

UNDERGRADUATE CURRICULUM PROPOSAL COVER SHEET

Title of Proposal: Change credit hours for ENCE 2610 (3) to ENCE 2610 (2); Add a lab section ENCE 2610(L) (1)

*Requires new Course #*

ENTERED

Check One: Full Proposal  and/or Information Item \_\_\_\_\_

NOV 18 2011

Effective Date for Curricular Offering: Fall 2012

RECORDS

FROM: Ignatius Fomunung, Engineering, EMCS 440D, X2005, Ignatius-Fomunung@utc.edu  
(proposal originator: include spokesperson's name, department, office number, telephone, e-mail)

Does this require new resources from the originating department or other department? NO  
Please attach explanation if yes.

Faculty of the originating department approved this proposal on 11-14-11 (date),  
by a vote of 3 aye votes; 0 nay votes; 0 abstentions; 0 eligible voting members absent  
The following have examined this proposal:

Dept Head/Director: Joseph Owino *J. Owino*      
printed name signature approve neutral disapprove\*

College Curriculum Committee Date: 11-18-11 Vote: 6-0-2 Signature of Chair: *Cecilia M. DePaul*

*Spokespersons for Affected Departments:*

_____	_____	_____	_____	_____
(name, department, date)	signature	approve	neutral	disapprove*
_____	_____	_____	_____	_____
(name, department, date)	signature	approve	neutral	disapprove*
_____	_____	_____	_____	_____
(name, department, date)	signature	approve	neutral	disapprove*
_____	_____	_____	_____	_____
(name, department, date)	signature	approve	neutral	disapprove*
Dean/Director: <u><i>W.H. Sutton</i></u>	<u><i>W.H. Sutton</i></u>	<input checked="" type="checkbox"/>	_____	_____
	signature	approve	neutral	disapprove*
University Registrar: <u><i>Linda Carter</i></u>	<u><i>Linda Carter</i></u>	_____	_____	_____
	signature	approve	neutral	disapprove*
Provost: <u><i>J. Sanders</i></u>	<u><i>J. Sanders</i></u>	<input checked="" type="checkbox"/>	_____	_____
	signature	approve	neutral	disapprove*

\*Those who disapprove may attach an explanation

ACTIONS on this proposal:	Curriculum Committee	Faculty Council
Date the proposal was considered	_____	_____
Vote of the body:	_____	_____
Accepted as information item (indicate date)	_____	_____
Approved as submitted (indicate date)	_____	_____
Approved with amendments (amendments indicated and transmitted to all signatories above, date):	_____	_____
Signature of Chair:	_____	_____

*12-051-067*

## **Full Proposal to Change Course Credit Hours and Add a Stand Alone Lab Course In the Civil Engineering Program**

### **(1) Description:**

Change the credit hours in the “Introduction to Geomatics (ENCE 2610) course” from three (3) to two (2); and add a one (1) credit hour “Introduction to Geomatics Lab (ENCE 2610L) course.

### **(2) Justification / Rationale for Change:**

This course was first offered in the Spring 2011, and it quickly became clear that minor changes are needed to improve content delivery and enhance student learning. The current catalog description states inter alia: “Lecture 2 hours, laboratory 1 hour”, with the intent clearly being that there will be two hours of lecture and three hours of field work. However, since students were not required to sign up for the lab separately, they were not obliged to block adequate time window for the field exercises. In fact many of the students had other classes immediately following the Geomatics class. Consequently, adequate time was never available to perform the field exercises in a complete and satisfactory fashion. The field exercises are integral to an effective pedagogy of the Geomatics course and cannot be divorced from the lectures.

This proposal is submitted to address the above need by ensuring that students who sign up for the lectures will be bound to sign up for the lab section as well. No increase in total credit hours (128) students are required to take will occur as a result of this change.

