ERE 371 – SURVEYING FOR ENGINEERS
COURSE SYLLABUS – FALL 2016

INSTRUCTOR

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CLASS MEETING TIMES

Lecture: Monday/Wednesday 9:30–10:25 AM
Lab: Monday 2:15–5:05 PM; or Tuesday 2:00–4:50 PM; or Thursday 2:00–4:50 PM

REQUIRED TEXTS AND EQUIPMENT

Elementary Surveying by Ghilani and Wolf (Thirteenth edition): on reserve in Moon Library
A scientific calculator
A pencil with hard (3H or 4H) and sharp lead but no eraser

COURSE DESCRIPTION

The principles of plane surveying and position determination for engineers. Subject matter areas include introduction to the theory of measurement and errors, reference surfaces, coordinate systems and datums, horizontal and vertical measurements, traversing and computations, construction surveying including circular and parabolic curves, the analysis and treatment of systematic and random errors, foundations and applications of global positioning systems. Laboratory fieldwork and computations culminate in a topographic map.

COURSE LEARNING OUTCOMES

Many programs at ESF aim at training students in designing solutions to problems associated with managing and developing land resources. A basic tenet of this training is an ability to locate and quantify the resource being managed or problem being solved. In addition, professionals involved with the design and construction of facilities must acquire knowledge of the principles and practices of construction surveying. ERE 371 introduces surveying for these and other tasks associated with engineering or construction management practice.

At the conclusion of this course, the student will be able to:

- Use the principles and procedures of plane surveying for data collection, mapping, and construction layout;
- Analyze and reduce survey field measurements to produce a topographic map;
- Assess the accuracy and precision of field measurements, evaluate the sources of systematic and random errors in those measurements, and determine the suitability for calculating derived quantities;
- Perform, as a member of a team, many of the procedures of surveying field data collection (including the use of many types of equipment), professional documentation and communication, surveying computations and adjustments, and surveying data representation.

PROGRAM LEARNING OUTCOMES

Within the context of the course description and course outcomes presented above, this course will contribute to students achieving the following outcomes related to the accredited ERE undergraduate degree:

- Apply knowledge of mathematics, science, and engineering:

  - Utilize analytical and computation approaches;
  - Demonstrate mathematical capacity for problem solving.
- Design and conduct experiments, as well as to analyze and interpret data:
  - Analyze field data to detect errors, reduce measurements and produce a map.
- Function on multidisciplinary teams:
  - Work with other students to perform and complete a semester-long project.
- Identify, formulate, and solve engineering problems:
  - Understand and apply basic mathematical and spatial principles to solve problems.
- Understand professional and ethical responsibility:
  - Participate in a semester-long project that is presented in a professional context;
  - Function in situations requiring high expectations for ethics, self-discipline, and perseverance.
- Communicate effectively:
  - Learn and master effective recording of field data collection results and methods;
  - Demonstrate graphical communication by producing a professionally acceptable, accurate, and complete topographic map;
- Use the techniques, skills, and modern engineering tools necessary for engineering practice:
  - Become accomplished users of a variety of data collection tools.

COLLEGE LEARNING OUTCOMES:

Within the context of the course description and course outcomes presented above, this course will contribute to students achieving the following College-wide learning outcomes:

- Quantitative Reasoning:
  - Utilize analytical and computation approaches;
  - Understand and apply basic mathematical and spatial principles to solve problems.
- Basic Communication Skills:
  - Learn and master effective recording of field data collection results and methods;
  - Demonstrate graphical communication by producing a professionally acceptable, accurate, and complete topographic map;
- Technological and Information Literacy:
  - Become accomplished users of a variety of data collection tools.

RESPONSIBILITIES AND ATTITUDES

In order to be successful, everybody involved in this course must assume certain responsibilities. The professor's responsibilities include managing the overall course conduct, preparing and presenting instructional activities, preparing laboratory exercises, writing and grading exams, and supervising the teaching assistant(s). The TAs are responsible for conducting and grading lab exercises, helping grade exams, helping to prepare materials, and providing help during class times and office hours. The student's responsibilities are to learn the material and apply it to their profession and career. This responsibility includes attending class, completing assigned work, preparing for exams, and doing whatever is necessary for truly understanding and retaining the subject. Academic dishonesty is unacceptable evidence of character and will be dealt with severely.

ASSIGNMENTS

Readings and homework problems assigned in lecture are important. There will be no formal grading of these assignments but completing assigned homework is highly recommended as many exam problems will be similar to the homework problems. The homework problems and associated solutions will be available through Blackboard.

