Engineering Faculty Document No. 46-02
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 of Bachelor of Science in Land Surveying Engineering

The Faculty of the School of Civil Engineering has approved the following changes in the curriculum for the degree of Bachelor of Science in Land Surveying Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

An updated curriculum proposed by the Faculty of the School of Civil Engineering is attached as is a suggested plan of study. Proposed changes are summarized below

Change 1: Replace CE 200 Fundamentals of Surveying in the curriculum with CE 203 Principles and Practice of Geomatics

Reason: Replacing CE 200 - 3 credit hours (2 lectures and 1 lab) with CE 203 - 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 2: 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 junior year, thus better coupling it with LS 400 Summer Geomatics Engineering Design Project and LS 409 Subdivision Planning and Design, the senior design project, wherein significant additional written and oral presentation experience is mandated.

Change 3: Replace IE 343 Engineering Economics with CE 398 Introduction to Civil Engineering System Design

Reason: This new civil engineering course will include engineering economics and systems analysis that is more closely related to land surveying and geomatics engineering practice. The course will introduce students to the engineering design method and better prepare them for our design sequence of courses, LS 400 Summer Geomatics Engineering Design Project, CE 511 GPS Surveying in the spring semester, and LS 409 Subdivision Planning and Design in the spring semester.

Change 4: Replace STAT 301 Elementary Statistical Methods in the curriculum with STAT 511 Statistical Methods

Reason: STAT 511 is a calculus-based course better suited to engineering students. The new requirement will be in line with the other curricula in the School of Civil Engineering.

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Fred L. Mannering, Head
School of Civil Engineering

Curriculum in Land Surveying Engineering- Proposed

The BSLSE program has a minimum of 136 credit hours including the Freshman Engineering Requirements. Divided into topical areas the curriculum is:

Credit Hours Required for Graduation: 136

	Credit Hours
Mathematics and Physical Sciences:	
Calculus: MA 165, 166, 261, 265, 266	**18**
Statistics: STAT 511	**3**
Chemistry: CHM 115, 116	**8**
Physics: PHYS 152, 241	**7**
Computing:	
ENGR 106, CS 156, CGT 164	**6**
Seminars:	
ENGR 100	**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:	
Basic Mechanics/Materials: 273, 297, 333, 340, 344	**13**
Economics, Systems, Design: CE 398	**3**
Transportation: CE 361	**3**
Geomatics: CE 203, 303, 306, 403, 506, 510, 511	**22**
Land Surveying: LS 300, 301, 400, 401	**13**
Final Design Project: LS 409 This course must be taken during the student's last spring semester.	**3**
Technical Electives:	
Courses are selected with the help of a faculty advisor to accommodate the student's professional goals. At least 6 of these credits must be selected from a designated list of approved elective courses.	**9**

Suggested Plan of Study for Land Surveying Engineering

Credit Hours Required for Graduation: 136

Freshman Year, see page 24.

Chemistry Sequence. It is recommended that students intending to study civil engineering select CHM 115 and 116 .
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 273** (Mechanics of Materials)
(3)	**CE 297** (Basic Mechanics I: Statics)	(3)	**CE 303** (Engineering Surveying)
(4)	**MA 261** (Multivariate Calculus)	(3)	**CE 333** (Engineering Materials)
(3)	**PHYS 241** (Electricity and Optics)	(3)	**MA 265** (Linear Algebra)
(3)	General education elective*	(6)	General education elective*
(17)		(18)	

Junior Year

Fifth Semester		Sixth Semester	
(3)	**LS 300** (Land Survey Systems)	(3)	**LS 301** (Property Surveys and Descriptions)
(3)	**CE 306** (Analysis of Survey Observations)	(3)	**CE 340** (Hydraulics)
(3)	**CE 361** (Transportation Engineering)	(1)	**CE 344** (Drainage Design Laboratory)
(3)	**MA 266** (Ordinary Differential Equations)	(3)	**CE 403** (Principles of Photogrammetry and Remote Sensing)
(3)	**STAT 511** (Statistical Methods)	(3)	**CE 398** (Introduction to Civil Engineering Systems Design)
(3)	General education elective*	(3)	**CE 399** (Oral and Written Communications for Civil Engineers)
(18)		(16)	

Summer Session

(4) **LS 400** (Summer Geomatics Engineering Design Project, Module I)

Senior Year

Seventh Semester		Eighth Semester	
(3)	**LS 401** (Legal Aspects of Surveying)	(3)	**LS 409** (Subdivision Planning and Design)
(3)	**CE 506** (Data Adjustment I)	(3)	**CE 511** (GPS Surveying)
(3)	**CE 510** (Map Projections and Geometric Geodesy)	(3)	Technical elective†
(6)	Technical elective†	(6)	General education elective*
(15)		(15)	