### **(3) Proposed Catalog Revisions**

#### **1. Change (3) Credit Hours Introduction to Geomatics Course ENCE2610 to (2) Credit Hours**

##### Old Description

The art, science, and technologies used in the determination of positions above, on, or beneath the earth’s surface. Fundamental concepts and practices of surveying, theory of measurements and field notes; methods of obtaining horizontal and vertical distances; methods of obtaining angles and directions; use of levels, transits, theodolites, and total stations; construction surveying, curves, and volumes. Global Navigation Satellite Systems; using maps and geographic information systems to turn survey data into useful information. Spring semester. Lecture 2 hours, laboratory 1 hour. Prerequisite: ENGR 104 with a grade of C or better.

##### New Description

The art, science, and technologies used in the determination of positions above, on, or beneath the earth’s surface. Fundamental concepts and practices of surveying, theory of

measurements and field notes; methods of obtaining horizontal and vertical distances; methods of obtaining angles and directions; use of levels, transits, theodolites, and total stations; construction surveying, curves, and volumes. Global Navigation Satellite Systems; using maps and geographic information systems to turn survey data into useful information. Spring semester. Lecture 2 hours, laboratory 3 hours. Prerequisite: ENGR 104 with a grade of C or better. Co-requisite: ENCE 2610L

### **1. Add a New Lab Course ENCE2610L – Introduction to Geomatics Lab**

#### Old Description

None

#### New Description

Students in small teams perform field exercises that are designed to illuminate fundamental surveying concepts that are introduced in the lectures. Field exercises include basic surveying techniques (distance and differential leveling with autolevel), as well as error analysis. Additionally, the collection of topographic and control data by electronic total station and data logger, using a GPS receiver to establish precise tie to a regional coordinate system, will be addressed. A number of lab exercises are directed at helping students to gain a good understanding of the trigonometry behind standard surveying techniques, and the conversion of angle and distance measurements to x-y-z coordinates. Spring semester. Laboratory 3 hours. Prerequisites: ENGR 104 with a minimum grade of C. Corequisite: ENCE 2610. Laboratory/studio course fee will be assessed. Supplementary course fee assessed.

#### Old Description - **\*\*denotes location of changes**

2312 - Engineering: Civil (ENCE)

(see General Education Requirements for list of approved courses)

##### **Rhetoric and Composition: (6 hours)**

Two approved courses in rhetoric and composition

##### **Mathematics: (4 hours)**

MATH 1910 - Calculus I and  
MATH 1911 - Calculus I Laboratory

##### **Statistics: (3 hours)**

ENGR 2220 - Probability and Statistics for Engineering

##### **Natural Sciences: (7-8 hours)**

Two approved natural science courses, at least one including a laboratory component

**Humanities and Fine Arts: (6 hours)**

One approved fine arts course and one approved humanities course

**Cultures and Civilizations: (3 hours)**

One approved Non-Western Cultures and Civilizations course

**Behavioral and Social Sciences: (6 hours)**

ECON 1010 - Principles of Economics: Macroeconomics and

ECON 1020 - Principles of Economics: Microeconomics

OR

Two approved behavioral science courses

**Program Requirements**

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CHEM 1110 - General Chemistry I and

CHEM 1110L - General Chemistry I Laboratory

MATH 1910 - Calculus I and MATH 1911 - Calculus I Laboratory

MATH 1920 - Calculus II and MATH 1921 - Calculus II Laboratory

MATH 2200 - Elementary Linear Algebra

MATH 2450 - Introduction to Differential and Difference Equations

MATH 2550 - Multivariable Calculus

PHYS 2310 - Principles of Physics - Electricity and Magnetism and

PHYS 2310L - Principles of Physics Laboratory - Electricity and Magnetism

**Engineering Fundamentals:**

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ENGR 1011 - Introduction to Two- and Three-Dimensional Modeling

