_____

_____

_____

See notes on next page

Civil Engineering Curriculum Worksheet
2012-2013

Note: Civil Engineering students enrolling in any CE course (except CE 459) must have a C grade or better in the prerequisites for that course.

[1] *See Policy on Social Sciences and Humanities for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.*

[2] *See advisor for approved list.*

[3] *See advisor for approved list. Technical Requirements and electives may be used to complete an emphasis area in one or more of the following fields: Applied Fluid Mechanics, Construction, Environmental Engineering, Geotechnical/Geoenvironmental Engineering, Structural Engineering, or Transportation Engineering*

000165

Edits Attached

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

X **Change a Course - Abbrev & Number: C E- 201**
Corresponding Lab Course: --
Corresponding Honors course: C E-H-201
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: STATICS

Brief Statement of Change:
Changing prerequisite to reflect that a grade of "C" or better is required in PHYS 122 in order to be enrolled in CE 201. This will allow us to fulfill ABET requirements for transfer students.

Edit

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 01/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: STATICS	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

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

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

U0186

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

X **Change Prerequisite(s):**
from: Prereq: PHYS 122, MTHSC 206 (or concurrent enrollment)
to: Prereq: PHYS 122 with C or better. Coreq: MTHSC 206

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Kristin Baker **Date Form Created:** 11/9/2011
Form Last Updated by: , **Date Form Last Updated:** 11/9/2011
Form Number: 4675

Approval

	11/9/11	12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun
	11/9/11	
Department Chair	Date	Chair, Graduate Curriculum Com
	11/11/11	12/20/11
Chair, College Curriculum Committee	Date	Provost
	11/14/11	12/21/1
College Dean	Date	President
Director, Calhoun Honors College	Date	

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

X **Change a Course - Abbrev & Number: C E- 201**
Corresponding Lab Course: --
Corresponding Honors course: C E-H-201
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: STATICS

Brief Statement of Change:
Changing prerequisite to reflect that a grade of "C" or better is required in PHYS 122 in order to be enrolled in CE 201. The department faculty has observed that the performance of students with Ds in the prerequisites is significantly worse than the performance of students with a C or better in the prerequisite courses.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 08/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: STATICS	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

000167
Edits Attached

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

X **Change a Course - Abbrev & Number: C E- 208**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: DYNAMICS

Brief Statement of Change:
Changing prerequisite to reflect that a grade of "C" or better is required in PHYS 122 and CE 201 in order to be enrolled in CE 208. This will allow us to fulfill ABET requirements for transfer students.

Last Term taught: 1108	.. **Change Abbrev to:**
Effective Term: 01/2012	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: DYNAMICS
to:	to:

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

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

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

003168

.. Change Catalog Description:
from:
to:

X **Change Prerequisite(s):**
from: Prereq: CE 201 and PHYS 122. Coreq: MTHSC 206
to: Prereq CE 201 and PHYS 122 with C or better. Coreq: MTHSC 206

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Kristin Baker **Date Form Created:** 11/9/2011
Form Last Updated by: , **Date Form Last Updated:** 11/9/2011
Form Number: 4676

Approval

	11/9/11	12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun
	11/9/11	
Department Chair	Date	Chair, Graduate Curriculum Com
	11/11/11	12/20/11
Chair, College Curriculum Committee	Date	Provost
	11/14/11	12/21/11
College Dean	Date	President
Director, Calhoun Honors College	Date	

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

X **Change a Course - Abbrev & Number: C E- 208**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: DYNAMICS

Brief Statement of Change:
Changing prerequisite to reflect that a grade of "C" or better is required in PHYS 122 and CE 201 in order to be enrolled in CE 208. The department faculty has observed that the performance of students with Ds in the prerequisites is significantly worse than the performance of students with a C or better in the prerequisite courses.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 08/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: DYNAMICS	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 2 (2,) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

CLEMSON UNIVERSITY

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

X **Change a Course - Abbrev & Number: C E- 255**
Corresponding Lab Course: C E-L-255
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: GEOMATICS

Brief Statement of Change:
EG 209 is currently listed as a corequisite for CE 255 in the undergraduate catalog. However, EG 209 is no longer taught, and was replaced by EG 210 for CE students. We need to update catalog to reflect the change in corequsite.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 01/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: GEOMATICS	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (2,3) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

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

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

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

000170

X **Change Prerequisite(s):**
from: Corequisite: EG 209
to: Corequisite: EG 210

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Kristin Baker **Date Form Created:** 11/8/2011
Form Last Updated by: KRISTI, Kristin Baker **Date Form Last Updated:** 11/8/2011
Form Number: 4666

Approval

	11/8/11	12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun
	11/8/11	
Department Chair	Date	Chair, Graduate Curriculum Com
	11/11/11	12/20/11
Chair, College Curriculum Committee	Date	Provost
	11/14/11	12/21/11
College Dean	Date	President
Director, Calhoun Honors College	Date	

003171
Edits Attached

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

X **Change a Course - Abbrev & Number: C E- 341**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: INTRO TO FLUID MECH

Brief Statement of Change:
Changing prerequisite to reflect that a grade of "C" or better is required in CE 208 or EM 202 in order to be enrolled in CE 341. This will allow us to fulfill ABET requirements for transfer students.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 01/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: INTRO TO FLUID MECH	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 4 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

006172

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

X **Change Prerequisite(s):**
from: Prereq: CE 208 or EM 202
to: CE 208 or EM 202 with C or better

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: KRISTI, Kristin Baker **Date Form Created:** 11/9/2011
Form Last Updated by: , **Date Form Last Updated:** 11/9/2011
Form Number: 4677

Approval

	11/9/2011		12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun	
	11/9/11		
Department Chair	Date	Chair, Graduate Curriculum Corr	
	11/11/11		12/20/11
Chair, College Curriculum Committee	Date	Provost	
	11/14/11		12/21/11
College Dean	Date	President	
Director, Calhoun Honors College	Date		

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

X **Change a Course - Abbrev & Number: C E- 341**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course: --**
Corresponding Graduate course: --
.. **Add Graduate course: --**
Course Title: INTRO TO FLUID MECH

Brief Statement of Change:
Changing prerequisite to reflect that a grade of "C" or better is required in CE 208 or EM 202 in order to be enrolled in CE 341. The department faculty has observed that the performance of students with Ds in the prerequisites is significantly worse than the performance of students with a C or better in the prerequisite courses.

Last Term taught: 1108	.. **Change Abbrev to:**
Effective Term: 08/2012	.. **Change Number to:**
.. **Change Catalog Title:** from: to:	.. **Change Transcript Title:** from: INTRO TO FLUID MECH to:

.. **Change of Credit**	From: Fixed Credit: 4 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

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

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

000173

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

X **Change a Course - Abbrev & Number: I E- 440**
Corresponding Lab Course: I E-L-440
Corresponding Honors course: --
.. **Add Honors course: --**
Corresponding Graduate course: I E- -640
.. **Add Graduate course: --**
Course Title: DECISION SUPPORT SYS

Brief Statement of Change:
The prerequisite of IE 280 forces this class to be taken in the junior year at the earliest or in the senior year if a student falls behind (due to, for example, changing into IE), meaning the course is taken with IE 482 which is a heavy course load. The course will focus on applying models, not developing them.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 01/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: DECISION SUPPORT SYS	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (2,3) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

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

X **Change Prerequisite(s):**
from: IE 280, ENGR 141
to: ENGR 141

Learning Objectives:

Topical Outline:

Evaluation:

Form Originator: MKURZ, Mary Kurz **Date Form Created:** 10/21/2011
Form Last Updated by: MKURZ, Mary Kurz **Date Form Last Updated:** 10/21/2011
Form Number: 4539

Approval

	10/21/11		12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	10/21/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	11/11/11		12/20/11
Chair, College Curriculum Committee	Date	Provost	Date
	11/14/11		12/21/11
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

