SUR 3520 – Measurement Science/
SUR 5525 – Least Squares Adjusted Computations

INSTRUCTOR:

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TEACHING ASSISTANT:

Adam Benjamin

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LECTURES:

Tue: 10:40a-11:30a (per. 4), Thu: 10:40a-12:35p (per. 4+5) via Adobe Connect

Note: With a few exceptions there will be no live lectures. Instead, links to lecture recordings will be provided on the online teaching platform for download.

First class: 01/05. Last class: 04/18;

Mid-term exam: Thu 2/23 from 10:40am-12:35pm; Final exam: Mon 4/24 from 12:30-2:30pm
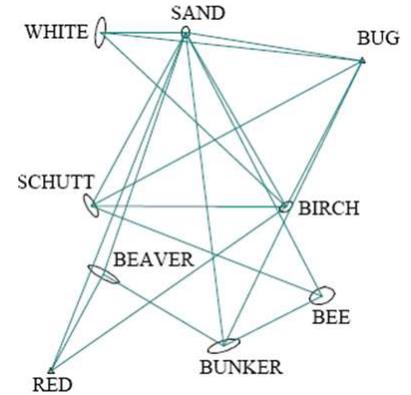
TEXTBOOK:

- Ghilani, C. D. (2010). Adjustment Computations - Spatial Data Analysis (5th Ed.). New York, NY: John Wiley & Sons

- Additional reading material for each session will be made available in advance through the Canvas course Web site (http://elearning.ufl.edu/)

COURSE CONTENT:

This course presents methodologies for analyzing and adjusting errors with a focus on least squares adjustments. It will provide students with a thorough understanding of errors, their sources, and magnitudes.

Topics covered:

    a. Theory of errors, random and systematic errors, statistical distributions, hypothesis testing

    b. Law of error propagation on various types of observations

    c. Principles of Least Squares

    d. Adjustment of horizontal surveys, level networks, and GPS baselines

    e. Error ellipse

    f. Blunder detection

UF UNIVERSITY of FLORIDA

Measurement Science
SUR 3520/5525 - Spring 2017

School of Forest Resources and
Conservation
Geomatics Program

COURSE OBJECTIVES AND STUDENT LEARNING OUTCOMES:

The course objective is to provide students (1) with a thorough understanding of errors, their sources, and magnitudes, and (2) with procedures to account for the presence of errors in spatial data handling.

At the completion of the course, the student should be able to:

i.   apply methods of statistics to assess and describe the quality of measurements

ii.   apply the theory of error propagation and least-square method to geodetic observations

iii.   understand the effect of errors on geodetic observations

iv.   use error ellipses for geodetic network design

v.   utilize adjustment software and spread sheet functions for adjustment computations

GRADING POLICY:

Grade	Percentage	Grade	Percentage
A	90.0-100.0	C+	73.0-74.9
A-	87.0-89.9	C	67.0-72.9
B+	85.0-86.9	C-	65.0-66.9
B	77.0-84.9	D	50.0-64.9
B-	75.0-76.9	F	0-49.9

Grading item	Percentage
Home assignments	30%
Online quizzes and discussions	15%
Attendance of Q&A sessions and guest lectures	5%
Field lab	10%
Mid-term exam	20%
Final exam	20%
100%	

GRADES AND GRADE POINTS:

For information on current UF policies for assigning grade points, see

https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

COURSE OUTLINE:

Week	Topic	Book chapter
Week 1, Jan 5	Course introduction Types of measurements and errors	ch. 1
Week 2, Jan 10	Analyzing measurements Random errors	ch. 2 ch. 3
Week 3, Jan 17	Distributions used in sampling theory Confidence intervals	ch. 4
Week 4, Jan 24	Hypothesis testing	ch. 5
Week 5, Jan 31	Jan 31: Q & A session Law of error propagation	ch. 6
Week 6, Feb 7	Error Propagation in distance, angle, and elevation measurements	ch. 7-9
Week 7, Feb 14	Feb 14: Q & A session Principles of Least Squares Adjustment	ch. 11
Week 8, Feb 21	Feb 23: Mid-term exam	
Week 9, Feb 28	Solving nonlinear equation systems	ch. 11
Mar 6 - Mar 10	*Spring Break*	
Week 10, Mar 14	Adjustment of level networks	ch. 12
Week 11, Mar 21	Adjustment of trilateration networks	ch. 14
Week 12, Mar 28	Adjustment of triangulation networks Error ellipse	ch. 15 ch. 19
Week 13, Apr 4	Adjustment of GPS baselines Apr 6:Guest lecture, Q&A session	ch.17
Week 14, Apr 11	Blunder detection in geodetic networks	ch. 21
Week 15, Apr 18	No lecture. Finish field lab	

