Engineering Faculty Document No. 43-02
February 25, 2003

TO: The Faculty of the Schools of Engineering
FROM: The Faculty of the School of Civil Engineering
DATE: February 25, 2003
SUBJECT: Change of Course Requirements for the Degree Bachelor of Science in Civil Engineering

The Faculty of the School of Civil Engineering has approved eight modifications to the curriculum for the Bachelor of Science in Civil Engineering resulting in no change in the total of 133 credit hours required for the degree. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Current and proposed curricula are attached as well as current and proposed suggested plans of study. Detailed descriptions of proposed changes are provided along with reasons for these proposed changes.

Curriculum in Civil Engineering – Current

Credit Hours Required for Graduation: 133

	Credit Hours
Mathematics and Physical Sciences:	
Calculus: MA 165, 166, 261, 265, 266	**18**
Chemistry: CHM 115, 116	**8**
Physics: PHYS 152, 241	**7**
Computing:	
ENGR 106, CS 156, CGT 164, C E 293	**9**
Seminars:	
ENGR 100, CE 290	**1**
Communication and General Education:	
English Composition: ENGL 101	**3**
Speech: COM 114	**3**
Technical Communication: CE 292	**1**
Humanities and Social Sciences: Courses are selected according to an approved list with the help of a faculty advisor.	**18**
Core Engineering Courses:	
Surveying: CE 200	**3**
Basic Mechanics/Materials: 231, 270, 297, 298, 331, 340, 343	**20**
Thermodynamics: ME 200	**3**
Stochastics: CE 392	**3**
Economics, History, Case Studies: CE 394	**3**
Final Design Project: CE 498 This course must be taken during the student's final semester.	**3**
Technical Electives:	
Courses are selected with the help of a faculty advisor to accommodate the student's professional goals and to provide the student with sufficient design background. At least 21 of these credits must be C E designated courses.	**30**

Plan of Study for Civil Engineering - Current

Credit Hours Required for Graduation: 133

Freshman Year, see page 24.

Graphics. CGT 164 is a required course in the civil engineering curriculum and should be taken in the freshman year.

Sophomore Year

Third Semester	Fourth Semester
(3) **CE 200** (Fundamentals of Surveying)	(3) **CE 231** (Engineering Materials I)
(0) **CE 290** (Civil Engineering Seminar)	(4) **CE 270** (Introductory Structural Mechanics)
(3) **CE 297** (Basic Mechanics I: Statics)	(3) **CE 293** (Computers and Computer Programming for Civil Engineers)
(4) **MA 261** (Multivariate Calculus)	(3) **CE 298** (Basic Mechanics II: Dynamics)
(3) **PHYS 241** (Electricity and Optics)	(3) **MA 265** (Linear Algebra)
(3) General education elective*	
(16)	(16)

Junior Year

Fifth Semester	Sixth Semester
(1) **CE 292** (Oral and Written Communications for Civil Engineers)	(3) **CE 392** (Stochastic Concepts and Methods in Civil Engineering)
(3) **CE 331** (Engineering Materials II)	(3) **CE 394** (Civil Engineering History, Ethics, Engineering Economic Analysis, and Case Studies)
(3) **CE 340** (Hydraulics)	(3) General education elective*
(1) **CE 343** (Elementary Hydraulics Laboratory)	(9) Electives†
(3) **MA 266** (Ordinary Differential Equations)	
(3) General education elective*	
(3) Elective†	
(17)	(18)

Senior Year

Seventh Semester	Eighth Semester
(3) **ME 200** (Thermodynamics I)	(3) **CE 498** (Civil Engineering Design Project)
(6) General education electives*	(3) General education elective*
(9) Electives†	(9) Electives†
(18)	(15)