ENGR 1030 - Basic Engineering Science

ENGR 1030L - Freshman Engineering Laboratory

ENGR 1040 - Vector Statics

ENGR 1850 - Introduction to Engineering Design

ENGR 2220 - Probability and Statistics for Engineering

ENGR 2460 - Mechanics of Materials

ENGR 2460L - Mechanics of Materials Laboratory

ENGR 2700 - Electrical Circuits I

ENGR 3850 - Interdisciplinary Design Project I

**Program and Related Courses**

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GEOL 4450 - Hydrology

**Engineering Fundamentals:**

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ENGR 2240 - Introduction to Engineering Computations

ENGR 2480 - Dynamics

ENGR 3070 - Fluid Mechanics

ENGR 3070L - Fluid Mechanics Laboratory

ENGR 3520 - Engineering Economy

**Environmental Engineering:**

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ENEV 3310 - Environmental Process Principles

ENEV 4380 - Water Supply and Waste Water Treatment

**Civil Engineering:**

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**\*\*ENCE 2610 - Introduction to Geomatics**  
ENCE 3400 - Civil Engineering Materials  
ENCE 3610 - Soil Mechanics  
ENCE 3610L - Soil Mechanics Laboratory  
ENCE 3620 - Transportation Engineering I  
ENCE 3640 - Structural Analysis I  
ENCE 3680 - Design of Concrete Structures  
ENCE 4500 - Civil Engineering Design Project  
ENCE 4610 - Foundation Analysis and Design  
ENCE 4620 - Transportation Engineering II  
ENCE 4680 - Design of Steel Structures

**Technical Elective:**

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One 3-hour 3000-level or 4000-level courses in an Engineering specialty.

**Science Elective:**

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One 3-hour science course selected from an approved list

**Additional Information and Notes**

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128 hours (138 for co-op graduates).

Minimum 39 hours at the 3000-4000 level.

2.0 GPA in all engineering courses.

See [Degree and Graduation Requirements](#) for additional requirements.

**New Description - \*\*denotes location of changes**  
**2312 - Engineering: Civil (ENCE)**

(see General Education Requirements for list of approved courses)

**Rhetoric and Composition: (6 hours)**

Two approved courses in rhetoric and composition

**Mathematics: (4 hours)**

MATH 1910 - Calculus I and  
MATH 1911 - Calculus I Laboratory

**Statistics: (3 hours)**

ENGR 2220 - Probability and Statistics for Engineering

**Natural Sciences: (7-8 hours)**

Two approved natural science courses, at least one including a laboratory component

**Humanities and Fine Arts: (6 hours)**

One approved fine arts course and one approved humanities course

**Cultures and Civilizations: (3 hours)**

One approved Non-Western Cultures and Civilizations course

**Behavioral and Social Sciences: (6 hours)**

ECON 1010 - Principles of Economics: Macroeconomics and

ECON 1020 - Principles of Economics: Microeconomics

OR

Two approved behavioral science courses

**Program Requirements**

CHEM 1110 - General Chemistry I and

CHEM 1110L - General Chemistry I Laboratory

MATH 1910 - Calculus I and MATH 1911 - Calculus I Laboratory

MATH 1920 - Calculus II and MATH 1921 - Calculus II Laboratory

MATH 2200 - Elementary Linear Algebra

MATH 2450 - Introduction to Differential and Difference Equations

MATH 2550 - Multivariable Calculus

PHYS 2310 - Principles of Physics - Electricity and Magnetism and

PHYS 2310L - Principles of Physics Laboratory - Electricity and Magnetism

**Engineering Fundamentals:**

ENGR 1011 - Introduction to Two- and Three-Dimensional Modeling

ENGR 1030 - Basic Engineering Science

ENGR 1030L - Freshman Engineering Laboratory

ENGR 1040 - Vector Statics

ENGR 1850 - Introduction to Engineering Design

ENGR 2220 - Probability and Statistics for Engineering

ENGR 2460 - Mechanics of Materials

ENGR 2460L - Mechanics of Materials Laboratory

ENGR 2700 - Electrical Circuits I

ENGR 3850 - Interdisciplinary Design Project I

**Program and Related Courses**

GEOL 4450 - Hydrology

**Engineering Fundamentals:**

ENGR 2240 - Introduction to Engineering Computations

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ENEV 3310 - Environmental Process Principles

