

SURVEYING COMPUTATIONS/SURE 215
Spring, 2007/08 (3 Credit Hours)

Instructor: Robert Burtch
Office Johnson Hall 304
Office Phone: 592-2634
Office Hours: M 10:00-10:50, T 3:00-3:50, W 12:00-12:50, R 1:00-1:50
E-Mail: robert_c_burtch@ferris.edu

PREREQUISITE COURSES/SPECIAL SKILLS: SURE 110

COURSE DESCRIPTION:

A study of principles and methods of surveying computation related to Cartesian coordinate systems, coordinate geometry including a four-parameter similarity transformation and an introduction to spherical coordinate systems as applied to spherical astronomy and the use of mathematical software with programming features.

COURSE OBJECTIVE/FOCUS:

The objective of this course is to give the student an introduction to the principles of coordinate geometry and basic astronomy for surveying problems.

REQUIRED COURSE MATERIALS:

Textbook: SURVEYING THEORY AND PRACTICE, 7th ed., by J. Anderson and E. Mikhail
SURE 215 Lecture Notes

References: INTRODUCTION TO MATHCAD 11, by R. Larsen, Prentice Hall
SURVEYING PRINCIPLES AND APPLICATIONS, by B. Kavanagh and S. Bird, Prentice Hall.
ADVANCED SURVEYING I, by W. Faig, University of New Brunswick Lecture Note No. 26.

COURSE SCHEDULE:

Lecture: T 4:00-5:50; Laboratory: Wed 5:00-7:50am

Week 1 Jan 14 - Jan 18	Introduction: Understand course objectives, grading policy, etc. Traverse Computations including computation of angular error of closure, compute azimuths from angle, Compute latitudes and departures, linear error and its direction and relative error of closure, adjustment of the traverse by Compass and Transit Rules, compute final adjusted traverse, compute coordinates of traverse points and determination of area by DMD and coordinates
Week 2 Jan 21 - Jan 25 (No class 1/21)	Traverse Computations
Week 3 Jan 28- Feb 1	Coordinate Geometry: Equation of a line, equation of circle, solving equations simultaneously, quadratic equation
Week 4 Feb 4 – Feb 8	Coordinate Geometry: Line-line intersection
Week 5 Feb 11 - Feb 15	Coordinate Geometry: Horizontal and vertical curves
Week 6 Feb 18 - Feb 22	Coordinate Geometry: Line-circle intersection
Week 7 Feb 25 - Feb 29	Coordinate Geometry: Circle-circle intersection
Week 8 Mar 3 - Mar 7	Coordinate Geometry: Missing data calculations
Mar 10 - Mar 14	Spring Break
Week 9 Mar 17 - Mar 21 (No Classes 20-21)	Coordinate Geometry: Area Partitioning

Week 10 Mar 24 - Mar 28	Coordinate Geometry: Three point resection
Week 11 Mar 31 – Apr 4	Coordinate transformation
Week 12 Apr 7 - Apr 11	Spherical Astronomy: Basic spherical astronomy concepts and definitions, coordinate systems.
Week 13 Apr 14 - Apr 18	Spherical Astronomy: Corrections to astronomical observations
Week 14 Apr 21 – Apr 25	Spherical Astronomy: Azimuth using Polaris observations and observations on the sun.
Week 15 Apr 28 – May 2	Spherical Astronomy
Week 16	Final Exam: Tuesday, May 6, 4:00-5:40

LAB WORK:

In labs, the student will be introduced to computer methods of solving surveying problems. Topics will include: Introduction to Mathcad fundamentals including kinds of equal signs, entering an equation, working with units, and manipulating displays; Mathcad functions: elementary mathematical functions, trigonometric functions, logical functions, string functions, file functions; Mathcad: working with arrays, graphing capabilities

All work will be due on the date specified. Late assignments will be assessed a penalty of 5% per day or fraction thereof. All work must be completed to receive a passing grade for this course. No assignments will be accepted after the unit exam in which the assignment was given. Each assignment will be submitted in a report folder that can be reused throughout the semester. A cover sheet will be included with each assignment identifying the assignment, student name, and class. Unless otherwise stated, only one assignment per folder will be accepted. All formulas must be shown and identified. When working with MathCAD, define the steps involved in the solution. See sample assignments that identify a format that will be followed in submitting homework assignment.