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

Change Major Name: Mathematical Sciences (BA)
Degree: BA
Effective Catalog Year: 2012
.. **Change Major Name to:**
.. **Change Degree to:** (CHE approval required)
X **Change Curriculum Requirements**
(Submit or upload Curriculum map in catalog format. CHE approval required for > 18 hours of changes)
.. **Change General Education Requirements**
(Must also submit a General Education Checklist)
.. **Add, Change or Delete Concentration(s)**
(Submit or upload Curriculum map in catalog format. CHE approval required)
.. **Add, Change or Delete Emphasis Area(s)**
Explanation: See attachment.
Form Originator: JRBRN, James Brannan **Date Form Created:** 11/7/2011
Form Last Updated by: , **Date Form Last Updated:** 11/10/2011
Form Number: 4665

Approval

Robert S. Taylor 11-10-11		[signature] 12/7/2011	
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
Robert S. Taylor 11-10-11			
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
[signature] 11/11/11		[signature] 12/20/11	
Chair, College Curriculum Committee	Date	Provost	Date
[signature] 11/14/11		[signature] 12/21/11	
College Dean	Date	President	Date

MATHEMATICAL SCIENCES

The Mathematical Sciences curriculum is designed to be versatile. Students gain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions requiring a strong mathematical background. In addition to the basic courses that provide necessary mathematical skills, the curriculum allows students to select an emphasis area or concentration, providing an introduction to a specific area where mathematics is used. These are Abstract Mathematics, Actuarial Science/Financial Mathematics, Applied and Computational Mathematics, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found at *www.clemson.edu/ces/departments/math.*

All mathematical sciences majors are required to complete a capstone experience that provides an opportunity to pursue research, independent study, or an approved internship under the direction of a faculty member, or the opportunity to study mathematical models in some area of the mathematical sciences. The capstone experience requires a written report (thesis, computer code, project description, intern experience, etc.) and an oral or poster presentation by each student.

Combined Bachelor's/Master's Plan

Under this plan, students may reduce the time necessary to earn both degrees by applying up to twelve graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for pursuing the combined degree from the Department of Mathematical Sciences (*www.clemson.edu/ces/departments/math*) as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under *Academic Regulations* in this catalog.

MATHEMATICAL SCIENCES

Bachelor of Arts

Freshman Year

First Semester

3 - ECON 200 Economic Concepts *or*
  3 - ECON 211 Principles of Microeconomics[1]
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Foreign Language Requirement[2]
1 - Elective
14

Second Semester

4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math. *or*
  3 - MTHSC 119 Intro. to Discrete Methods
3 - Computer Science Requirement[3]
3 - Foreign Language Requirement[2]
3 - Social Science Requirement[4]
16

Sophomore Year

First Semester

4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - MTHSC 360 Intermed. Math. Computing *or*
  3 - EDSEC 437 Technology in Sec. Math.
3 - Arts and Humanities (Literature) Requirement[4]
3 - Cross-Cultural Awareness Requirement
14

Second Semester

4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - MTHSC 302 Statistics for Science and Engr.
3 - MTHSC 311 Linear Algebra
3 - Arts and Humanities (Non-Lit.) Requirement[4]
3 - Minor Requirement[5] *or*
  3 - Second Major Requirement
16

Junior Year

First Semester

3 - ENGL 314 Technical Writing
3 - MTHSC 412 Introduction to Modern Algebra
3 - Math Science Requirement[6]
4 - Natural Science Requirement[4]
3 - Elective
16

Second Semester

3 - COMM 250 Public Speaking
3 - Math Science Requirement[6]
3 - Minor Requirement[5] *or*
  3 - Second Major Requirement
4 - Natural Science Requirement[4]
3 - Elective
16

Senior Year

First Semester

3 - MTHSC 453 Advanced Calculus I
3 - Arts and Humanities Requirement[4] *or*
  3 - Education Requirement[7]
3 - Capstone Experience[8]
3 - Minor Requirement[5] *or*
  3 - Second Major Requirement
3 - Science and Tech. in Society Requirement[4]
15

Second Semester

1 - MTHSC 492 Professional Development
3 - Capstone Experience[8]
3 - Math Science Requirement[6]
6 - Minor Requirement[5] *or*
  6 - Second Major Requirement
2 - Elective
15

122 Total Semester Hours

[1]ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirement may be taken.

[2]Six credits in any foreign language, including American Sign Language, numbered 200 or above

[3]CP SC 101, 111, or 220

[4]See General Education Requirements.

[5]See page 106 for approved minors.

[6]MTHSC 308, any 400-level MTHSC course, or EX ST 402

[7]See advisor.

[8]May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by advisor; or (4) EDSEC 446 for students seeking a double major in Secondary Education–Mathematics.

Notes:

1. For graduation, a candidate for the BA degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.
3. Students who change majors to Mathematical Sciences must have achieved the Minimum Cumulative Grade-Point Ratio (MCGPR) by Total Credit Hour Level as defined in the Academic Regulations section of the Undergraduate Announcements and must have received a grade of C or better in all MTHSC courses taken.

Changes in Math Sciences (BS) Curriculum

1. "Bachelor of Science" subheading moved from directly beneath MATHEMATICAL SCIENCES so that it immediately follows the paragraph with the heading Combined Bachelor's/Master's Plan and precedes the subheading Freshman Year.

2. MATHEMATICAL SCIENCES, Paragraph 1, Line 6 - Replace "that" with "which"

3. MATHEMATICAL SCIENCES, Paragraph 3, Line 2 - Replace "that" with "which"

4. Bachelor of Science, Freshman Year, First Semester, Lines 1 and 2 - "3 - ECON 200 Concepts *or* 3-ECON 211 Principles of Microeconomics[1]"
   Reason: Allows students with AP credit to satisfy a Gen Ed Social Science Requirement

5. Bachelor of Science, Freshman Year, Second Semester, Lines 3 and 4 - "3 - MTHSC 129 Prob. Solving in Discrete Math. or 3-MTHSC 119 Intro. to Discrete Methods"
   Reason: 129 3(2,2) is not currently being offered, but may be in the future, 119 3(3,0) covers essentially same material.

6. Bachelor of Science, Footnotes, New Footnote 1 - "ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirements may be taken. ECON 211 is required for students whose emphasis area is Actuarial Science/Financial Math."

7. Bachelor of Science, Footnotes - Footnotes 1-8 changed to Footnotes 1-9, next three items refer to new numbering.

8. Bachelor of Science, Footnotes, Footnote 2 - "See General Education Requirement"

9. Bachelor of Science, Footnotes, Footnote 6, Line 1 and Line 6 - ECON 212 and 405 replaces ECON 314 and ECON 405 in both places.

10. Bachelor of Science, Footnotes, Footnote 6, Lines 5 and 6 - "Actuarial Science/Financial Mathematics requires ECON 212 and FIN 311"

11. Bachelor of Science, Footnotes, Footnote 8, Lines 5-7 - "Students in Actuarial Science/Financial Mathematics Emphasis Area must take MTHSC 407 and MTHSC 441."
    Reason: Required courses are a tight fit and 407 requires a project and presentation.

12. Bachelor of Science, Footnotes, Footnote 9 - "Any 400-level MTHSC course approved by advisor" replaced by "Any 400-level MTHSC course approved by advisor or EX ST 402"

13. Bachelor of Science, EMPHASIS AREAS, Actuarial Science/Financial Mathematics - Added ACCT 201, ACCT 204 (prereqs for FIN 311 which is prereq for FIN 312). Removed MTHSC 407, now a Capstone requirement.

14. Bachelor of Science, EMPHASIS AREAS, Footnotes, Footnote 2, Line 1 - "MTHSC 408, 410, 419, or 435" replaced by "MTHSC 410, 419, or 435" MTHSC 408 is removed because content of course has changed from *Topics in Geometry* to *Exploration and Analysis of Secondary Mathematics*, no longer an appropriate course for Abstract Mathematics

15. EMPHASIS AREAS, Footnotes, Footnote 4, Line 1 - "Students are required to take MTHSC 441 and FIN 312 as..." replaced by "Students are required to take MTHSC 407 and MTHSC 441 as..."

16. Bachelor of Science, BIOLOGY CONCENTRATION, Freshman Year, First Semester, Lines 3 and 4 - Replace "MTHSC 129..." with "MTHSC 129 or MTHSC 119...".
Reason: 129 3(2,2) is not currently being offered, but maybe in the future, 119 3(3,0) covers essentially same material.