**General education elective requirements:*

1. *Students are required to take a minimum of 18 credit hours in approved humanities and social sciences electives. A list of approved humanities and social sciences courses will be reviewed and updated periodically by the Engineering Education Committee.*
2. *Of the 18 credit hours total, a minimum of 6 credit hours must be taken in at least one department, and a maximum of 12 credit hours may be taken in any one department.*
3. *No more than 9 credit hours of humanities and social sciences electives can be taken at an introductory or survey level.*
4. *No more than 6 credit hours of the approved humanities and social sciences courses can be scheduled in any one semester.*
5. *If credit by examination in a course (or courses) is used to satisfy part of the humanities and social sciences requirements, an additional 3 credit hours must be satisfactorily completed in the same department, except for foreign languages for which the course must be in the same language.*
6. *The program must contain at least 6 credit hours in the humanities (visual and performing arts, English literature, foreign languages and literatures, history, or philosophy).*
7. *The program must contain at least 6 credit hours in social sciences (audiology and speech sciences, communication, economics, political science, psychology, or sociology and anthropology). It is strongly recommended that ECON 251 be included in the program in social sciences.*
8. *Introductory foreign language courses can only be used as part of a 6-credit-hour sequence.*

†The elective 30 credit hours must be chosen in accord with the following:

1. *The elective course program shall be consistent with career objectives. For instance, one can elect to concentrate on a major in a specialized area with an integrated sequence of courses, or can choose a general program in civil engineering by taking courses in several areas.*
2. *At least 21 credit hours must be CE designated courses that must include two integrated sequences with a minimum of six credit hours in each.*
3. *Six credit hours of the remaining 9 credit hours required must be selected in support of the career objectives of the student. The remaining 3 credit hours may be chosen without restriction other than: no freshman-level remedial courses, must be taken for a grade, and must be approved by the student's faculty adviser. After satisfactory completion of four semesters of advanced ROTC, a maximum of 6 credit hours can be included.*

Curriculum in Civil Engineering - Proposed

The BSCE program has a minimum of 133 credit hours including the Freshman Engineering Requirements. Divided into topical areas the curriculum is:

Credit Hours Required for Graduation: 133

	Credit Hours
Mathematics and Physical Sciences:	
Calculus: MA 165, 166, 261, 265, 266	**18**
Stochastics: STAT 511	**3**
Chemistry: CHM 115, 116	**8**
Physics: PHYS 152, 241	**7**
Computing:	
ENGR 106, CS 156, CGT 164	**6**
Seminars:	
ENGR 100, CE 290	**1**
Communication and General Education:	
English Composition	**3**
Speech: COM 114	**3**
Technical Communication: CE 399	**3**
Humanities and Social Sciences: Courses are selected according to an approved list with the help of a faculty advisor.	**18**
Core Engineering Courses:	
Surveying: CE 203	**4**
Basic Mechanics/Materials: 231, 270, 297, 298, 331, 340, 343	**20**
Thermodynamics: ME 200	**3**
Economics, Systems Design: CE 398	**3**
Final Design Project: CE 498 This course must be taken during the student's final semester.	**3**
Technical Electives:	
Courses are selected with the help of a faculty advisor to accommodate the student's professional goals and to provide the student with sufficient design background. At least 21 of these credits must be C E designated courses.	**30**

Suggested Plan of Study for Civil Engineering - Proposed

Credit Hours Required for Graduation: 133

Freshman Year, see page 24.

Graphics. CGT 164 is a required course in the civil engineering curriculum and should be taken in the freshman year.

Sophomore Year

Third Semester	Fourth Semester
(4) **CE 203** (Principles and Practice of Geomatics)	(3) **CE 231** (Engineering Materials I)
(0) **CE 290** (Civil Engineering Seminar)	(4) **CE 270** (Introductory Structural Mechanics)
(3) **CE 297** (Basic Mechanics I: Statics)	(3) **CE 298** (Basic Mechanics II: Dynamics)
(4) **MA 261** (Multivariate Calculus)	(3) **MA 265** (Linear Algebra)
(3) **PHYS 241** (Electricity and Optics)	(3) General education elective*
(3) General education elective*	
(17)	(16)

Junior Year

Fifth Semester	Sixth Semester
(3) **CE 331** (Engineering Materials II)	(3) **STAT 511** (Statistical Methods)
(3) **CE 340** (Hydraulics)	(3) **CE 398** (Introduction to Civil Engineering Systems Design)
(1) **CE 343** (Elementary Hydraulics Laboratory)	(3) **CE 399** (Oral and Written Communications for Civil Engineers)
(3) **MA 266** (Ordinary Differential Equations)	(3) General education elective*
(3) General education elective*	(6) Electives†
(3) Elective†	
(16)	(18)

