

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 four modifications to the curriculum for the Bachelor of Science in Land Surveying Engineering resulting in an increase in the total credit hours required for the degree from 133 to 136. 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 Land Surveying Engineering- Current

Credit Hours Required for Graduation: 133

	<i>Credit Hours</i>
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 - Current

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 297 (Basic Mechanics I: Statics) (4) MA 261 (Multivariate Calculus) (3) PHYS 241 (Electricity and Optics) (3) STAT 301 (Statistical Methods I)	(3) CE 273 (Mechanics of Materials) (1) CE 292 (Oral and Written Communications for Civil Engineers) (3) CE 303 (Route and Construction Surveying) (3) CE 333 (Engineering Materials) (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 361 (Transportation Engineering) (3) LS 300 (Land Survey Systems) (3) MA 266 (Ordinary Differential Equations) (3) Engineering science elective† (3) General education elective*	(3) CE 340 (Hydraulics) (1) CE 344 (Drainage Design Laboratory) (3) CE 403 (Principles of Photogrammetry and Remote Sensing) (3) LS 301 (Property Surveys and Descriptions) (3) Technical 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 510 (Map Projections and Geometric Geodesy) (3) LS 401 (Legal Aspects of Surveying) (3) Technical elective* (3) General education elective†	(3) CE 511 (GPS Surveying) (3) LS 409 (Subdivision Planning and Design) (3) Technical elective* (6) General education electives†
(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.

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

	<i>Credit Hours</i>
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 - Proposed

Credit Hours Required for Graduation: 136

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 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* Engineers)	(3) CE 399 (Oral and Written Communications for Civil
(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)

**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.*

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

Reasons for the proposed changes to the curriculum are explained in detail 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.

Fred L. Mannering, Head
School of Civil Engineering