17. Bachelor of Science, BIOLOGY CONCENTRATION, Sophomore Year, Second Semester, Lines 2 and 3 - Insert Footnote 3

18. Bachelor of Science, BIOLOGY CONCENTRATION, Footnotes, New Footnote 3 - "ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirements may be taken."

19. Bachelor of Science, BIOLOGY CONCENTRATION, Footnotes - Old Footnote numbering 3-7 changed to numbers 3-8 because of insertion of new Footnote 3.

20. Bachelor of Science, BIOLOGY CONCENTRATION, Footnotes, Footnote 5 - "Any 400-level MTHSC course approved by advisor" replaced by "Any 400-level MTHSC course approved by advisor or EX ST 402"

21. MATHEMATICAL SCIENCES, Bachelor of Arts, Freshman Year, First Semester, Lines 1 and 2 - "3 - ECON 200 Concepts *or* 3-ECON 211 Principles of Microeconomics[1]"

22. MATHEMATICAL SCIENCES, Bachelor of Arts, Freshman Year, Second Semester, Lines 2 and 3 - "3 - MTHSC 129 Prob. Solving in Discrete Math. or 3-MTHSC 119 Intro. to Discrete Methods"

23. MATHEMATICAL SCIENCES, Bachelor of Arts, Footnotes, Footnote 1 - "ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirement may be taken."

24. MATHEMATICAL SCIENCES, Bachelor of Arts, Footnotes, Footnote 6 - "MTHSC 308, any 400-level MTHSC course, or EX ST 402"

000179

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

Change Major Name: Mathematical Sciences
Degree: BS
Effective Catalog Year: 2012
.. **Change Major Name to:**
.. **Change Degree to:** (CHE approval required)
X **Change Curriculum Requirements**
(Submit or upload Curriculum map in catalog format. CHE approval required for > 18 hours of changes)
.. **Change General Education Requirements**
(Must also submit a General Education Checklist)
.. **Add, Change or Delete Concentration(s)**
(Submit or upload Curriculum map in catalog format. CHE approval required)
.. **Add, Change or Delete Emphasis Area(s)**
Explanation: See attachment.
Form Originator: JRBRN, James Brannan **Date Form Created:** 11/4/2011
Form Last Updated by: , Date Form Last Updated: 11/10/2011
Form Number: 4662

Approval

Robert J. Taylor 11-10-11			
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
Robert J. Taylor 11-10-11			
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
11/11/11		Doris R. Helman	12/20/11
Chair, College Curriculum Committee	Date	Provost	Date
11/22/11			12/21/11
College Dean	Date	President	Date

MATHEMATICAL SCIENCES

The Mathematical Sciences curriculum is designed to be versatile. Students gain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions requiring a strong mathematical background. In addition to the basic courses that provide necessary mathematical skills, the curriculum allows students to select an emphasis area or concentration, providing an introduction to a specific area where mathematics is used. These are Abstract Mathematics, Actuarial Science/Financial Mathematics, Applied and Computational Mathematics, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found at *www.clemson.edu/ces/departments/math.*

All mathematical sciences majors are required to complete a capstone experience that provides an opportunity to pursue research, independent study, or an approved internship under the direction of a faculty member, or the opportunity to study mathematical models in some area of the mathematical sciences. The capstone experience requires a written report (thesis, computer code, project description, intern experience, etc.) and an oral or poster presentation by each student.

Combined Bachelor's/Master's Plan

Under this plan, students may reduce the time necessary to earn both degrees by applying up to twelve graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for pursuing the combined degree from the Department of Mathematical Sciences (*www.clemson.edu/ces/departments/math*) as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under *Academic Regulations* in this catalog.

Bachelor of Science

Freshman Year

First Semester

3 - ECON 200 Economic Concepts *or*
  3 - ECON 211 Principles of Microeconomics[1]
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities (Non-Lit.) Requirement[2]
3 - Foreign Language Requirement[3]
16

Second Semester

4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math. *or*
  3 - MTHSC 119 Intro. to Discrete Methods
3 - PHYS 122 Physics with Calculus I
3 - Computer Science Requirement[4]
3 - Social Science Requirement[2]
16

Sophomore Year

First Semester

4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - MTHSC 311 Linear Algebra
3 - MTHSC 360 Intermediate Math. Computing
4 - Natural Science Requirement[5]
15

Second Semester

4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - MTHSC 302 Statistics for Science and Engr.
3 - Arts and Humanities (Literature) Requirement[2]
4 - Natural Science Requirement[5]
3 - Cross-Cultural Awareness Requirement
17

Junior Year

First Semester

3 - ENGL 314 Technical Writing
3 - MTHSC 400 Theory of Probability
3 - MTHSC 440 Linear Programming
3 - MTHSC 453 Advanced Calculus I
3 - Science Requirement[6]
15

Second Semester

3 - MTHSC 412 Introduction to Modern Algebra
3 - MTHSC 454 Advanced Calculus II
3 - Emphasis Area Requirement[7]
3 - Science Requirement[6]
3 - Elective
15

Senior Year

First Semester

3 - COMM 250 Public Speaking
3 - Capstone Experience[8]
6 - Emphasis Area Requirement[7]
3 - Science and Tech. in Society Requirement[2]
15

Second Semester

1 - MTHSC 492 Professional Development
3 - Capstone Experience[8]
3 - Emphasis Area Requirement[7]
3 - Mathematical Sciences Requirement[9]
3 - Elective
13

122-123 Total Semester Hours

[1]ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirement may be taken. ECON 211 is required for students whose emphasis area is Actuarial Science/Financial Math.

[2]See General Education Requirements.

[3]Three credits in any foreign language, including American Sign Language, numbered 102 or above

[4]CP SC 101, 111, or 220

[5]A two-semester sequence selected from BIOL 103/105 and 104/106; BIOL 110 and BIOL 111; CH 101 and 102; PHYS 221/223 and 222/224; GEOL 101/103, and 102 or 112/114.

[6]ECON 212 and 405; CP SC 102 and 212; CP SC 210 and 212; ECON 212 and FIN 311; or any two natural science courses from General Education Natural Science Requirements (labs not required). Actuarial Science/Financial Mathematics requires ECON 212 and FIN 311; Operations Research Emphasis Area requires ECON 212 and 405. Computer Science Emphasis Area requires CP SC 102 and 212, or 210 and 212.

[7]Select from Abstract Mathematics, Actuarial Science/Financial Mathematics, Applied and Computational Mathematics, Computer Science, Operations Research/Management Science, or Statistics.

[8]May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; or (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by the advisor. Students in Actuarial Science/Financial Mathematics Emphasis Area must take MTHSC 407 and MTHSC 441.

[9]Any 400-level MTHSC course approved by advisor or EX ST 402

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.
3. Students who change majors to Mathematical Sciences must have achieved the Minimum Cumulative Grade-Point Ratio (MCGPR) by Total Credit Hour Level as defined in the Academic Regulations section of the Undergraduate Announcements and must have received a grade of C or better in all MTHSC courses taken.

EMPHASIS AREAS

Abstract Mathematics[1]

6 - Abstract Mathematics Requirement[2]
6 - Mathematical Sciences Requirement[3]
12

Actuarial Science/Financial Mathematics[4]

3 - ACCT 201 Financial Accounting Concepts
1 - ACCT 204 Accounting Procedures
3 - FIN 312 Financial Management II
3 - MTHSC 403 Intro. to Statistical Theory
3 - MTHSC 431 Theory of Interest
13

Applied and Computational Mathematics

3 - MTHSC 434 Advanced Engineering Math.
3 - MTHSC 460 Intro. to Numerical Analysis I
6 - Applications Area[1]
12

Computer Science

3 - CP SC 215 Software Development Foundations
9 - Computer Science 300-Level Requirement[5]
12

Operations Research/Management Science

3 - I E 384 Engineering Economic Analysis *or*
  4 - I E 482 Systems Modeling
3 - MGT 402 Operations Planning and Control
3 - MTHSC 407 Regress. and Time-Ser. Analysis
3 - MTHSC 441 Intro. to Stochastic Models
12-13

Statistics

3 - MTHSC 403 Intro. to Statistical Theory
3 - MTHSC 405 Statistical Theory and Meth. II
3 - MTHSC 406 Sampling Theory and Methods
3 - MTHSC 407 Regress. and Time-Ser. Analysis
12

[1]See advisor.

