

**Forest Surveying  
FE 308 Syllabus  
Spring 2008**

**Instructor:** Michael Wing  
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**Office Hours:** Th 2:00-4:00  
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**Prerequisite:** Trigonometry (Math 112), FOR 111

**Course Format:** Tu & Th 8:00 - 9:20 (Peavy 242)  
Lab 1: Tu 10:00 – 1:50 (Peavy 024)  
Lab 2: Tu 2:00 – 5:50 (Peavy 024)  
Lab 3: Th 10:00 – 1:50 (Peavy 024)

**Text:** Elementary Surveying: An Introduction to Geomatics. Paul R. Wolf and Charles G. Ghilani. 2006. Prentice Hall, New Jersey. This text is strongly recommended for those students who intend to take the Fundamentals of Land Surveying exam but is not required.

**Course WWW site:** <http://www.cof.orst.edu/cof/teach/fe308/>

**Lecture Notes:** Lecture outlines are available at the WWW site listed above. The outlines are provided for your convenience. Please print them out prior to class and bring them with you for lecture. I will let you know ahead of time which lecture outlines to bring to class.

**Additional Reading:** Surveying for Forestry and the Natural Resources- Kiser  
Readings on file in the SLC and in the Konnie Lab  
Elementary Forest Surveying and Mapping – Wilson  
Elementary Forest Surveying and Mapping II – Wilson

**Materials:** Hardhat – required (a hardhat will be made available to you if you don't have one)  
Handheld scientific calculator – required (bring to all tests)  
Transit style field notebook (2) – required  
Level style field notebook (1) – optional  
Engineer's scale – optional  
Field boots - required  
Field survey vest - optional

**Personal lockers:** Personal lockers are available from the instrument room free of charge (unless you lose the key).

**The Sequence of Surveying and Measurements Courses:**

FE 308 is one course from an integrated sequence of four courses in Forest Surveying and Measurements (FE 308, FE 309, FE 310, FE 311). FE 308 is an introduction to the theory and practice of surveying methods and measurements as applied to the specifics of forestry problems and their solutions. FE 308 provides fundamental instruction for surveying and field measurements. FE 308 is also intended to prepare forest engineering students for Forest Route Surveying, Advanced Forest Surveying, and Survey Law (CE 465). This sequence of courses and FE 357 (GIS Applications in Forest Engineering) is designed to prepare students for the Fundamentals of Land Surveying exam that is necessary to become a Professional Land Surveyor.

**Course Goals:**

There are two primary goals for this course. The first is to learn and become proficient in basic forest survey techniques including surveying fundamentals, field notes, angle measurements, traversing, and leveling techniques. The second goal, which is consistent throughout all Forest Surveying and Measurement courses, is the development and application of good professional practices.

**Course Objectives:**

The course objectives are built around lecture and lab combinations. Material presented in lecture will focus on the theory of surveying measurements and the application of surveying techniques to forestry related problems. The field labs will focus on the hands-on use of equipment, proper field measurement techniques, proper field note keeping and the application of classroom material in forest field conditions.

Students who successfully complete this course will be able to:

- Understand and apply the theory of measurement errors.
- Successfully solve surveying problems of horizontal distance, vertical distance, and angular measurement.
- Understand the principles of map creation and projection and use maps to successfully solve problems of measurements and legal descriptions.
- Understand the concepts and development of the Public Land Survey System in the United States and Oregon, and use these concepts to successfully analyze and solve problems of division of public lands.
- Become proficient in various field survey techniques and field note-keeping.
- Understand the concept of survey order.

## Course Policies

1. All assignments are due by the time and date assigned unless specifically stated as otherwise.
2. To receive credit, assignments must be turned in on time. **Late assignments will not be accepted.**
3. All work must be neat, legible, and complete. All steps should be shown. Sample calculations and a summary table may be used to illustrate repetitive calculations. Use words to explain the computations where necessary. Use sketches and drawings where required or helpful. Incomplete, undocumented work is unacceptable.
4. All figures, drawings, and tables should be titled.
5. Work that does not conform to the above requirements and the designated format may not be graded.
6. There will be no make-up exams or quizzes.
7. **Any requests for deviations in the course policies, schedule, or deadlines must be made in writing to the instructor. These requests should be made in the form of a typed business style letter that clearly states and defends your request. E-mail is acceptable but should be confirmed as having been received.**

## Grading:

Final grades for the course will be based on performance in the following areas:

Item	Total points
Labs (6)	120
Lab Final	40
Weekly Quizzes (3)	30
Midterm Exams (2)	200
Final Exam	100
Totals	490

Letter grades will be based on the following:

Letter grade	% of total
A	90
B	80
C	70
D	60
F	<60

Point totals are approximate and may be shifted depending on class performance. Plus and minus grades will be given where appropriate.