**General education elective requirements:*

1. *Courses used to satisfy the General Education Program must be drawn from those offered by the departments of Agricultural Economics, Audiology and Speech Sciences, Child Development and Family Studies, Communication, Economics, English, Foreign Languages and Literatures, History, Interdisciplinary Studies, Philosophy, Political Sciences, Psychological Sciences, Sociology and Anthropology, and Visual and Performing Arts. Any course offered by these departments is allowable, provided that it is open to students in the offering department and is not focused primarily on professional training, natural science or mathematics. A list has been developed that represents a consensus across all of the Schools of Engineering of courses that are approved as General Education Electives in Engineering. This list is maintained by the Engineering Education Committee and will be updated every two years.*
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. *At least 6 credit hours of humanities and social sciences electives must be taken at a non-introductory level. Non-introductory courses are defined as course at the 300 level or above or courses with prerequisites.*
4. *If a foreign language is taken, at least 6 credit hours are required in the same language. Credit is not allowed for language courses in the student's native tongue(s), but literature, culture, drama and related courses are allowed.*
5. *Credit by examination or granted credit, conditioned solely at the discretion of the awarding department, can be used to satisfy any part of the requirement.*
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.*

†A minimum of two of the technical electives must be selected from a list of courses approved by the land surveying engineering faculty.

Curriculum in Land Surveying 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	**6**
Seminars:	
ENGR 100	**1**
Communication and General Education:	
English Composition: ENGL 101	**3**
Speech: COM 114	**3**
Technical Communication: C E 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: C E 200, 303	**6**
Basic Mechanics/Materials: 273, 297, 333, 340, 344	**13**
Engineering Science: I E 343 or E E 201 or M E 200	**3**
Statistics: Stat 301	**3**
Transportation: C E 361	**3**
Geomatics: C E 306, 403, 506, 510, 511	**15**
Land Surveying: L S 300, 301, 400, 401	**13**
Final Design Project: L S 409 This course must be taken during the student's last spring semester.	**3**
Technical Electives: Courses are selected with the help of a faculty advisor to accommodate the student's professional goals. At least 6 of these credits must be selected from a designated list of approved elective courses.	**9**

Plan of Study for Land Surveying Engineering

Credit Hours Required for Graduation: 133

Freshman Year, 33 Credit Hours, see page 24.

Graphics. CGT 155 is a required course in the land surveying engineering curriculum and should be taken in the freshman year.

Sophomore Year

Third Semester	Fourth Semester
(3) **CE 200** (Fundamentals of Surveying)	(3) **CE 273** (Mechanics of Materials)
(3) **CE 297** (Basic Mechanics I: Statics)	(1) **CE 292** (Oral and Written Communications for Civil Engineers)
(4) **MA 261** (Multivariate Calculus)	(3) **CE 303** (Route and Construction Surveying)
(3) **PHYS 241** (Electricity and Optics)	(3) **CE 333** (Engineering Materials)
(3) **STAT 301** (Statistical Methods I)	(3) **MA 265** (Linear Algebra)
	(3) General education elective*
(16)	(16)

Junior Year

Fifth Semester	Sixth Semester
(3) **CE 306** (Analysis of Survey Observations)	(3) **CE 340** (Hydraulics)
(3) **CE 361** (Transportation Engineering)	(1) **CE 344** (Drainage Design Laboratory)
(3) **LS 300** (Land Survey Systems)	(3) **CE 403** (Principles of Photogrammetry and Remote Sensing)
(3) **MA 266** (Ordinary Differential Equations)	(3) **LS 301** (Property Surveys and Descriptions)
(3) Engineering science elective†	(3) Technical elective‡
(3) General education elective*	(3) General education elective*

(18)	(16)

Summer Session

(4) **LS 400** (Summer Geomatics Engineering Design Project, Module 1)

Senior Year

Seventh Semester	Eighth Semester
(3) **CE 506** (Data Adjustment I)	(3) **CE 511** (GPS Surveying)
(3) **CE 510** (Map Projections and Geometric Geodesy)	(3) **LS 409** (Subdivision Planning and Design)
(3) **LS 401** (Legal Aspects of Surveying)	(3) Technical elective*
(3) Technical elective*	(6) General education electives†
(3) General education elective†	
(15)	(15)

*Eighteen credit hours of general education electives, in addition to the freshman speech and composition requirements, must be chosen in accordance with the requirements of the School of Civil Engineering.

†This elective must be chosen from EE 201, IE 343, or ME 200.

‡A minimum of two of the technical electives must be selected from a list of courses approved by the land surveying engineering faculty.