[2]MTHSC 410, 419, or 435

[3]Any 400-level MTHSC course

[4]Students are required to take MTHSC 407 and MTHSC 441 as their capstone experience. Students who want to take the Society of Actuaries "P" and "FM" exams are also advised to take MTHSC 430 and MTHSC 432.

[5]Any 300–400-level CP SC course

Changes in Math Sciences (BS) Curriculum & BA

1. "Bachelor of Science" subheading moved from directly beneath MATHEMATICAL SCIENCES main heading so that it immediately follows the paragraph with the heading Combined Bachelor's/Master's Plan and precedes the subheading Freshman Year. Reason: Avoid confusion.

2. MATHEMATICAL SCIENCES, Paragraph 1, Line 6 - Replace "that" with "which". Reason: Grammar

3. MATHEMATICAL SCIENCES, Paragraph 3, Line 2 - Replace "that" with "which". Reason: Grammar

4. Bachelor of Science, Freshman Year, First Semester, Lines 1 and 2 - "3 - ECON 200 Concepts *or* 3-ECON 211 Principles of Microeconomics[1]"
   Reason: Allows students with AP credit to satisfy a Gen Ed Social Science Requirement and is now consistent with corresponding BA degree requirement.

5. Bachelor of Science, Freshman Year, Second Semester, Lines 3 and 4 - "3 - MTHSC 129 Prob. Solving in Discrete Math. or 3-MTHSC 119 Intro. to Discrete Methods"
   Reason: 129 3(2,2) is not currently being offered, but may be in the future, 119 3(3,0) covers essentially same material.

6. Bachelor of Science, Footnotes, New Footnote 1 - "ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirements may be taken. ECON 211 is required for students whose emphasis area is Actuarial Science/Financial Math." Reason: See Item 4 above.

7. Bachelor of Science, Footnotes - Footnotes 1-8 changed to Footnotes 1-9, next three items refer to new numbering.

8. Bachelor of Science, Footnotes, Footnote 2 - "See General Education Requirement". Replaces old Footnote 1.

9. Bachelor of Science, Footnotes, Footnote 6, Line 1 and Line 6 - ECON 212 replaces ECON 314 in two places. Reason: Econ 212 is prereq for Econ 405;

10. Bachelor of Science, Footnotes, Footnote 6, Lines 5 and 6 - "Actuarial Science/Financial Mathematics requires ECON 212 and FIN 311". Clarifies and simplifies Actuarial Science requirements.

11. Bachelor of Science, Footnotes, Footnote 8, Lines 5-7 - "Students in Actuarial Science/Financial Mathematics Emphasis Area must take MTHSC 407 and MTHSC 441."
    Reason: Required courses are a tight fit and 407 requires a project and presentation, necessary for Capstone Course.

12. Bachelor of Science, Footnotes, Footnote 9 - "Any 400-level MTHSC course approved by advisor" replaced by "Any 400-level MTHSC course approved by advisor or EX ST 402". Reason: EX ST is now in MthSc Department and this avoids course substitution forms.

13. Bachelor of Science, EMPHASIS AREAS, Actuarial Science/Financial Mathematics - Added ACCT 201, ACCT 204 (prereqs for FIN 311 which is prereq for FIN 312). Removed MTHSC 407, now a Capstone requirement.

14. Bachelor of Science, EMPHASIS AREAS, Footnotes, Footnote 2, Line 1 - "MTHSC 408, 410, 419, or 435" replaced by "MTHSC 410, 419, or 435" MTHSC 408 is removed because content of course has changed from *Topics in Geometry* to *Exploration and Analysis of Secondary Mathematics*, no longer an appropriate course for Abstract Mathematics

15. EMPHASIS AREAS, Footnotes, Footnote 4, Line 1 - "Students are required to take MTHSC 441 and FIN 312 as..." replaced by "Students are required to take MTHSC 407 and MTHSC 441 as...". Reason: Simplifies and clarifies Actuarial Science requirements.

16. Bachelor of Science, BIOLOGY CONCENTRATION, Freshman Year, First Semester, Lines 3 and 4 - Replace "MTHSC 129..." with "MTHSC 129 or MTHSC 119...".
Reason: 129 3(2,2) is not currently being offered, but maybe in the future, 119 3(3,0) covers essentially same material.

17. Bachelor of Science, BIOLOGY CONCENTRATION, Sophomore Year, Second Semester, Lines 2 and 3 - Insert Footnote 3.

18. Bachelor of Science, BIOLOGY CONCENTRATION, Footnotes, New Footnote 3 - "ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirements may be taken." See Item 6 above.

19. Bachelor of Science, BIOLOGY CONCENTRATION, Footnotes - Old Footnote numbering 3-7 changed to numbers 3-8 because of insertion of new Footnote 3.

20. Bachelor of Science, BIOLOGY CONCENTRATION, Footnotes, Footnote 5 - "Any 400-level MTHSC course approved by advisor" replaced by "Any 400-level MTHSC course approved by advisor or EX ST 402" See Item 12 above.

21. MATHEMATICAL SCIENCES, Bachelor of Arts, Freshman Year, First Semester, Lines 1 and 2 - "3 - ECON 200 Concepts *or* 3-ECON 211 Principles of Microeconomics[1]". See Item 4 above.

22. MATHEMATICAL SCIENCES, Bachelor of Arts, Freshman Year, Second Semester, Lines 2 and 3 - "3 - MTHSC 129 Prob. Solving in Discrete Math. or 3-MTHSC 119 Intro. to Discrete Methods". See Item 5 above.

23. MATHEMATICAL SCIENCES, Bachelor of Arts, Footnotes, Footnote 1 - "ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirement may be taken."

24. MATHEMATICAL SCIENCES, Bachelor of Arts, Footnotes, Footnote 6 - "MTHSC 308, any 400-level MTHSC course, or EX ST 402". See Item 12 above.

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

Change Major Name: Mathematical Sciences
Degree: BS
Effective Catalog Year: 2012
.. **Change Major Name to:**
.. **Change Degree to:** (CHE approval required)
.. **Change Curriculum Requirements**
(Submit or upload Curriculum map in catalog format. CHE approval required for > 18 hours of changes)
.. **Change General Education Requirements**
(Must also submit a General Education Checklist)
X **Add, Change or Delete Concentration(s)**
(Submit or upload Curriculum map in catalog format. CHE approval required)
.. **Add, Change or Delete Emphasis Area(s)**

Explanation: See attachment.

Form Originator: JRBRN, James Brannan **Date Form Created:** 12/5/2011
Form Last Updated by: RTODD, Rhonda Todd **Date Form Last Updated:** 12/6/2011
Form Number: 4755

Approval			
	12-9-11		12/9/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	12-9-11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	12/12/11		12/20/11
Chair, College Curriculum Committee	Date	Provost	Date
	12/12/11		12/21/11
College Dean	Date	President	Date

MATHEMATICAL SCIENCES

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In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found at *www.clemson.edu/ces/departments/math.*

All mathematical sciences majors are required to complete a capstone experience that provides an opportunity to pursue research, independent study, or an approved internship under the direction of a faculty member, or the opportunity to study mathematical models in some area of the mathematical sciences. The capstone experience requires a written report (thesis, computer code, project description, intern experience, etc.) and an oral or poster presentation by each student.