CLASS FORMAT AND POLICIES

1. This course is primarily taught through pre-recorded lectures, with a part of lectures being delivered live synchronously through the virtual classroom software Adobe Connect.

2. The Canvas system, more specifically the Canvas conversation function, should be used as the platform for written communication between students and the instructor. Questions and suggestions to the whole class can also be posted under the Discussions tab.

3. Any short-term changes concerning lectures or classes are announced through Canvas, either as a conversation or an announcement. Feel free to call the instructor with any questions.

4. For each assignment a due date and time is given.

5. Lecture material can be downloaded from the Canvas course website.

MISSING AND LATE ASSIGNMENT POLICIES:

1. A 10% penalty per day will be applied to late assignments up to one week after they are due date/time. This means that assignments handed in late on the due date or the next calendar day get a 10% point deduction, for 2 days late

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this gives a 20% penalty, and so on. Assignments will not be accepted if handed in more than one week (7x24 hours) after the due date/time. If you know in advance that you will be late for an assignment, let the instructor know in advance (via Canvas), and it will be decided on a case-by-case basis whether an exception can be made.

2. There will be no make-up quizzes or make-up exams.

3. Once closed no more contributions to posted online discussion forums will be possible

ABSENCES AND MAKE-UP WORK:

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

COMMUNICATION:

The Canvas system should be used as the primary platform for written communication between students, the instructor, and the TA, where the built-in conversation or discussion function can be utilized. Any short-term changes concerning lectures or other course components will be announced through Canvas.

The lecture material can be downloaded from the Canvas website (http://elearning.ufl.edu/) at least half an hour before the lecture starts.

USING ADOBE CONNECT SOFTWARE:

Live lectures (as announced) and office hour meetings (per individual student requests) will be conducted with the Adobe Connect web conferencing software. The software is accessed by clicking a link posted by the instructor through e-Learning. The instructor will schedule the sessions and post the link to you earlier in the semester.

The following link explains how to participate in Adobe Connect meetings/sessions. Adobe Connect only requires an internet connection, a web browser, and Adobe Flash Player version 10.1 or higher. Adobe Connect supports nearly any operating system including Windows, Macintosh, Linux and Solaris, as well as the most widely used browsers including Internet Explorer, Firefox, Safari, and Chrome. A microphone is also needed to communicate with the instructors and the students attending the session.

NOTE - This syllabus is tentative and subject to change. As with all classes, you are responsible to know the course schedule, readings & labs, and check for short term changes in the topics, dates, etc.

ONLINE COURSE EVALUATION PROCESS:

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of

the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results. Should you have any complaints with your experience in this course please visit http://www.distance.ufl.edu/student-complaint-process to submit a complaint.

SOFTWARE USE:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

UF HONOR CODE:

As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

The instructors of this course fully support the intent of the above statement and will not tolerate academic dishonesty. We, the members of the University of Florida Community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. Read more: http://www.dso.ufl.edu/students.php

CAMPUS HELPING RESOURCES:

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling Center, 301 Peabody Hall, 392-1575, www.counseling.ufl.edu/cwc/
- Career Resource Center, CR-100 JWRU, 392-1602, www.crc.ufl.edu/
- Student Mental Health Services, Rm. 245 SHCC, 392-1171, www.shcc.ufl.edu/smhs/
  - o Alcohol and Substance Abuse Program (ASAP)
  - o Center for Sexual Assault / Abuse Recovery & Education (CARE)
  - o Eating Disorders Program
  - o Employee Assistance Program
  - o Suicide Prevention Program

SERVICES FOR STUDENTS WITH DISABILITIES:

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/