Online Instructor's Manual
to accompany

Surveying Fundamentals and Practices, 5/e

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PEARSON
Prentice Hall

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Columbus, Ohio

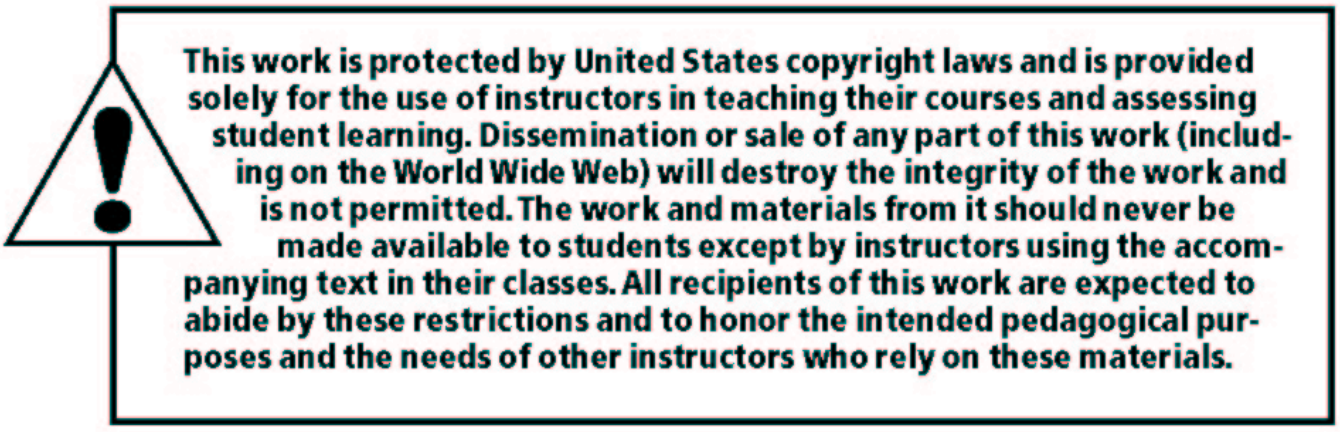

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Table of Contents

COURSE SYLLABUS
SURVEYING I

PREREQUISITES: MAT 155 or equivalent (Algebra & Trigonometry) **REVISED:** 2005
MET 109 or equivalent (Computer Aided Drafting)

COURSE ORIGINATOR: JERRY NATHANSON

The first of a two-part introductory sequence in plane surveying, including the measurement of distances, elevations, angles and directions. Principles and field use of traditional and modern surveying instruments are covered in lecture and practiced in lab. Fundamental surveying computations are also covered.

OBJECTIVES:

Surveying is a very important aspect of civil/construction engineering technology. It serves as the link between design (office) and construction (field) activities. All civil/construction technicians must be skilled and knowledgeable in modern as well as traditional surveying theory and methods.

In surveying I, students will learn how to use basic surveying equipment – the steel tape and plumb bob, the level and level rod, and the total station. Students will learn to plot ground profiles and contours as well as do basic surveying computations using hand-held calculators and surveying software.

MAJOR TOPICS:

- Measurements: Errors and mistakes, accuracy and precision.
- Horizontal Distances: Pacing, taping and electronic distance measurement.
- Vertical Distances: Differential leveling, profiles, contours.
- Angles/Directions: Bearings, azimuths, declination, theodolite and total stations.
- Horizontal Control: Traverse surveys and computations

Upon completion of CIT-205, the student will be able to:

1. Keep a set of neat and legible surveying field notes in acceptable format.
2. Recognize, define and explain common surveying terms and symbols.
3. Compute accuracies for horizontal and vertical distance measurements.
4. Use a steel tape, plumb bob, and other accessories for measurement of horizontal distances, within a specified degree of accuracy; also compute appropriate tape corrections.
5. Explain the basic principles of electronic distance measurement (EDM); use to measure horizontal distances.

6. Set up and use an automatic level, and read a level rod; also, close a benchmark leveling circuit within a specified degree of accuracy.

7. Perform profile and/or topo (grid method) leveling surveys, and to plot the elevation data as ground profiles and/or contour lines.

8. Perform direction computations involving horizontal angles, azimuths, bearings.

9. Set up over a point and use a total station or theodolite for measurement of horizontal and vertical angles; also close the horizon at a survey station.

10. Perform a loop traverse survey; also do basic traverse computations, including closure, adjustment, station co-ordinates, and enclosed area.

11. Use appropriate COGO software to perform basic traverse computations.

MAJOR LAB ASSIGNMENTS:

Horizontal Distances; pacing, taping. EDM	(3 weeks)
Leveling; benchmark, profile, grid-topo	(4 weeks)
Angular Measurement; theodolite/total station	(3 weeks)
Traversing/Computations	(4 weeks)

(Specifications for the lab projects will be given in class)

TEXT BOOK:

Surveying Fundamentals and Practices, 5th Edition, Nathanson, Lanzafama & Kissam, Prentice Hall., 2005.

GRADE DISTRIBUTION:

	% of Total	**Letter**	**Average**
Tests/Quizzes/HW	50 %	A	90+
Lab Assignments	25 %	B+	85+
Final Exam	25 %	B	80+
	100 %	C+	75+
		C	70+
		D+	65+
		D	60+
		F	<60

TESTS:

Two or three class tests will be given during the semester; notice will be given at least one week before each test. Make-up tests will be given at the discretion of the instructor. The maximum make-up test grade will be 80 %. A short quiz will be given each week; no make-up quizzes will be given. A comprehensive final exam will be given at the end of the semester.

LABS:

Instructions for lab assignments will be given and explained in class during each lab session. The overall lab grade will be based on attendance, participation, the quality of the field book. Field book specifications will be given and explained in class. Two (2) percentage points will be deducted from the lab grade for each unexcused absence from the lab session.

QUIZZES:

A short quiz will be given each week at the beginning of the class, covering the previous week's classwork; no make-up quizzes will be given.

HOMEWORK:

Assigned problems may be collected periodically during the semester and graded on the basis od accuracy, neatness, thoroughness and timely submission.

FINAL:

A comprehensive final exam will be given at the end of the semester.

Lab 1 Measuring Horizontal Distance by Pacing

Part I Calibration of Unit Pace

A 200 ft. long baseline on level ground will be established with a steel tape. Range poles will be used to clearly mark the beginning and the end of the line.

Calibrate your pace by walking with natural steps from one range pole to the other, counting the number of paces as you walk. Record the number of paces (and estimated decimal fraction of a pace) in your field book. Repeat this at least five times, recording the number of paces each time. Compute the average number of your paces for the 200 ft. baseline distance.

Compute the length of your unit pace by dividing the average number of paces into 200 ft. Record this number of feet/pace in your field book, and memorize it for future use.

Convert your unit pace from feet/pace to meters/pace and record the value in your field book. (Conversion: 1ft = 0.3048m).

Part II Rough Distance Measurement by Pacing

Measure, by pacing, the length of a given line assigned by your instructor. Compute the length of the line using the value of your unit pace. Do this at least twice (once forward and once back), to avoid a blunder; use the average distance as your final result. Express the distance both in feet and meters.

Obtain the "true" length of the line from your instructor, and determine your degree of accuracy for the distance measurement; it should be at least 1/50. Record all results in your field book (a sample form of notes will be available for your reference.) Several other lines may also be assigned for pacing.

Reference: Sec. 1-6 (pg 23-25), Sec. 204 (pg45-48), Sec. 4-1 (pg 102-104)
Surveying Practice

Example Note Forms

Lab 2 Witnessing or Referencing Control Points and Taping Horizontal Distances

Part I: Witnessing Points
Equipment: Steel Tape, Plumb Bob

Directions: Several points on campus will be assigned by your instructor, for use as survey stations in Surveying I and II. In your field book, give a general description of its location which will enable you or someone else to find the vicinity of the point at a future date. Then make a detailed sketch showing measured distances and directions to witness marks. The witness marks should be prominent objects which are easily identified. Use at least two, preferably three witness objects for each point, which are less than 100 feet from the point. Do not crowd the sketches in your field book.

Part II: Taping Horizontal Distances
Equipment: 100 ft. Steel Tape, Plumb Bobs, Chaining Pin, Range Pole, Tape Clamp, Tension Scale, Hand Level

Directions: Several lines or courses will be assigned by your instructor (running between the points witnessed above). Set up a range pole about 2 feet behind the point to be measured. The rear tapeman will keep the head tapeman on line by sighting along the tape to the range pole. (If necessary, use the hand level to keep the tape horizontal).

Assume the tape is 100 ft. long when supported at the two ends only, with a tension of 20 lbs. Use the tension scale at least once to get the "feel" for the pull on the tape. For this exercise, neglect tape corrections.

Tape each line forward and back. The tape must be held in a horizontal position. The values obtained should agree within 1/3000 to be acceptable, but a degree of accuracy of 1/5000 should be your goal. Use the average of the two measurements as the "true" distance. All member of the group should take turns as head tapeman, rear tapeman, notekeeper, etc. on the different lines assigned. Record the distances and accuracies in your field book. Convert to meters.

Example Note Forms

Surveying Fundamentals and Practices, Sixth Edition, covers up-to-date surveying technology without losing perspective of the need to provide students with a strong foundation in traditional surveying fundamentals. Through clear explanations and applied examples, the text presents the methods of measuring and computing distances, angles, and directions. It provides students with a firm grasp of modern equipment and office and field procedures related to horizontal control surveys, property surveys, topographic surveys, roadway curve calculations, and construction layout surveys. The sixth edit Surveying Fundamentals an has been added to your Cart. Add to Cart. Buy Now.Â The late Philip Kissam, Professor Emeritus of Civil Engineering at Princeton University, who established the underlying foundation of this textbook, in its first three editions as Surveying Practice, has made significant contributions to surveying education. Read more. Product details. The practice of surveying is an art, because it is dependent up on the skills, judgments and experience of surveyor. It may also be considered as an applied science, because field and office procedures rely upon a systematic body of knowledge. 1.4 importance of surveying. Surveying is one of the worldâ€™s oldest and most important arts because, as noted previously, from the earliest times it has. 2. been necessary to mark boundaries and divide land.Â 2. Describe the two fundamental purposes of surveying. 3. Briefly describe why surveying may be characterized as. both an art and a science.