Combined Bachelor's/Master's Plan

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Bachelor of Science

BIOLOGY CONCENTRATION

Freshman Year

First Semester

5 - BIOL 110 Principles of Biology I
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Foreign Language Requirement[1]
15

Second Semester

5 - BIOL 111 Principles of Biology II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math. *or*
3 - MTHSC 119 Intro. to Discrete Methods
3 - Computer Science Requirement[2]
15

Sophomore Year

First Semester

4 - CH 101 General Chemistry
3 - ECON 200 Economic Concepts *or*
3 - ECON 211 Principles of Microeconomics[3]
4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - PHYS 207 General Physics I
1 - PHYS 209 General Physics I Lab.
16

Second Semester

4 - CH 102 General Chemistry
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - MTHSC 311 Linear Algebra
3 - PHYS 208 General Physics II
1 - PHYS 210 General Physics II Lab.
15

Junior Year

First Semester

3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - ENGL 314 Technical Writing
3 - MTHSC 360 Intermediate Math. Computing
3 - MTHSC 440 Linear Programming
3 - Arts and Humanities (Literature) Requirement[4]
16

Second Semester

3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - COMM 250 Public Speaking
3 - MTHSC 302 Statistics for Science and Engr.
3 - Arts and Humanities (Non-Lit.) Requirement[4]
3 - Math Science Requirement[5]
16

Senior Year

First Semester

3 - MTHSC 400 Theory of Probability
3 - MTHSC 453 Advanced Calculus I *or*
3 - MTHSC 463 Mathematical Analysis I
3 - Animal or Plant Diversity Requirement[6]
3 - Capstone Experience[7]
3 - Social Science Requirement[4]
15

Second Semester

3 - MTHSC 412 Introduction to Modern Algebra
3 - MTHSC 454 Advanced Calculus II
1 - MTHSC 492 Professional Development
3 - Biological Sciences Requirement[8]
3 - Capstone Experience[7]
13

121 Total Semester Hours

[1]Three credits in any foreign language, including American Sign Language, numbered 102 or above

[2]CP SC 101, 111, or 220

[3]ECON 200 or ECON 211 is recommended, but any other social science course that satisfies the Social Sciences General Education requirement may be taken.

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

[5]Any 400-level MTHSC course approved by advisor or EX ST 402

[6]BIOSC 302, 303, 304, or 305

[7]May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; or (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by advisor.

[8]BIOCH 301, GEN 302/303, MICRO 305, or any 300–400-level BIOSC course

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.
3. Students who change majors to Mathematical Sciences must have achieved the Minimum Cumulative Grade-Point Ratio (MCGPR) by Total Credit Hour Level as defined in the Academic Regulations section of the Undergraduate Announcements and must have received a grade of C or better in all MTHSC courses taken.

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

.00184

X **Change a Course - Abbrev & Number: MTHSC- 408**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: MTHSC- -608
.. **Add Graduate course:** --
Course Title: TOPICS IN GEOMETRY

Brief Statement of Change:
The content of the course is being changed to better reflect the needs of the secondary mathematics education students. This course is a degree requirement for these students

Last Term taught: 1108 Effective Term: 01/2012	.. **Change Abbrev to:** .. **Change Number to:**
X **Change Catalog Title:** from: Topics in Geometry to: Exploration and Analysis of Secondary Mathematics	X **Change Transcript Title:** from: TOPICS IN GEOMETRY to: SEC MATH ANALYSIS

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

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

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

X **Change Catalog Description:**
from: Introduction to topics in special geometries which include non-Euclidean space concepts such as projective geometry, finite geometries, and intuitive elementary topology. Brief introduction to vector geometry. Preq: MTHSC 206
to: In-depth exploration and analysis of important underlying ideas in the secondary mathematics curriculum. An emphasis is placed on reasoning and proof as students investigate topics in algebra, geometry, probability, statistics, and calculus. Preq: MTHSC 206

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

Learning Objectives: 1. The student will be able to describe the mathematical content of typical secondary mathematics courses and identify the core underlying mathematical ideas of these courses.
2. The student will be able to describe the similarities and differences among the NCTM, State, and Common Core standards for secondary mathematics.
3. The student will be able to write inquiry-based tasks related to core underlying mathematical ideas for typical secondary mathematics courses.
4. The student will be able to align inquiry-based tasks with different high school mathematics courses.
5. The student will be able to use and connect multiple representations in the presentation of mathematical work.
6. The student will be able to explain, justify, and write proofs related to mathematical course content.

Topical Outline: Probability and Statistics (12 hours); Trigonometry (12 hours); Calculus (12 hours); Reasoning and Proof (9 hours); Assessments (5 hours)

Evaluation: Investigations and Labs: 20%; Homework: 20%; Course Projects: 30%; Midterm Exam: 15%; Final Exam: 15%
90% – 100% A; 80% - 89% B; 70% - 79% C; 60% - 69% D; 0% - 59% F

Add course requirements for honors and/or 600-level courses (if applicable): Graduate students enrolled in the 608 course will be required to complete all of the optional readings and write one additional inquiry-based task for the course project.

Form Originator: NBANNIS, Nicole Sinwell **Date Form Created:** 9/26/2011
Form Last Updated by: , Date Form Last Updated: 10/1/2011

Clemson University
MTHSC 408/608
Exploration and Analysis of Secondary Mathematics

Professor: Dr. Nicole Bannister
Email: nbannis@clemson.edu (***preferred***)
Office Phone: (864) 656-4564
Office Location: O-01 Martin Hall (basement)

"NCTM challenges the assumption that mathematics is only for the select few. On the contrary, everyone needs to understand mathematics. All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding. **There is no conflict between equity and excellence.**" (*Principles and Standards for School Mathematics*, 2000, p. 5)

Course Overview

This course centers on making sense of mathematics topics fundamental to the secondary mathematics curriculum vis-à-vis cognitively demanding, open-ended, inquiry-based tasks. In tandem with this work, this course emphasizes in-depth exploration of *equitable mathematics classrooms*, including deciding what that means along with understanding related structures of schooling that perpetuate inequalities. We will investigate groupwork as a potential method for mitigating inequitable circumstances and fostering equitable learning environments for students. A variety of teaching methods, "high-leverage" teaching practices, and assessment strategies will be modeled and used in the course.

Current Catalog Description:
MTHSC 408/608: Topics in Geometry 3(3,0) Introduction to topics in special geometries which include non-Euclidean space concepts such as projective geometry, finite geometries, and intuitive elementary topology. Brief introduction to vector geometry. Preq: MTHSC 206.

Proposed Revisions to the Catalog Description:
MTHSC 408/608: Exploration and Analysis of Secondary Mathematics 3(3,0) In-depth exploration and analysis of important underlying ideas in the secondary mathematics curriculum. An emphasis is placed on reasoning and proof as students investigate topics in algebra, geometry, probability, statistics, and calculus.

Learning Outcomes:
1. The student will be able to describe the mathematical content of typical secondary mathematics courses and identify the core underlying mathematical ideas of these courses.
2. The student will be able to describe the similarities and differences among the NCTM, State, and Common Core standards for secondary mathematics.
3. The student will be able to write inquiry-based tasks related to core underlying mathematical ideas for typical secondary mathematics courses.
4. The student will be able to align inquiry-based tasks with different high school mathematics courses.
5. The student will be able to use and connect multiple representations in the presentation of mathematical work.
6. The student will be able to explain, justify, and write proofs related to mathematical course content.

Academic Integrity

"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately and expeditiously to charges of violations of academic integrity."

Accommodations Policy

"It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation."

Course Goals

➢ Think Deeply of Simple Things

What mathematics should students learn in high school? This simple-sounding question frames our work in this course. Our primary goal thus involves making sense of content essential to the secondary grades curriculum. To be sure, *how* we answer this question has consequences for your future students and the mathematics they have the opportunity to learn. This important intellectual work is inherently messy, and so we will devote a large portion of our course to sorting out and making connections between the big ideas from your undergraduate mathematics courses, education courses, and lived experiences.

