

## SUR 4530/6934 – Geodesy and Geodetic Positioning

### INSTRUCTOR:

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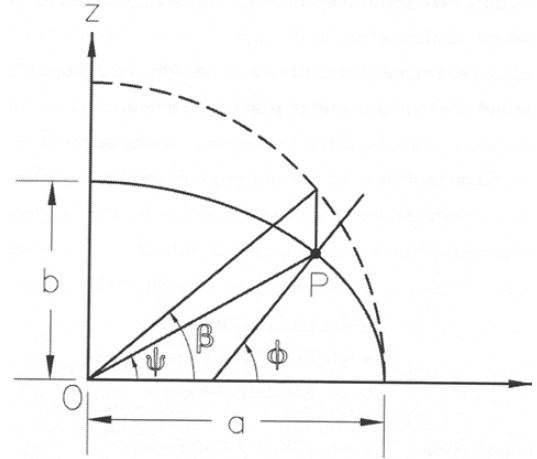
### TEACHING ASSISTANT:

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### OFFICE HOURS:

The instructor and TA can be best reached via the messaging system in Canvas. Students are also welcome to call by phone or arrange a video conference meeting.

### LECTURES:

Tue: 9:35a-11:30a (per. 3+4), Thu: 9:35a-10:25a (per. 3) via Canvas conferences (recordings available)

First class: 8/26/14; last class: 12/19/14; final exam: 12/15 from 10a-12p

### TEXTBOOKS:

- Elithorp, J. A. and Findorff, D. D. (2009). Geodesy for Geomatics and GIS Professionals (2nd ed.). Acton, MA:

XanEdu Custom Publishing.

- van Sickle, J. (2008). GPS for Land Surveyors (3rd Ed.): CRC Press.

### COURSE CONTENT:

Geodesy is relevant for many surveying tasks today, may it be through the definition of a geodetic datum for geodetics control, computed satellite orbits for deriving GPS positions, the approximation of the earth through an ellipsoids as it is used for the State Plane Coordinate System, or for high accuracy measurements over spatially extended areas that need to take into account earth curvature. This course will explain the fundamentals of Geodesy which are relevant for the practicing surveyor both for for plane surveying (topographic surveys, cadastral surveying, engineering surveying) and geodetic surveys (determination of the earth's surface and gravity field over a region that typically spans and acountry or group of countries). Students will learn the concepts of the ellipsoid, geodetic coordinates, gravity, datums,

satellite orbits, code and carrier phase GPS observations, and GPS data collection and processing.

**COURSE OBJECTIVES AND STUDENT LEARNING OUTCOMES:**

The course objective is to provide the students with an understanding of geodetic science as it pertains to the practice of Geomatics. This involves an understanding of different representations of the earth, including its gravity field, and their relationship to the required accuracy of the final product. Required accuracy determines also best practice guidelines for measurement procedures.

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

- i. apply trigonometric computations on spherical and spheroidal earth models
- ii. convert point coordinates between different geodetic reference systems
- iii. evaluate the discrepancies between different horizontal and vertical datums as it pertains to the practice of land surveying
- iv. explain theoretical concepts of GPS survey methods and data processing
- v. apply best practices for GPS surveys

**GRADING POLICY:**

<i>Grade</i>	<i>Percentage</i>	<i>Grade</i>	<i>Percentage</i>
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

<i>Grading item</i>	<i>Percentage</i>
Home assignments	35%
Online quizzes	15%
Mid-term exam	20%
Final exam (cumulative)	30%
	<b>100%</b>

**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>

**CLASS FORMAT AND POLICIES**

1. This course is a distance education course taught synchronously through a virtual conference platform (BigBlueButton) as part of the Canvas system (<http://lss.at.ufl.edu/>). BigBlueButton is an open source web conferencing system for online learning. Although the lectures are recorded and available online for review, attendance is strongly encouraged.
2. The Canvas system should be used as the platform for written communication between students and the instructor. The canvas conversation function is like an internal e-mail system. 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 instructors with any questions.
4. For each assignment a due date and time is given, which is usually the beginning of the next class.
5. Lecture material can be downloaded from the Canvas website (<http://lss.at.ufl.edu/>) at least half an hour before class starts.