### FE 308 Course Schedule

Week 1	<p>Lecture:</p> <p>Lab:</p> <p>Reading:</p> <p>Supplemental reading:</p>	<p>Introduction to the course (Lecture 1 notes)            Introduction to surveying            Field notes &amp; notekeeping            Measurement errors (Lecture 2 notes)</p> <p>No lab</p> <p>Introduction W&amp;G chap. 1            Units and significant figures W&amp;G chap. 2 part I            Survey field notes W&amp;G chap. 2 Part II            Theory of errors in observations W&amp;G chap. 3</p> <p>Pafford, pages 1-87.            Introduction, Wilson pp. 1-8.            Introduction, Wilson II pp. 1-4.            Horizontal distance, Wilson pp. 30-34.</p>
Week 2	<p>Lecture:</p> <p>Quiz:</p> <p>Lab:</p> <p>Reading:</p> <p>Supplemental reading:</p>	<p>Horizontal distance (Lecture 3 notes)            Taping specifications (Lecture 4 notes)</p> <p><b><i>Q1 – Measurement error (Thursday)</i></b></p> <p>Introduction to equipment room            Field book setup and field book lab            Pacing and measurement error (field)            Compass navigation</p> <p>Distance measurement:            Methods W&amp;G chap. 6, Part I            Taping W&amp;G chap. 6, Part II</p> <p>Tapes, Wilson II pp. 5-24.            Horizontal distance, Wilson pp. 22-29.            Pafford, pp. 84-87</p>
Week 3	<p>Lecture:</p> <p>Lab:</p> <p>Reading:</p> <p>Supplemental reading:</p>	<p>Angles, bearings, and azimuths (Lecture 5 notes)            The compass (Lecture 6 notes)</p> <p>Horizontal traverse measurements (field)            Steel tape methods</p> <p>Angles, azimuths, and bearings W&amp;G chap. 7</p> <p>Angles, Wilson II pp. 25-40.            Pafford, pp. 90-95</p>

Week 4	Lecture:	Leveling 1 / Elevation Measurements (Lecture 7 notes)
	Quiz:	<b><i>Q2 – Angles and bearings (Thursday)</i></b>
	Lab:	Area layout with staff compass (field)
	Reading:	Leveling- theory, methods, and equipment W&G chap. 4

Week 5	Lecture:	No class on Thursday
	Exam:	<b><i>Midterm 1 (Tuesday)</i></b>
	Lab:	No lab

Week 6	Lecture:	Differential leveling (Lecture 8 notes) Leveling errors (Lecture 9 notes)
	Lab:	Profile leveling with laser range finder & tape/clinometer (field)
	Reading:	Leveling- field procedures and computations W&G chap. 5
	Supplemental reading:	Pafford, pp. 105

Week 7	Lecture:	Leveling adjustments (Lecture 10 notes) Preliminary line measurement (Lecture 11 notes)
	Lab:	Closed traverse differential leveling (field)
	Reading:	Traverse computations W&G chap. 10 Area W&G chap. 12

Week 8	Lecture:	Traverse 1 (Lecture 12 notes) Traverse computations and adjustments (Lecture 13 notes) Traverse Area & coordinate computations (Lecture 14 notes)
	Lab:	<b>Field exam</b> (field)
	Reading:	Surveys of the public lands W&G chap. 22
	Supplemental reading:	Colvocoresses, The Gridded Map.

Week 9	Lecture:	Public land survey system (Lecture 15 notes) Introduction to GIS Maps and mapping (Lecture 16 notes) Map projections, coordinate systems, and datums
	Exam:	<b>Midterm 2 (Tuesday)</b>
	Lab:	Maps and mapping (Indoor lab)
	Reading:	Mapping W&G chap. 17 Photogrammetry W&G chap. 27 pp. 786-806

Week 10	Lecture:	Survey control (Lecture 17 notes) Course wrap-up
	Lab:	Digital Total Station (field)
	Reading:	Control Surveys W&G chap. 19 GPS W&G chap. 13 & 14
	Supplemental reading:	GPS The next Utility SLC # 9 Geoexplorer II CD

<b>Week 11</b>	<b>FINAL EXAM</b>	<b>Thursday, June 12, 9:30 AM</b>
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### **FE 308 Reading List**

- 1. Buckner, R. B. 1997-1998. The Nature of Measurement. 12 part series. Professional Surveyor 17-18(2-8).**
- 2. Colvocoresses, A. P. 1997. The Gridded Map. Photogrammetric Engineering & Remote Sensing 63(4): 377-380.**
- 3. Kiser, J. 2006. Surveying for Forestry and the Natural Resources. John Bell & Associates. Available at OSU Bookstore.**
- 4. Pafford, F. W. 1962. Handbook of Survey Notekeeping. John Wiley and Sons.**
- 5. Trimble Navigation. 1993. GPS A Guide to the Next Utility. Trimble Navigation Limited.**
- 6. Trimble Navigation. 1997. Geoplotter II System. CD ROM. Trimble Navigation Limited.**
- 7. Wilson, R. L. 1996. Elementary Forest Surveying and Mapping. OSU Bookstores.**
- 8. Wilson, R. L. 1996. Elementary Forest Surveying and Mapping II. OSU Bookstores.**
- 9. Wolf, P. R. and C. G. Ghilani. 2006. Elementary Surveying: An Introduction to Geomatics. Prentice Hall, New Jersey.**