Our course is designed to **contribute to the subtle changes by interfering with our – yes, our – knee-jerk responses to the ways educational problems are usually defined.** ... Our first goal is to **transform the discussion of race, class, gender, sexual orientation, and how this relates to students' learning of mathematics.** ... A second goal is directed to **how you think about the problems that develop right in front of your face in your own classrooms filled with children.** What are you going to do with the first child you don't like, or want to give up on, or find one hundred reasons to forget? You will not be alone in these problems. They happen everywhere called educative in American society. There is a way they are the problems of the children you are asked to save and nurture, a way they are your problem, and a way they belong to everyone. How are you going to worry about them? If you **leave this course with a different way** – any second way, please – **of thinking and talking about and responding to our own engagement and investment in the production of the very troubles we are trying to solve**, we will have made a contribution to subtle change. The third effort for change, a third goal, is to **worry about these problems at the level of classroom practice.**

Adapted from the syllabus for the "Equity and Democracy in Education" course at Stanford University

Course Expectations

- This class is centered on learning about equitable mathematics classrooms together. **Participating actively and fully in classroom tasks is vital to this class.** Your participation in our class activities is important not only for your own learning but also the learning of others. Sharing ideas and questions with the group, as well as responding to those of your classmates, are critical to our work together. As a teacher, you need to do more than understand your own thinking – you have to listen to others' thinking, figure out what others are saying, and determine whether and how they make sense. In our class, the "others" will be your colleagues. So listening to and interacting with them is explicitly to help you develop dispositions and skills that matter for teaching. We understand that some people are more comfortable than others with verbal participation, while others will be challenged to listen. This is a chance for us to hold each other accountable for developing the kind of learning community we hope to foster for our students, one that is safe, equitable, and in which everyone learns through various forms of participation.
- **Regular and punctual class attendance** is expected. Students are responsible for all notes, assignments, and announcements made in class. Those who have more than 3 absences are subject to being dropped from the course. Students must provide the instructor with proper documentation for university-sanctioned absences. Students are expected to make up all missed work in consultation with the instructor, though, it should be noted that **the nature of our work does not lend itself well to make-up assignments.** Three instances of tardiness of 15 minutes or more or three instances of leaving 15 minutes or more before the end of class or a combination of the two will count as one absence.
- "Students may now send a notice electronically to their professors of either an anticipated or unanticipated absence through MyCLE/Blackboard. With the Notification of Absences module, students can quickly notify all of their instructors of an absence. It remains the student's responsibility to follow-up with professors to discuss any work that may be missed. A professor may require documentation (e.g., a walk-out statement from Redfern); as always, the professor is the one who determines if a student's absence is excused or unexcused."
- Students at Clemson are expected to wait 15 minutes if an instructor is late. If, after 15 minutes, the instructor *or appropriate instructions have not arrived,* students may leave without incurring a class absence.
- This class was carefully designed and is being implemented purposefully. As such, I expect you to **talk to me** about our discussions, assignments, readings, course design, teaching strategies, and other areas of interest sparked by our work together.
- You are required to regularly check your **clemson.edu** email (all communication with the professor and on behalf of the course should use your clemson.edu account), have Internet access, and **use Blackboard** to obtain assignments or supplemental materials.
- You are expected to **bring your materials to class.** This includes: **course readings,** materials, math notebook, **up-to-date annotated bibliography, and written reflections.**

Required Textbooks & Materials

- Horn, I. (in press). Strength in Numbers. Collaborative Learning in Secondary Mathematics. NCTM publications.
  → *Distributed as a PDF on Blackboard; Used with permission of the author. Students must not reproduce or share this book in any way. Students are asked to purchase the book when it becomes commercially available.*
- Cohen, E. (1994). *Designing Groupwork: Strategies for the Heterogeneous Classroom (2nd ed.).* Teachers College Press: New York.
- Wiggins, G. & McTighe, J. (2005). Understanding by design (Exp 2nd ed.). Pearson Prentice Hall: Upper Saddle River, NJ
- Additional required readings will be distributed in class and/or posted on Blackboard.

Course Grades

Point Distribution for Assignments:

Annotated Bibliography:	30%
Investigations and Projects:	30%
Midterm:	15%
Final Exam:	15%
Reflective Writing Assignments:	10%

Grade Calculation:

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

Notes:

- *Graduate students enrolled in the 608 course will be required to complete all of the optional readings and write two inquiry-based tasks for the Opportunities to Learn Mathematics Project.*
- *Annotated Bibliography Entries, Reflective Writing Assignments, and many of your other assignments will be collected on Blackboard (look for the Assignment name in the Content Folder). Keep track of your written work in a saved Word document and upload your work to the appropriate BB folder. Due dates for in-progress drafts will be announced in class. As such, you should keep track of your work and then upload your "complete" draft on the due date announced by the instructor. Expect to turn in 2-3 drafts and a final version.*
- ***All due dates for all assignments will be announced in class.***
- *Students are expected to turn in assignments on or before the due date. Late assignments will be assessed a 10% penalty for each day the assignment is late. This includes weekends.*

Course Readings Schedule

EQ1: What mathematics should students learn in high school?

- NCTM, Common Core, and SC Standards documents
  Review these documents and write a reflection that compares the similarities and differences between them.

EQ2: What does it mean to be smart in mathematics? Who are the bright children?

1. Delpit, L. D. (2006). *Other People's Children* (2nd ed.). New York: New Press.
   a. "Culture of Power" excerpt (pp. 24-26)
   b. "Education in Multicultural Society" (pp. 167-183)
2. Gutiérrez, R. (2008). A "gap-gazing" fetish in mathematics education? Problematizing research on the achievement gap. *Journal for Research in Mathematics Education, 39*(4), 357-364.
3. Sternberg, R. (2007). Who are the bright children? The cultural context of being and acting intelligent. *Educational Researcher*, 36(3), 148-155.

EQ3: Will tracking reform promote social equity?

4. Oakes, J. (2005). *Keeping track: How schools structure inequality* (2nd ed.). New Haven: Yale University Press. [Chapter 1: Tracking]
5. Linchevski, L. and Kutscher, B. (2002). Mixed-ability vs. same ability group in mathematics. In J. Sowder and B. Schappelle (Eds.) *Lessons learned from research* (pp. 63-67). NCTM: Reston, VA.
6. Loveless, T. (1999). Will tracking reform promote social equity? *Educational Leadership. 26*(7), 27-32.

- ***Optional***: Fuligni, A., Eccles, J., and Barber, B. (1995). The long-term effects of seventh-grade ability grouping in mathematics. *Journal of Early Adolescence. (15)*1, 58-89.
- ***Optional***: Rubin, B. (2003). Unpacking detracking: when progressive pedagogy meets students' social worlds. *American Educational Research Journal. 40*(2), 539-573.

EQ4: What do equitable mathematics classrooms look like?

7. Horn, I. (in press). Strength in Numbers. Collaborative Learning in Secondary Mathematics. NCTM publications. [Introduction & Chapter 1]
8. Boaler, J. (2006). How a de-tracked mathematics approach promoted respect, responsibility and high achievement. *Theory into Practice, 45*(1), 40-46.

- ***Optional***: Lotan, R. (2006). Teaching teachers to build equitable classrooms. *Theory Into Practice. 45*(1), 32-39.
- ***Optional***: Horn, I. S. (2006). Lessons learned from detracked mathematics departments. *Theory into Practice, 45*(1), 72-81.

EQ5: Is groupwork the same as sitting kids together?

9. Horn, I. S. (in press). Strength in Numbers. Collaborative Learning in Secondary Mathematics. NCTM publications. [Ch 2]
10. Sharan, Y. and Sharan, S. (1994). Group investigation in the cooperative classroom. In S. Sharan (Ed.), *Handbook of cooperative learning methods* (pp. 97-114). London: Praeger.
11. Cohen, E. (1994). *Designing groupwork: Strategies for the heterogeneous classroom.* (2nd ed.). New York: Teachers College Press. [Chapter 1: Groupwork as a Strategy for Classrooms & Chapter 2: Why Groupwork?]

EQ6: Will groupwork slow down the smart kids?

12. Horn, I. (in press). Strength in Numbers. Collaborative Learning in Secondary Mathematics. NCTM publications. [Ch 3]
13. Cohen, E. (1994). Designing groupwork: Strategies for the heterogeneous classroom. (2nd ed.): Teachers College Press. [Chapter 3: The Dilemma of Groupwork & Chapter 8: Treating Expectations for Competence]

EQ7: What does mathematics look like in equitable classrooms?

14. NRC. (2001). *Adding it up: Helping children learn mathematics.* J. Kilpatrick, J. Swafford, and B. Findell (Eds.). Washington, DC: National Academy Press. [Executive Summary]. Accessible here: http://books.nap.edu/openbook.php?record_id=9822&page=1
15. Lotan, R.A. (2003). Group-worthy tasks. *Educational Leadership*, 60(6), 72-75.
16. Horn, I. (in press). Strength in Numbers. Collaborative Learning in Secondary Mathematics. NCTM publications. [Ch 4]

- ***Optional***: Schoenfeld, A. (2004). The math wars. *Educational Policy, 18*(1). 253-286.