**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, assignments handed in 2 days late are taken off 20%, etc. Assignments will not be accepted if handed in more than one week after the due date. 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 by the instructor whether an exception can be made on a case-by-case basis.
2. There will be no make-up quizzes or make-up exams.

**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 message or discussion function can be utilized. Any short-term changes concerning lectures or other course components will be announced through Canvas.

**USING THE CONFERENCING TOOL IN CANVAS:**

Live lectures (as announced) and office hour meetings (per individual student requests) will be conducted with the Conferences tool in Canvas, which is based on BigBlueButton. Live lectures and recordings can be accessed through links posted in the conference directory. A headset (with microphone) is needed to communicate with the instructors and the students attending the session. Some tutorials on BigBlueButton can be found here:

<http://demo.bigbluebutton.org/>

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**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> to submit a complaint.

**ACADEMIC HONESTY POLICY:**

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.

**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.

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.

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**LECTURES:**

- 1 Introduction – EF:Ch. 1
- 2 Latitude and Longitude – EF:Ch. 2
- 3,4 Geometry of the Sphere – EF:Ch. 3
- 5 Earth's Gravity – EF:Ch. 4
- 6-8 Geometry of the Ellipsoid – EF:Ch. 5
- 9 Geodetic Perspective on the USPLSS – EF:Ch. 6
- 10-12 Geodetic Reference Systems – EF:Ch. 7
- 13,14 Geodetic Datums – EF:Ch. 8
- 15,16 The Geoid – EF:Ch. 9
- 17 Reduction of Observations – EF:Ch. 10  
Exam I
- 18 Reduction of Observations – EF:Ch. 10
- 19 Satellite Coordinate Systems - EF:Ch. 11
- 20 Intro to GPS
- 21,22 Overview of GPS – VS:Ch. 1
- 23-26 Biases and Solutions - VS:Ch. 2
- 27 History and Framework - VS:Ch. 3
- 28,29 Receivers and Methods - VS:Ch. 4
- 30,31 Planning a GPS Survey - VS:Ch. 6
- 32 GPS Data Collection - VS:Ch. 7
- 33 GPS Data Formats
- 34 GPS Postprocessing  
Exam II
- 35-37 GPS Postprocessing
- 38-40 RTK and DGPS
- 41 Future Trends in GPS

**SEMESTER SCHEDULE:**

Monday	Tuesday	Wednesday	Thursday	Friday
8/25	8/26 Lec. 1,2	8/27	8/28 Lec. 3	8/29
9/1 <b>Labor Day</b>	9/2 Lec. 4,5	9/3	9/4 Lec. 6	9/5
9/8	9/9 Lec. 7,8	9/10	9/11 Lec. 9	9/12
9/15	9/16 Lec. 10,11	9/17	9/18 Lec. 12	9/19
9/22	9/23 Lec. 13,14	9/24	9/25 Lec. 15	9/26
9/29	9/30 Lec. 16,17	10/1	10/2 Lec. 18	10/3
10/6	10/7 Lec. 19,20	10/8	10/9 Lec. 21	10/10
10/13	10/14 Lec. 22,23	10/15	10/16 Lec. 24	10/17
10/20	10/21 Mid-term exam	10/22	10/23 Lec. 25	10/24
10/27	10/28 Lec. 26,27	10/29	10/30 Lec. 28	10/31
11/3	11/4 Lec. 29,30	11/5	11/6 Lec. 31	11/7 <b>Homecoming</b>
11/10	11/11 <b>Veterans Day</b>	11/12	11/13 Lec. 32	11/14
11/17	11/18 Lec. 33,34	11/19	11/20 Lec. 35	11/21
11/24	11/25 Lec. 36,37	11/26 <b>Holiday</b>	11/27 <b>Thanksgiving</b>	11/28 <b>Holiday</b>
12/1	12/2 Lec. 38,39	12/3	12/4 Lec. 40	12/5
12/8	12/9 Lec. 41	12/10	12/11 <b>Reading Day</b>	12/12 <b>Reading Day</b>
12/15 Final Exam 10:00AM-Noon	12/16	12/17	12/18	12/19

**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 & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)*
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Wellness Coaching
- *Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

**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/](http://www.dso.ufl.edu/drc/)