



## CE161

# Principles of Surveying Lab

### Summer 2017

**LECTURES:** T, R 3:00 pm – 7:30 pm

**PROFESSOR:** Shane M. Palmquist, Ph.D., P.E.

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**OFFICE:** EBS 2126

**OFFICE HOURS:** Available Daily

**PREREQUISITES:** High School-Trigonometry

**COREQUISITES:** CE160, Principles of Surveying

**TEXTBOOKS:** Elementary Surveying, An Introduction to Geomatics, 14<sup>th</sup> edition Paul R. Wolf & Charles D. Ghilani Prentice Hall, 2015, ISBN 13: 978-0-13-375888-7 (optional).

**FIELD BOOK:** Each student must purchase a field book.

#### **COURSE DESCRIPTION:**

CE161, Cr. 3. A study of the basic principles of surveying. Topics include: field note taking, taping distances, differential leveling, profile leveling, angular measurements, bearings & azimuths, EDM, traversing, topographic mapping, and construction stakeout. The use and care of surveying equipment includes: automatic levels, theodolites, pocket transits, total stations, and data collectors.

CE161, Cr. 1 Field and office procedures in support of material covered in CE160.

#### **COURSE OBJECTIVES:**

CE161, Surveying Lab, will enhance the subject material covered in CE160, Surveying, through hands-on field exercises. It will provide students with the knowledge and skill needed to perform basic surveying operations at a jobsite with proficiency in setting up and using automatic levels, theodolites, pocket transits, total stations, and data collectors. Field data taken during the lab sessions will then be reduced using appropriate calculations to produce final drawings and reports.



**CONCEPTS TO BE INTRODUCED:**

Instrument Setup & Use  
Field Note taking & Sketching  
Hand Signals and Use of Two-Way Radios  
Measuring Horizontal Distances (pacing, taping, EDM)  
Differential & Profile Leveling  
Reconnaissance Surveying using Pocket Transit & Pacing  
Vertical & Horizontal Angular Measurements  
Traverse Calculations  
Data Collection & SurvCADD (including topographical mapping)  
Construction Stakeout

**COURSE OUTCOMES:**

Setup an automatic level, transit and total station  
Take appropriate field notes for various surveying projects  
Measure horizontal distances using pacing techniques, steel tape, and EDM devices  
Perform differential leveling in the field and note reduction  
Determine vertical and horizontal angles  
Perform (open and closed) traversing and side length measurements  
Perform calculations needed to stakeout the corners of a building, set offset stakes, and general construction site layout using associated software  
Perform collection of topographic data using a total station and electronic data collector

**COURSE GRADE:**

Exams (40%):	Midterm	15%
	Final	15%
Components (60%):	Field book (all labs):	<u>70%</u>
		100%

NOTE: It will include both a written portion and instrumentation setups. You must be able to correctly setup a level in under two minutes and a total station in under five minutes.

Grades will be based upon exams, field work, calculations, field book documentation & AutoCAD drawings. I expect each individual to help out equally on all lab projects. Each individual will be expected to have a completed field book for all assignments.

Final class grades will be assigned based on a weighted average of the levels of performance demonstrated through-out the semester. Scores for work will be based on the following rubric:

Letter Grade	Numeric Equivalent	Qualitative Description (Typical)
A	> 90%	Exemplar; no to minor mistakes.
B	> 80%	Proficient; several minor mistakes; almost no conceptual mistakes.
C	> 70%	Apprentice; several mistakes, some major; conceptual mistakes.
D	> 60%	Novice; many significant mistakes and conceptual errors.
F	< 60%	Non-response or completely incorrect response.

**CLASS POLICY:**

Attendance is extremely important! You will be working in groups of three or four, so other people will be depending on you to show up. For extreme emergencies, labs can only be made up if arrangements are made ahead of time along with approval of professor and other members of the group. Each week, you must rotate duties. For example, if you are instrument person during one week, then you cannot be instrument person the following week.

Homework must be turned in on time. **NO CREDIT WILL BE GIVEN FOR LATE HOMEWORK ASSIGNMENTS.** All homework assignments must be neat and orderly.

**SAFETY:**

Students should read and abide safety guidelines given in the text book. In addition, cold weather may occur on class days. Be sure to dress properly in these situations with layers of clothing.

**CHEATING:**

Cheating and/or plagiarism on graded materials will not be tolerated and will be prosecuted to the maximum according to **STUDENT RIGHTS AND RESPONSIBILITIES** as stated in the WKU Undergraduate Catalog.

**SPECIAL ASSISTANCE:**

Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services.

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**ATTENDANCE:**

A **one (1)** unexcused absence will result in a lowering of the final letter grade by two (2) full letter grades. Thus, if the final letter grade in the class is an A and the student has one unexcused absence, the final letter grade in the course will be a C.

**Two (2)** unexcused absences will result in an F in the course, regardless of the final letter grade earned in the course.

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**PRELIMINARY SCHEDULE** (Schedule is subject to change.):

<b>CE 161 (PRINCIPLES OF SURVEYING LAB)</b>		
<b>T, R (TUESDAYS &amp; THURSDAYS)</b>		
<b>DATE</b>	<b>LAB #</b>	<b>TITLE</b>
16-May Tues.	1	<ul style="list-style-type: none"><li>• Introduction, Determination of Groups, Field book, Pacing, and Taping (<b>Lab #1</b>)</li><li>• Measure Horizontal Distances using a Steel Tape, Chaining Pins, Plumb Bob, and Hand Level (<b>Lab #2</b>)</li></ul>
18-May Thurs.	2	<ul style="list-style-type: none"><li>• Differential Leveling Circuit (<b>Lab #3</b>)</li><li>• Profile Leveling Circuit (<b>Lab #4</b>)</li></ul>
23-May Tues.	3	<ul style="list-style-type: none"><li>• <b>Lab Midterm</b></li></ul>
25-May Thurs.	4	<ul style="list-style-type: none"><li>• Measuring Angles using a Theodolite of a 4-Point Closed Traverse in Diddle Park (<b>Lab #5</b>)</li><li>• Measuring Slope Distances and Interior Angles using a Total Station of a 4-Point Traverse in Diddle Park (<b>Lab #6</b>)</li></ul>
30-May Tues.	5	<ul style="list-style-type: none"><li>• Measuring Slope Distances and Interior Angles using a Total Station of a 4-Point Traverse in Diddle Park (<b>Lab #7</b>)</li></ul>
1-June Thurs.	6	<ul style="list-style-type: none"><li>• Construction Stakeout of Building Corners with Offset Stakes (<b>Lab #8</b>)</li><li>• <b>Lab Final Exam</b></li></ul>

Due to weather conditions such as excessive heat or rain, labs may be moved to a Monday, Wednesday, or Friday.