COMPUTER USE

Word processing and spreadsheet software packages are considered basic tools in modern life. These types of programs are used for written and graphic communication and many types of quantitative analyses. E-mail will be used frequently for communicating outside class times. All students have access to an e-mail account through the Syracuse University system. Lecture outlines and homework problem sets will be available through Blackboard. Computer clusters at ESF and SU provide access to the Internet for those who do not have home access.

GRADING

The course grade will be computed based on the following components:

Exam 1	20 %
Exam 2	20 %
Exam 3	20 %
In class exercises	5 %
Field work/Lab submissions	20 %
Final map	12 %
Final map computations	3 %
	100%

A final exam will be offered during the scheduled final exam period. This final exam will cover material from the whole course. If you take all four exams, only the three highest exam grades will count towards your course grade. You must take the final exam if you miss one of the regularly scheduled exams. The field work and lab book grades are largely based on proper note taking procedures, neatness, and organization.

The numerical scores you earn on class assignments will average to a final numerical score for the course. Letter grades will be assigned based on the scale shown below. The grade cutoffs may be adjusted by a point when actually assigning final grades at the end of the semester.

Letter Grade	Range of Numerical Grade
A	90 and above
A-	87 to just less than 90
B+	84 to just less than 87
B	80 to just less than 84
B-	77 to just less than 80
C+	74 to just less than 77
C	70 to just less than 74
C-	67 to just less than 70
D	60 to just less than 67
F	less than 60

ATTENDANCE POLICY:

Participation in lectures and labs is essential to success in this course. As shown on the grading schedule above, in-class exercises inherently track attendance and count toward the overall grade. Attendance in laboratory sessions is required because of the emphasis on group work.

ACADEMIC DISHONESTY

Academic dishonesty is a breach of trust between a student, one's fellow students, or the instructor(s). By registering for courses at ESF you acknowledge your awareness of the ESF Code of Student Conduct (http://www.esf.edu/students/handbook/StudentHB.05.pdf), in particular academic dishonesty includes but is not limited to plagiarism and cheating, and other forms of academic misconduct. The Academic Integrity Handbook contains further information and guidance (http://www.esf.edu/students/integrity/). Infractions of the academic integrity code may lead to academic penalties as per the ESF Grading Policy (http://www.esf.edu/provost/policies/documents/GradingPolicy.11.12.2013.pdf).

SOURCES OF SUPPORT AND CLASS ABSENCE:

If you experience academic or personal difficulties that affect your studies or life, there are people and resources that will help you. There is a website that serves to answer many student questions: http://www.esf.edu/students/success. In addition, the ESF Office of Student Life, 110 Bray Hall (470-6660) will provide academic support, career guidance, personal counseling, or direct you to the proper source of help. If you encounter a situation beyond your control in which you will be missing 3 or more days of classes, you should contact the Office of Student Life and they will get in touch with all your instructors for you. Supportive documentation may be required.

ACCOMMODATIONS FOR STUDENTS WITH LEARNING AND PHYSICAL DISABILITIES:

SUNY-ESF works with the Office of Disability Services (ODS) at Syracuse University, who is responsible for coordinating disability-related accommodations. Students can contact ODS at 804 University Avenue- Room 309, 315-443-4498 to schedule an appointment and discuss their needs and the process for requesting accommodations. Students may also contact the ESF Office of Student Affairs, 110 Bray Hall, 315-470-6660 for assistance with the process. To learn more about ODS, visit http://disabilityservices.syr.edu. Authorized accommodation forms must be in the instructor's possession one week prior to any anticipated accommodation. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

INCLUSIVE EXCELLENCE STATEMENT

As an institution, we embrace inclusive excellence and the strengths of a diverse and inclusive community. During classroom discussions, we may be challenged by different ideas. Understanding individual differences and broader social differences will deepen our understanding of each other and the world around us. In this course, all people are strongly encouraged to respectfully share their unique perspectives and experiences. This statement is intended to help cultivate a respectful environment, and it should not be used in a way that limits expression or restricts academic freedom at ESF.

RELIGIOUS OBSERVANCE:

ESF recognizes the diversity of faiths represented among the campus community and protects the rights of students to observe religious holy days according to their tradition. Students will be provided an opportunity to make up any exam or work requirements that may be missed due to a religious observance provided they give the instructor reasonable advance notification.

