

CE 115 – FIELD MEASUREMENTS

Type (check one): Required: X Elective: _____

2005-2006 Catalog Data: CE 115. Field Measurements. Theory of measurements and errors. Measurement of line, direction and angles. Principles of leveling, traversing and topographic surveys. Horizontal and vertical route alignments. Computer applications. Two lectures and three laboratory hours each week. Report writing skills are required. Offered in the Fall semester. Co-requisites: CE 111 and ENG 111. *One semester, three credits.*

Prerequisites: None

Co-Requisites: CE 111 and ENG 111.

Textbook: Paul R. Wolf & Charles D. Ghilani, *Elementary Surveying: An Introduction to Geomatics*, Prentice-Hall, Eleventh Edition, 2006.

Other Required Materials: See course syllabi

Other References: None

Instructor: Mr. Gene McGinnis, Assistant Professor of Civil and Environmental Engineering

Course Objectives: The course will develop the student's knowledge of field measurements and the applications of measurements to the planning, design, construction and operation of typical civil and environmental engineering projects. The student will learn about the types of instruments, techniques and detailed procedures used for taking measurements in the field. The nature of errors that occur in measurements and the resultant effects of these errors after propagation through computations that involve measurements will be discussed. The students will learn the techniques involved in collecting, processing and plotting the types of geo-spatial data necessary for constructing engineering-scale topographic maps and other engineering drawings such as plan, profile and cross-sections. The students will be exposed to effective approaches to setting up and presenting engineering problem solutions with clarity and completeness; and the interpersonal and communication skills required for successful teamwork.

Prerequisites by Topics: 1. Basic knowledge of geometry and trigonometry

Topics:

1. Units of measurement and measurement theory
2. Horizontal and vertical distance measurements
3. Horizontal and vertical curves
4. Angles and directions
5. Traverse computations and computation of areas
6. Topographic mapping
7. Earthwork quantities

Class Schedule: Two 50-minute sessions per week and one three-hour laboratory session per week.

Prepared by: Mr. Gene McGinnis, P.E.

Date: October 2005

**PROFESSIONAL COMPONENT:
CE 115 – FIELD MEASUREMENTS**

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input type="checkbox"/> Significant <input type="checkbox"/> Some <input checked="" type="checkbox"/> None
Realistic Constraints (check all that apply)	<input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice