Geography 433
Surveying and Field Techniques
Fall Term, 2005
Dr. Craig Caupp

Catalog Description

GEOG 433 Surveying and Field Techniques 3 cr.
Theory of measurements, computation, and instrumentation; field work , use of Global Positioning Systems (GPS) and compilation of topographic base maps; evaluation of errors; profiling, grading, slope and grade stakes. Fieldwork will include use of a variety of instruments. One hr. lecture and 4 hrs. lab. Fall. *Recommended: MATH 103 and GEOG 275.*

Purpose: The surveying course is intended to educate and train the student in basic surveying operations and computations. The course will provide students with as much "hands-on" experience surveying and with field techniques as possible.

Course Objectives: The course will educate the students on the following topics:
1. History of surveying
2. Procedures and standards for field notes
3. Basic trigonometry
4. Horizontal distance measurement- pacing, taping, statia and electronic distance measurement
5. Use of baseplate and sighting compasses
6. Elevation measurement using differential and profile leveling with hand level, transit, and total station
7. Horizontal and vertical angle measurement– transit and total station
8. Use of traverse to establish base points for survey
9. Preparation of profiles and cross sections
10. Map interpretation and public land systems
11. Topographic surveys
12. Use of GPS in basic surveying
13. Property boundary surveys
14. Construction stake out

Goal: Upon completion of the course students will:
1. become familiar and proficient with several instruments used by surveyors.
2. use computer programs as tools in the course to complete projects, word processor programs will be used to prepare reports; calculations, graphing, and data management will be done in a spreadsheet.
3. use AUTOCAD to prepare draft drawings of the data collected.
4. use AutoCad Land Development program to integrated data collected in the field with a drafting program.
5. understand angle and distance measurement; and differential, profile, cross-section, and topographic leveling.
6. collect appropriate field notes by hand and with a total station
7. understand and apply measurement error, accuracy, precision and techiniques to improve

accuracy of survey

8. work effectively as part of the survey crew by taking on each role in turn
9. analyze and synthesize survey data
10. use GPS units to establish control points
11. transfer data from field collector to computer
12. prepare basic maps by hand and within AutoCad

COURSE OUTLINE: Given on separate sheet. The schedule is tentative for Geography 433 Most of the labs will be outside so the weather can have a significant impact on the schedule. Indoor activities will be rescheduled to match up with poor field days. You should read ahead in the text book to be prepared if you can not go to the field.

TEXT Surveying: Principles and Applications. Barry F. Kavanagh. Sixth Edition.

EQUIPMENT: Calculator, colored pencils, floppy disks (or zip disk or R/W cd), engineering scale, field note book, grid paper, protractor.

COURSE EXAMINATIONS:The exams include questions from your text readings, lecture notes, and lab exercises. Types of questions include multiple choice, matching, fill-in-blank, short answer essay, and problems. The tests will be very similar to the projects. The tests will be given during the lab periods or as take home tests.

Three exams will be given. The first exam will occur in the fifth or sixth week, the second in approximately the tenth week and the last during the scheduled final exam period. Make-up exams will be given only if the student is ill or a personal emergency occurs. The absence must be reported to the instructor prior to the examination period and supported by proper written documentation.

GRADES -- determined by total points accumulated:

Exam 1	100	A = 450 or more
Exam 2	100	B = 400 to 449
Final Exam	125	C = 350 to 399
Lab	175	D = 300 to 349
		F = 299 and below
	500	

Late exercises. Homework and lab exercises are expected to be on time. A grace period of 1 day is allowed. After 1 day 5% per day will be taken off until 10 days passes when they will no longer be accepted.

ATTENDANCE POLICY : Attendance will not be taken. Students assume responsibility for information and handouts missed due to absence. Lab exercises are expected to be done on time. Lab exercises missed due to absence will not be accepted.

OFFICE: **GU 205 (ext. 4755)** Hours I have an open door office policy, stop by with your question at any time. **Office Hours:** Tue, Thur 9:30 - 10:30 AM., Wed 2:00-4:00, Friday 12:00-1:00.

ACADEMIC DISHONESTY: is defined to include giving or receiving aid on exams, any form of cheating, or plagiarism. Students found guilty of academic dishonesty will receive an automatic course grade of "**F**" and will be referred to the Campus Judicial System. For a discussion of Academic Dishonesty refer to statement in the Student Handbook.

Disruption of class or any behavior in class which interferes with an effective learning environment will not be tolerated, and will result in expulsion from the classroom. Please consult the Pathfinder.

Topics and techniques you should be familiar with by the end of the course

Trig review
coordinate geometry
measuring distance estimate
measuring distance pacing
measuring distance tape
measuring distance statia
measuring distance total station
measuring slope estimate
measuring slope hand level
measuring slope transit
measuring slope total station
measuring height of object estimate
measuring height of object hand level
measuring height of object total station
differential leveling
Benchmark leveling
profile leveling
Cross-section leveling
trigonometric leveling
measuring angles compass
measuring angles hand level
measuring vertical angles transit
measuring horizontal angles transit
Azimuths
bearings
Grid direction
Magnetic direction
level set up
transit set up
rod with bubble
rod tipped forward and backward
laying off angles
prolonging a straigth line
Bucking-In (interlining)
Intersection of two straight lines
Prolonging a line past an obstacle
traverse survey with transit
traverse survey with total station
Closed traverse, angular closure error
Closed traverse, length closure
Traverse, Latitudes and departures
Traverse adjustments
Rectangular Coordinates of Traverse Stations
Area of Closed Traverse
Total Station Field Techniques
TS Point location
TS Missing Line Meaurement
TS Resection
TS Azimuth Calculations
TS Obect height calcuation
TS Offset Measurments
TS Layout points
TS Area calcuations
Collection of Total Station data by data collector
Use of Data Collector
Coding station descriptors into data collector
Uploading data to computer
Use of AutoCad to capture data from data collection
Use of AutoCad to draft map or plan
Use of AutoCad to draft profile (example of stream)
Use of AutoCad to draft cross section of stream
AutoCad Basics
Plotting of map or Plan
Contours
Preparing Contour map by hand drafting
Interpolation of contour location between spot elevations
Use of Computer to prepare Contour map
GPS basics
GPS: Use of GPS to establish Control points
GPS: Collection of GPS data
GPS: Post processing of data
GPS: Downloading points into data collector
Control Surveys
Surveying Applications
Surveying Applications Construction Surveys
Surveying Applications Land Surveying
Field Projects
Draft drawing of legal description, by hand and AutoCad
Township Range legal descriptions