Senior Year

Seventh Semester	Eighth Semester
(3) **ME 200** (Thermodynamics I)	(3) **CE 498** (Civil Engineering Design Project)
(3) General education electives*	(3) General education elective*
(12) Electives†	(9) Electives†
(18)	(15)

**Eighteen credit hours of general education electives are chosen in accordance with the general education requirements of the Schools of Engineering and the following departmental requirements:*

1. *The program must contain at least 6 credit hours in the humanities (visual and performing arts, English literature, foreign languages and literatures, history, or philosophy).*
2. *The program must contain at least 6 credit hours in social sciences (audiology and speech sciences, communication, economics, political science, psychology, or sociology and anthropology). It is strongly recommended that ECON 251 be included in the program in social sciences.*

†Thirty credit hours of electives are chosen in accordance with the following requirements:

1. *The elective course program shall be consistent with career objectives. For instance, one can elect to concentrate on a major in a specialized area with an integrated sequence of courses, or can choose a general program in civil engineering by taking courses in several areas.*
2. *At least 12 credit hours must be chosen from an approved list of introductory civil engineering courses to provide breadth of study.*
3. *At least 9 credit hours must be chosen from an approved list of design intensive civil engineering courses.*
4. *At least 21 credit hours must be CE designated courses that must include two integrated sequences with a minimum of six credit hours in each.*
5. *The remaining credit hours required must be selected in support of the career objectives of the student. After satisfactory completion of four semesters of advanced ROTC, a maximum of 6 credit hours can be included.*

Reasons for the proposed changes to the curriculum are explained in detail below:

Change 1: Delete CE 293 Computers and Computer Programming for Civil Engineers from the curriculum.

Reason: Students matriculating into Civil Engineering are now better prepared with regard to computer skills than previously as a result of life experiences and study in Freshman Engineering. They therefore require a reduced amount of formal study in this area. Some study of engineering problem solving software will be integrated into CE 203 as described below.

Change 2: Replace CE 200 Fundamentals of Surveying in the curriculum with CE 203 Principles and Practice of Geomatics.

Reason: Replacing CE 200 with 3 credit hours (2 lectures and 1 lab) with CE 203 with 4 credit hours (3 lectures and 1 lab) will allow needed expansion of coverage of surveying topics and inclusion of the introduction and application of engineering problem solving software.

Change 3: Replace CE 292 Oral and Written Communications for Civil Engineers with CE 399 Oral and Written Communications for Civil Engineers

Reason: The ability to communicate engineering ideas in an effective manner is critically important. This was a needed area of improvement identified through the recent Outcomes Assessment process. This will be accomplished by replacing CE 292 having 1 credit hour with CE 399 having 3 credit hours and placing it in the second semester of the junior year, thus better coupling it with CE 498, the senior design project, wherein significant additional presentation experience is mandated.

Change 4: Replace CE 394 Civil Engineering History, Ethics, Engineering Economic Analysis, and Case Studies with CE 398 Introduction to Civil Engineering System Design

Reason: The engineering economics portion of CE 394 will be moved intact to CE 398. The civil engineering case studies, history and ethics portions of CE 394 will be covered by inclusion as some of the subjects in CE 399. This will allow systems analysis and design with constraints to be brought into CE 398. The courses, CE 398 and CE 399, are viewed as directly supportive of CE 498.

Change 5: Replace CE 392 Stochastic Concepts and Methods in Civil Engineering in the curriculum with STAT 511 Statistical Methods

Reason: The content of STAT 511 is very similar to that of CE 392. The faculty feels that it would be beneficial for students to receive instruction in these concepts from faculty of the Department of Statistics.

Change 6: Convert the "unrestricted" elective into a regular technical elective.

Reason: The "unrestricted" elective has, in practice, been most commonly used as a regular technical elective. With the broadening of permissible general education electives, the need for the "unrestricted" elective has diminished.

Change 7: Add the following requirement: Four of the ten technical electives must be chosen from a prescribed list of courses.

Reason: This requirement mandates certain breadth in the curriculum.

Change 8: Add the following requirement: Three of the ten technical electives must be chosen from a prescribed list of design intensive courses. Design intensive courses are defined as courses certified by the faculty as having at least 2/3 design content. This list of courses will be developed by the faculty.

Reason: This requirement guarantees sufficient design content in the curriculum without the need to count design credits.

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Fred L. Mannering, Head
School of Civil Engineering