NCTM Content Standards: Task	Tentative Pacing	Making Sense of Equity Thru Groupwork
	24-Aug	EQ1: What mathematics should students learn in high school?
	26-Aug	
Data Analysis & Probability: The Game of Pig	29-Aug	EQ2: What does it mean to be smart in mathematics? Who are the bright children?
	31-Aug	
	2-Sep	
	5-Sep	
	7-Sep	EQ3: Will tracking reform promote social equity?
Data Analysis & Probability: The Pit and the Pendulum	9-Sep	
	12-Sep	
	14-Sep	
	16-Sep	EQ4: What do equitable mathematics classrooms look like?
Proof: A Hex on Pythagorous	19-Sep	
	21-Sep	
	23-Sep	
	26-Sep	EQ5: Is groupwork the same as sitting kids together?
Trigonometry: High Dive	28-Sep	
	30-Sep	
	3-Oct	EQ6: Will groupwork slow down the smart kids?
	5-Oct	
Midterm Part 1 (Individual Portion)	7-Oct	Midterm Part 1 (Individual Portion)
In-Class Midterm P2	10-Oct	In-Class Midterm P2
	12-Oct	EQ7: What does mathematics look like in equitable classrooms?
	14-Oct	
	19-Oct	
Exponentials, Logarithms, and Derivatives: Small World, Isn't It?	21-Oct	
	24-Oct	EQ7: What does mathematics look like in equitable classrooms?
	26-Oct	
	28-Oct	
	31-Oct	
Calculus: Grappling with Growth Rates	2-Nov	EQ8: What does teaching look like in equitable classrooms?
Calculus: Optimization with Soap Bubbles	4-Nov	
	7-Nov	EQ9: Can we guarantee equitable participation in our groups?
	9-Nov	
	11-Nov	
Calculus: Volume Food Labs	14-Nov	EQ10: What do equitable classrooms feel like? What do students think?
	16-Nov	
	18-Nov	
	21-Nov	EQ11: How can we become agents for reform and at the same time avoid romanticizing this work?
Investigation related to student-driven topic	28-Nov	
	30-Nov	
	2-Dec	EQ12:What support do our students need to be the learners we want them to be? How can we learn how to do this? What support do we need to do this work?
Investigation related to student-driven topic	5-Dec	
	7-Dec	
	9-Dec	
Final Exam: "Pizza & Problem Solving"	16-Dec	Final Exam: "Pizza & Problem Solving"

Form Number: 4419

000189

Approval

[signature]	10/31/2011	[signature]	12/7/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
[signature]	10/31/2011		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
[signature]	11/11/11	[signature]	12/20/11
Chair, College Curriculum Committee	Date	Provost	Date
[signature]	11/14/11	[signature]	12/21/11
College Dean	Date	President	Date
Director, Calhoun Honors College	Date		

003190

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

X **Change a Course - Abbrev & Number: CP SC- 111**
Corresponding Lab Course: CP SC-L-111
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: ELEM COMP PROG C/C++

Brief Statement of Change:
Change of title and description: drop references to C++ and more clearly describe courses orientation towards the C programming language. The current title and description are inaccurate. This course is mainly a service course for ECE. Some years ECE requested that we concentrate on C in this course. While this change has been in effect some time, we had not updated the title or course description.

Last Term taught: 1108 Effective Term: 01/2012		.. **Change Abbrev to:** .. **Change Number to:**
X **Change Catalog Title:** from: Elementary Computer Programming in C/C++ to: Introduction to Programming in C		X **Change Transcript Title:** from: ELEM COMP PROG C/C++ to: Introduction to C
.. **Change of Credit**	From: Fixed Credit: 3 (2,2) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

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

.. **Change Method of Instruction**	.. **Change Course Modifier**	.. **Change General Education Designation**	
from:	from:	from:	to:
to:	to:	.. English Composition	..
.. A-Lecture Only	.. Pass/Fail Only ..	.. Oral Communication	..
..	X Graded ..	.. Mathematics	..
.. B-Lab (w/fee)	.. Variable Title ..	.. Natural Science w/Lab	..
..	.. Creative Inquiry ..	.. Math or Science	..
.. D-Seminar	.. Repeatable ..	.. A&H (Literature)	..
..	maximum credits	.. A&H (Non-Literature)	..
.. E-Independent Study	from:	.. Social Science	..
..	to:	.. CCA	..
.. F-Tutorial (w/fee)		.. STS	..
..			
.. 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)			
..			

CP 191

X **Change Catalog Description:**
from: Introduction to computer programming in C/C++ and its use in solving problems. Intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.
to: Introduction to computer programming in C and its use in solving problems. Intended primarily for technical majors. Basic instruction in programming techniques, algorithms and standard Unix software development tools and utilities. Credit may not be received for both CP SC 101 and CP SC 111.

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

Learning Objectives: Upon completetion of this course the student will:
1) be able to develop a step-wise algorithm to solve problems of moderate complexity,
2) implement the algorithm in C,
3) apply standard debugging techniques,
4) develop programs in a Unix environment,
5) apply standard techniques involving array, functions and pointers.

Topical Outline: 1) Introduction to C: 2 hours
2) Development of a first program: 2 hours
3) Variables and expressions: 3 hours
4) Making programmatic decisions: 3 hours
5) Repetition and looping: 3 hours
6) Functions: 3 hours
7) array: 3 hours
8) array subtasks: 2 hours
9) character strings: 3 hours
10) pointers: 4 hours
11) Dynamic memory allocation: 3 hours
12) File Input/Output: 3 hours
13) Command line arguments: 2 hours
14) Problem solving methods: 5 hours
15) Tests: 3 hours

Evaluation: Programming assignments: 20%
Lab: 15%
Tests: 45%
Final Exam: 20%

Grading Scale: 90-100: A; 80-89: B; 70-79: C; 60-69: D; 0-59: F.

Add course requirements for honors and/or 600-level courses (if applicable): N/A

Learning Activities associated with General Education competencies (if applicable): N/A

Form Originator: MADPROF, Alan Madison **Date Form Created:** 11/4/2011
Form Last Updated by: , **Date Form Last Updated:** 11/4/2011
Form Number: 4658

Approval

Al Wan - M	11/4/2011	Patricia W. Marshall 12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun
	11/4/11	
Department Chair	Date	Chair, Graduate Curriculum Com

	11/11/11	12/20/11
Chair, College Curriculum Committee	Date	Provost
	11/14/11	12/21/11
College Dean	Date	President
Director, Calhoun Honors College	Date	

00193

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

X **Change a Course - Abbrev & Number: CP SC- 281**
Corresponding Lab Course: CP SC-L-281
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: SELECTED TOPICS

Brief Statement of Change:
Change CP SC 281 from "variable distribution" to "variable credit" In the many years that CP SC 281 has been offered it has never been offered with a lab. Each semester this causes confusion since we have to contact registration services to change the method of instruction to lecture only. If we forget students that sign up for lecture are dropped since the system by default expects a lab.

Last Term taught: 1108	.. **Change Abbrev to:**
Effective Term: 01/2012	.. **Change Number to:**
.. **Change Catalog Title:**	.. **Change Transcript Title:**
from:	from: SELECTED TOPICS
to:	to:

X **Change of Credit**	From: Fixed Credit: (,) Variable Credit: 1-4 (0-3), (0-6)	To: Fixed Credit: (,) Variable Credit: 1-4 (1-4),(0-0)

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

X **Change Method of Instruction**	.. **Change Course Modifier**	.. **Change General Education Designation**	
from:	from:	from:	to:
to:	to:	.. English Composition	..
.. A-Lecture Only	.. Pass/Fail Only ..	.. Oral Communication	..
X	X Graded ..	.. Mathematics	..
.. B-Lab (w/fee)	X Variable Title ..	.. Natural Science w/Lab	..
..	.. Creative Inquiry ..	.. Math or Science	..
.. D-Seminar	X Repeatable ..	.. A&H (Literature)	..
..	maximum credits	.. A&H (Non-Literature)	..
.. E-Independent Study	from:	.. Social Science	..
..	to:	.. CCA	..
.. F-Tutorial (w/fee)		.. STS	..
..			
.. 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)			
..			

500191

.. Change Catalog Description:
from:
to:

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

Learning Objectives: CP SC 281 is a selected topics course. Topics change from semester to semester and for that matter there c8n be multiple sections covering different topics in any given semester. Often CP SC 281 is used to support creative inquiry projects. Generic learning objectives of CP SC 281:
1) students will be exposed to new and evolving ideas in the field,
2) students will learn how to participate in research and development projects and make useful contributions.

Topical Outline: A generic topical outline for a selected topics course is by definition not feasible. A sample topical outline for a recent two-credit CP SC 281 offering titled "Designing an Instructor's Station for Technology-Enhanced Classrooms" is:
1) Introduction to Second Life: 3 hours
2) Creation of Virtual Worlds: 3 hours
3) Creating Avatars: 3 hours
4) Animating Avatars: 2 hours
5) Interacting with the Virtual Environment: 5 hours
6) Developing projects that utilize Second Life to enhance the classroom experience: 12 hours
7) Project Presentations: 2 hours

Evaluation: Evaluation criteria will differ from semester to semester and section to section. The evaluation criteria used for the 2-credit CP SC 281 section provided as a sample above was:

Project Design and Implementation: 60%
Project Written Report: 20%
Project Oral Report: 20%

Grading scale: 90-100: A; 80-89: B; 70-79: C; 60-69: D; 0-59: F.

Duplication (if applicable): None

Add course requirements for honors and/or 600-level courses (if applicable): N/A

Learning Activities associated with General Education competencies (if applicable): N/A

Form Originator: MADPROF, Alan Madison **Date Form Created:** 11/4/2011
Form Last Updated by: , **Date Form Last Updated:** 11/4/2011
Form Number: 4659

Approval

Alan Madison	11/4/2011	12/2/2
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun
	11/4/11	
Department Chair	Date	Chair, Graduate Curriculum Com
	11/11/11	12/20/11
Chair, College Curriculum Committee	Date	Provost
	11/14/11	12/21/11
College Dean	Date	President

00195

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

X **Change a Course - Abbrev & Number: CP SC- 322**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: INTRO OPERATING SYS

Brief Statement of Change:
Change of prerequisite: drop CP SC 215 as a prerequisite and add CP SC 212. CP SC 215 use to introduce students to C and C++, but C and C++ has now been moved to CP SC 101 and 102, which are prequisites to CP SC 212. CP SC 212 use to be a prerequisite to CP SC 215, but that prerequisite was dropped some years ago. Students in CP SC 322 need the data structures component of CPSC 212 or ECE 223.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 08/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: INTRO OPERATING SYS	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (3,) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

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

X **Change Prerequisite(s):**
from: CP SC 215 and 231 with a C or better; or E C E 223 and 272 with a C or better.
to: CP SC 212 and 231 with a C or better; or E C E 223 and 272 with a C or better.

Learning Objectives: The objective in this class is for students to become familiar with the basic operating system concepts. This includes process creation and control, concurrent processes synchronization, deadlock management, memory allocation and management, file systems, device management and virtual machines. Classical operating system problems will be presented along with their standard solutions.
By the end of this course you should:

1) understand the basic issues of process and thread creation, management and implementation,
2) be familiar with various CPU scheduling policies, the implications of the policies, and standard implementations,
3) be aware of issues related to concurrency control and the implications of non-determinism, be familiar with the implemenation of standard concurrency control mechanisms,
4) be aware of the issues related to deadlock, and standard techniques for avoiding or dealing with deadlocks,
5) understands issues related to linear memory management, and standard implementation,
6) understand the basics of and the implementation of virtual memory management,
7) be familiar with issues related to file systems and mass storage devices,
8) understand the role of the operating system is providing protection and security.

Topical Outline: 1) Introduction to operating systems: 1 hours
2) process and thread creation, management and implementation: 6 hours
3) CPU scheduling policies and standard implementations: 5 hours
3) concurrency control and implementation, and the implications of non-determinism: 6 hours
4) deadlock and deadlock management: 5 hours
5) linear memory management: 5 hours
6) virtual memory management: 6 hours
7) file systems and the management of mass storage devices: 5 hours
8) protection and security: 5 hours
9) Tests: 2 hours

Evaluation: Tests: 40%
Quizzes: 10%
Final Exam: 20%
Projects and Homework: 30%

The grading scale is 90-100: A; 80-89: B: 70-79: C: 60-69: D: 0-59: F.

Duplication (if applicable): None.

Add course requirements for honors and/or 600-level courses (if applicable): N/A

Learning Activities associated with General Education competencies (if applicable): N/A

Form Originator: MADPROF, Alan Madison **Date Form Created:** 11/4/2011
Form Last Updated by: , **Date Form Last Updated:** 11/4/2011
Form Number: 4654

Approval

	11/4/2011	12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun

Department Chair	11/4/11 Date	Chair, Graduate Curriculum Com
Chair, College Curriculum Committee	11/11/11 Date	Provost 12/20/1
College Dean	11/14/11 Date	President 12/21/1
Director, Calhoun Honors College	Date	

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

X **Change a Course - Abbrev & Number: CP SC- 330**
Corresponding Lab Course: --
Corresponding Honors course: --
.. **Add Honors course:** --
Corresponding Graduate course: --
.. **Add Graduate course:** --
Course Title: COMPUTER SYSTEMS ORG

Brief Statement of Change:
Prerequisite change: drop CP SC 215 as a prerequisite. CP SC 215 use to introduce C and C++ but that has now been moved to CP SC 101 and 102, which are prerequisites to CP SC 212 and 231.

Last Term taught: 1108	.. **Change Abbrev to:**	
Effective Term: 08/2012	.. **Change Number to:**	
.. **Change Catalog Title:**	.. **Change Transcript Title:**	
from:	from: COMPUTER SYSTEMS ORG	
to:	to:	
.. **Change of Credit**	From: Fixed Credit: 3 (3,0) Variable Credit: - (-), (-)	To: Fixed Credit: (,) Variable Credit: - (-),(-)

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

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

J00199

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

X **Change Prerequisite(s):**
from: CP SC 212, 215, 231 with a C or better.
to: CP SC 212 and 231 with a C or better.

Learning Objectives: Students who complete this course will:
1) understand the basic concepts of computer abstrations and technology,
2) know the basics of processor archtectures, and alternative designs,
3) understand memory heirarchies and architectures,
4) have a basic understanding of disk storage and I/O,
5) be introduced to multiprocessor and multicore architectures,
6) understand the performance implications of various design choices.

Topical Outline: 1) Computer abstractions and technology: 8 hours
2) Logic Circuits: 4 hours
3) Processor architectures: 6 hours
4) Memory Hierarchies: 6 hours
5) Disk storage and I/O: 6 hours
6) Multicore, multiprocessor and cluster architectures: 6 hours
7) performance analysis: 6 hours
8) Tests: 2 hours

Evaluation: Book Review: 12%
Tests: 35%
Homework: 15%
Projects: 18%
Final Exam: 20%

Grading scale: 90-100: A; 80-89: B; 70-79: C; 60-69: D; 0-59: F.

Add course requirements for honors and/or 600-level courses (if applicable): N/A

Learning Activities associated with General Education competencies (if applicable):
N/A

Form Originator: MADPROF, Alan Madison **Date Form Created:** 11/4/2011
Form Last Updated by: MADPROF, Alan Madison **Date Form Last Updated:** 11/4/2011
Form Number: 4657

Approval

[signature]	11/4/2011	[signature] 12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculun
[signature]	11/4/11	
Department Chair	Date	Chair, Graduate Curriculum Com
[signature]	11/11/11	[signature] 12/20/1
Chair, College Curriculum Committee	Date	Provost
[signature]	11/14/11	[signature] 12/21/11
College Dean	Date	President
Director, Calhoun Honors College	Date	