When graphical output is required for an assignment, the output should be properly identified and located in the appropriate part of the assignment. If the graphical output is being done by hand, it must be drawn using a straight-edge and appropriate templates. Label all parts of the graphic as appropriate.

Work that is submitted in hand-written form must be prepared on engineering paper in pencil. Corrections will be erased or placed above the incorrect values which will be stuck out with a single line through the error. Use only the front side of the sheet. Always include units in the answer and highlight the answer by either underlining it, placing a box around the answer, or by using a highlighter. When you have answers that are less than 1, always begin the number with a zero. For example, .471 shall be written as 0.471. When writing angles, minutes and seconds must always have two units, excluding any decimal portion. If a minute or second contains only single units, i.e., 4 minutes, 7 seconds, the number shall be preceded by a zero. In this case, 04' 07". Unless otherwise stated, all angles will be presented in degrees, minutes and seconds format. Use common sense in portrayal of significant figures.

ATTENDANCE POLICY

I understand that each student may upon occasion need to be away from class due to illness or other important matters. The following policy recognizes these life issues but at the same time reflects the real world need to be present in class in order to learn and share your learning with others in the class.

Each student will be allowed to miss up to 4 classes, either lectures or lab, without penalty. These absences may be for any reason and do not require giving me an excuse. A student who is absent a fifth time will be required to withdraw from the course if this absence occurs during the withdrawal period of the semester. If this absence occurs after the withdrawal period the student will receive a failing (F) grade in the course. The four absences a student may have represents nearly 10% of the meeting dates and far exceed any absence policy that would exist in business, industry or other professional areas. All laboratory absences must be made up during the semester.

Exceptions to the Attendance Policy (Verification of all exceptions is necessary):

1. A University-sponsored event in which an excused absence from the Vice President for Academic Affairs office is given.

2. Death of a family member or close personal relation (friends, neighbors).
3. Extended hospitalization (this does not apply to a visit to the health center because of a cold or other illness).
4. Jury duty or being subpoenaed to testify in a court case.
5. Dangerous weather conditions in which driving is considered by local authorities to be unsafe (for commuter students).

CLASS CONDUCT

It is essential that everyone in this class establish a mutual respect amongst each other in this class. Therefore, there are a few simple rules that you will be asked to adhere to, most of these can be defined as good manners. These rules are:

- Class starts on the hour so please make every effort to arrive on time by planning ahead for any contingencies.
- Class lasts for 50 minutes so do not begin to pack up your books and other items early. This is very distracting to me and your fellow students. You are expected to participate throughout the entire class period.
- Turn off all cell phones, pagers, pda's and other electronic devices before class. If there are extenuating reasons, please see me.
- During the lecture, feel free to ask questions, but refrain from conducting personal conversations. Again, this is very disruptive.
- Sleeping, eating and reading newspapers are not allowed in class. While in class the student is expected to pay attention and participate in this class and not finish work for another class during this class periods.
- Come to class prepared. Instructional material students should not be without include, as a minimum, writing material, computer disks and calculators.
- Students are expected to check the web page for this course weekly and students are responsible for all material on this web page along with textbook and other readings.
- When you leave the classroom, please pick up after yourself. Try to leave the room cleaner than when you found it.

PERFORMANCE CRITERIA:

50% from exams

50% from laboratory and other assignments

100% TOTAL

GRADING POLICIES:

90 - 100%	- A Range
80 - 89%	- B Range
70 - 79%	- C Range
60 - 69%	- D Range
0 - 59%	- F Range

Students absent from class for a test must make arrangements to take the exam prior to the next class meeting. Failing to do so will result in a grade of 0%. It is the student's responsibility to call me to set up a time to make up the test.

ADDITIONAL COMMENTS:

This class represents a commitment of time and energy for both the faculty and student. It is expected that the student put in an additional 2-3 hours of work for every credit hour of this course. This number represents an average and not an absolute maximum threshold. This means that some students will have to put in even more time to learn the material presented in this course. Work schedules or other responsibilities do not represent acceptable exceptions to this obligation.

Office hours have been listed above. Other hours can be arranged if necessary. If you have problems, please see me as soon as possible. Waiting until the end of the semester may be too late.

FINAL NOTE:

I reserve the right to make needed and appropriate adjustments in this syllabus