ENEV 4380 - Water Supply and Waste Water Treatment

**Civil Engineering:**

\*\*ENCE 2610 - Introduction to Geomatics

\*\*ENCE 2610L- Introduction to Geomatics Laboratory

ENCE 3400 - Civil Engineering Materials  
ENCE 3610 - Soil Mechanics  
ENCE 3610L - Soil Mechanics Laboratory  
ENCE 3620 - Transportation Engineering I  
ENCE 3640 - Structural Analysis I  
ENCE 3680 - Design of Concrete Structures  
ENCE 4500 - Civil Engineering Design Project  
ENCE 4610 - Foundation Analysis and Design  
ENCE 4620 - Transportation Engineering II  
ENCE 4680 - Design of Steel Structures

**Technical Elective:**

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One 3-hour 3000-level or 4000-level courses in an Engineering specialty.

**Science Elective:**

---

One 3-hour science course selected from an approved list

**Additional Information and Notes**

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128 hours (138 for co-op graduates).

Minimum 39 hours at the 3000-4000 level.

2.0 GPA in all engineering courses.

See [Degree and Graduation Requirements](#) for additional requirements.

**(4) Effect on Engineering**

No additional equipment will be needed, and no additional faculty will be required.

**(5) Effect on Other Programs**

No adverse effect on other programs is anticipated.

**(6) Syllabus**

See attached.

# University of Tennessee at Chattanooga

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## Introduction to Geomatics

ENCE2610 001      3 Credit Hours

Spring 2012

**Instructor:** Ignatius Fomunung, Ph.D.  
**Office:** EMCS 440D  
**Phones:** Office: (423) 425-2005  
**Email:** [Ignatius-Fomunung@utc.edu](mailto:Ignatius-Fomunung@utc.edu)  
**Lecture Schedule:** TR            10:50 – 12:15.  
**Classroom:** EMCS 401

**Office Hours:** Monday (11:00am – 2:00pm); Wednesday (11:00am – 3:00 pm);  
Open-door policy: If I am in my office, you are welcome to stop by anytime. To be sure that I am available to meet, you can also set up an appointment via email.

**Prerequisites:** ENGR 104, with a grade of C or better

**Corequisites:** ENCE 2610L

### Course Description:

Introduction to geomatics introduces the student to the art, science, and technologies used in the determination of positions above, on, or beneath the earth's surface. Students will gain the ability to understand and apply methods and use instruments to make measurements and collect data for determining horizontal distances; differences in elevation and direction; angular differences; determining locations on the earth's surface; and calculating areas and volumes. Students will be introduced to the science of geodesy and the art of cartography; traverse and control surveys; Global Navigation Satellite Systems; surveying technology and methods; land surveys and deed descriptions; and using maps and geographic information systems to turn survey data into useful information.

**Required Materials:** 1. Elementary Surveying – An Introduction to Geomatics by Paul R. Wolf, and Charles D. Ghilani 11<sup>th</sup> Edition  
2. Handouts of Technical Material (Provided by Instructor)

**Engineering Program Outcome #3:** An ability to use engineering principles and modern engineering tools to identify, analyze and solve technical problems in civil engineering including the appropriate use of computer technology.

### Course Objective:

*With the successful completion of the course, the student should have the capability to*