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LECTURE SCHEDULE – FALL 2016

DATE	LECTURE TOPIC	READINGS
29 Aug	Introduction to Surveying	Ch 1; Ch 2: sec 6-11; Ch 3: sec 1-7
31 Aug	Introduction to Surveying and Measurements	Ch 6: sec 1-16
5 Sep	***NO CLASS – LABOR DAY***	
7 Sep	Horizontal Distance Measurement	Ch 6: sec 17-24;
12 Sep	Horizontal Distance and Angle Measurement	Ch 7: sec 1-16
14 Sep	Horizontal Angle Measurement	Ch 8: sec 1-5, 20, 22
19 Sep	Measurements and Measurement Science	Ch 2: sec 1-5
21 Sep	Measurement Science	Ch 3: sec 1-21
26 Sep	Measurement Science	
28 Sep	Measurement Science and Traversing	Ch 9: sec 1-7, 10, 11;
3 Oct	**EXAM 1 – Through Measurement Science**	
5 Oct	Traverse Computations	Ch 10 sec 1-8
10 Oct	Traverse Adjustment	Ch 10: sec 10-11, 16-17
12 Oct	Traverse Adjustment	Ch 16: Sec 1-3
17 Oct	Position Determination	Ch 19: sec 1, 2, 6-10
19 Oct	Coordinate Systems	Ch 20: sec 1-5, 8-12
24 Oct	Measurement of Vertical Distance	Ch 4: sec 1-14
26 Oct	**EXAM 2 – Through Coordinate Systems**	
31 Oct	Measurement of Vertical Distance	Ch 5: sec 1-6, 11-14
2 Nov	Measurement of Vertical Distance	Ch 19: sec 6.4, 6.5
7 Nov	Mapping	Ch 17: 1-6, 9;
9 Nov	Mapping	Ch 18: 1-12, 16-17
14 Nov	Overview of GPS, positioning and errors	Ch 13: sec 1-6; Ch 14: sec 6-7
16 Nov	*GPS demonstration*	
21 Nov	GPS enhancement and GNSS	Ch 13: sec 7-9
21/23 Nov	***NO CLASS – THANKSGIVING***	
28 Nov	GPS Techniques	Ch 14: sec 1-4, Ch 15: sec 10
30 Nov	*Guest Lecture*	
5 Dec	**EXAM 3 – Through GPS**	
7 Dec	Review	

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Lab Schedule – Fall 2016

Monday Lab Schedule		Tuesday Lab Schedule		Thursday Lab Schedule	
Dates	**Laboratory Exercise**	**Dates**	**Laboratory Exercise**	**Dates**	**Laboratory Exercise**
29 Aug	Introduction to Lab & Taping	30 Aug	Introduction to Lab & Taping	1 Sep	Introduction to Lab & Taping
5 Sep	**Labor Day – No Lab**	6 Sep	GPS Collection & Station Tie-ins	8 Sep	GPS Collection & Station Tie-ins
12 Sep	GPS Collection & Station Tie-ins	13 Sep	Horizontal Measurement	15 Sep	Horizontal Measurement
19 Sep	Horizontal Measurement	20 Sep	Horizontal Measurement	22 Sep	Horizontal Measurement
26 Sep	Horizontal Measurement	27 Sep	Map Data Collection	29 Sep	Map Data Collection
3 Oct	Map Data Collection	4 Oct	Map Data Collection	6 Oct	Map Data Collection
10 Oct	Map Data Collection	11 Oct	Traverse Computations	13 Oct	Traverse Computations
17 Oct	Traverse Computations	18 Oct	Mapping in AutoCAD (437 Baker)	20 Oct	Mapping in AutoCAD (309 Baker)
24 Oct	Mapping in AutoCAD (309 Baker)	25 Oct	Introduction to Leveling	27 Oct	Introduction to Leveling
31 Oct	Introduction to Leveling	1 Nov	Leveling of Traverse	3 Nov	Leveling of Traverse
7 Nov	Leveling of Traverse	8 Nov	Mapping and Map Data Collection	10 Nov	Mapping and Map Data Collection
14 Nov	Mapping and Map Data Collection	15 Nov	Mapping	17 Nov	Mapping
21 Nov	**Thanksgiving – No Lab**	22 Nov	**Thanksgiving – No Lab**	24 Nov	**Thanksgiving – No Lab**
28 Nov	Mapping	29 Nov	Mapping	1 Dec	Mapping
5 Dec	Mapping	6 Dec	Mapping	8 Dec	Mapping

Preliminary Map: Due at the start of lab on 7 Nov (Monday) / 1 Nov (Tuesday) / 3 Nov (Thursday)

Final Map: Due by 4 pm on Friday 9 December