- Describe the function of surveying in civil engineering construction.
- Work with survey observations, and perform calculations in SI, and US customary units of measure. Identify the sources of measurement errors and mistakes; understand the difference between accuracy and precision as it relates to distance, differential leveling, and angular measurements.
- Be familiar with the principles of recording accurate, orderly, complete, and logical field notes from surveying operations, whether recorded manually or with automatic data collection methods.
- Identify and calculate the errors in measurements and to develop corrected values for differential level circuits, horizontal distances and angles for open or closed-loop traverses.
- Operate an automatic level to perform differential and profile leveling; properly record notes; mathematically reduce and check leveling measurements
- Measure horizontal, vertical, and zenith angles with a transit, theodolite, total station or survey grade GNSS instruments.
- Calculate azimuths, latitudes and departures, error of closure; adjust latitudes and departures and determine coordinates for a closed traverse.
- Perform traverse calculations; determine latitudes, departures, and coordinates of control points and balancing errors in a traverse. Use appropriate software for calculations and mapping.
- Operate a total station to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system. Calculate, design and layout horizontal and vertical curves.
- Understand, interpret, and prepare plan, profile, and cross-section drawings.
- Work with cross-sections and topographic maps to calculate areas, volumes, and earthwork quantities.

**Outcome # 4:** An ability to function effectively in multidisciplinary teams and to communicate effectively through speaking and writing.

*Objectives:*

- Effectively communicate with team members during field activities; identify appropriate safety procedures for personal protection; properly handle and use measurement instruments. Be able to identify hazardous environments and take measures to insure one's personal and team safety.
- Work as a team member on a surveying party to achieve a common goal of accurate and timely project completion.

**Grading Scheme:** The following grading scale pertains to all work. At the discretion of the instructor, all of the student grades on any quiz, exam, homework, or other exercise may be increased (but not lowered). Extra credit questions may be given on any quiz, exam, and homework that can add points to the normal grade for that quiz, exam, or homework.

90.0 – 100.0 → A

80.0 – 89.9 → B

70.0 – 79.9 → C

60.0 – 69.9 → D

59.9 or less → F

**Course Evaluation:** These weightings will be given to each student's work to determine her or his overall grade in the course:

Homework and Assignments	20%
Laboratory Exercises	17%
Laboratory Attendance (field work)	13%
Weekly Quizzes	20%
Midterm Exam	20%
Final Exam†	20%

† The final exam will be comprehensive and take place tentatively on Thursday April 26, 2012, 11am – 1.00 pm. in EMCS 401.

Students shall maintain a portfolio that will be turned in and graded at the end of the semester. The portfolio will include ALL homeworks, quizzes, and exams properly placed in a 3-ring binder or folder.

#### **Attendance**

Class attendance is not mandatory, but it is strongly advised that you attend class. Attendance may be checked periodically throughout the semester and will be used as a determining factor when making decisions regarding borderline grades.

#### **Exams**

There will be **no make-up tests** except for those who notify the instructor **before the test** with an appropriate reason.

#### **Homework Policy (a critical key to a good grade)**

- Homework counts for 20% of your grade
- **All homework is required to be turned in on the due date, at the beginning of class.**
- Homework turned in anytime after this, but before the beginning of the next class, will lose one letter grade (i.e., 10 points will be subtracted).
- Homework turned in anytime after the beginning of the next class period after the due date will receive a grade of 50%. You must turn in every homework or you will receive a 0% for the homework. **You cannot afford to average in a 0% homework--it is a killer** (try averaging a zero versus a 50% into your average homework grades and the difference becomes very clear).
- All non-numerical type homework problems and papers will be typed. All problem solutions for numerical type problems must be presented on engineering paper.

#### **Academic Honor Code**

All students are expected to do their own work. However, collaboration and consultation during out of class assignments are strongly encouraged to foster the spirit of team work which is essential for engineering practice. After interacting with your classmates, you must do the work yourself if you are to gain the level of knowledge and competence expected of an engineer.

**Disabilities**

If you are a student with a disability (e.g. physical, learning, psychiatric, vision, hearing, etc) and think that you might need special assistance or a special accommodation in this class or any other class, call the Office for Students with Disabilities/College Access Program at 425-4006 or come by the office - 110 Frist Hall.

**Note:**

- (1) The instructor reserves the right to change aspects of this syllabus, if it becomes necessary, to improve pedagogy.
- (2) It is the responsibility of the student to keep informed of changes, new materials, missed content, etc.