

Route Geometrics Design – SUR 4201

1 Overview

The geometric design of transportation systems, computer applications and a comprehensive design project. Spiral curves, super-elevation theory and earthwork analysis are covered.

- 3 Credits
- Fall Semester
- Format: 50% in-class & 50% online: Live lectures and exams, Online assignments and quizzes
- <http://elearning.ufl.edu/>
- Office Hours in person on Main Campus: Period 7 (1:55 - 2:45 M W F) or via Zoom (by appointment) : <https://ufl.zoom.us/my/jthomas88>

Course Prerequisites: none

Instructor: Justin Thomas (Phone: 352.392.4996; Email: jthomas88@ufl.edu, Office: 301 Reed Lab [Main Campus])

- Please use gatorlink email (jthomas88@ufl.edu) for fastest response and be sure to start the subject with SUR4201.
- Office hours: as needed by appointment via Zoom¹ (<https://ufl.zoom.us/my/jthomas88>), phone, or email.

Required textbook(s) and/or readings: None. Utilize online resources via Canvas and The Florida “Greenbook” and other useful references can be found at:
<http://www.dot.state.fl.us/rddesign/CS/CS.shtm>

Recommended Texts: “Elementary Surveying – An Introduction to Geomatics” by Wolf and Ghilani (10th edition or later: 15th is the current one and is listed as Ghilani and Wolf)

2 Learning Outcomes

After successful completion of this course, each student will:

- Have a fundamental knowledge of basic surveys and coordinate systems
- Understand the design and geometry of horizontal and vertical highway routes
- Be able to design highway cross sections and compute end areas
- Be able to incorporate spiral curves into a horizontal alignment and calculate the necessary components
- Be able to design super-elevation for horizontal curves
- Know how to perform earthwork analysis in order to compute optimal balance of cut and fill, and hauling of soil
- Have knowledge of Geometric Design Standards for highways
- Be familiar with a set of highway construction plans.

¹Zoom is a software program used to conduct virtual meetings. See “Using Zoom Software” section of the syllabus.

3 Course Logistics

This course is not an online course but there will be elements online that students must utilize to be successful. Students may access lectures, supporting materials, quizzes and homework assignments as they become available each week.

Learning modules consist of lecture videos, supporting material, homework assignments and quizzes are provided online for each topic.

There are no mandatory laboratory sessions. Any needs that arise outside of office hours, sessions will be scheduled with the instructor and/or conducted in Zoom as needed. Support is also available by phone or by email. In the past, students have typically found that communication by email is a flexible way to work through assignment issues if not in person.

Using Zoom Software

Office hour meetings (per request) will be conducted using Zoom web conferencing software. The software is accessed by clicking the link provided by the instructor via the eLearning course site. The instructor will schedule and post sessions and their links. Click the provided link to access the office hour session.

The eLearning site provides information about participating in Zoom meetings and sessions. Zoom requires internet connection and a web browser. A microphone, speakers, and a webcam are recommended for participation in office hours to capitalize on the full communication functionality of Zoom. Zoom supports almost all operating systems, including Windows, Macintosh, and Linux. Most widely used browsers are also supported, including Internet Explorer, Firefox, Safari, and Chrome. Zoom is compatible with iOS, Android, Blackberry and Surface Pro devices. Visit the "[Getting Started](#)" link to see other connections and trouble shooting.

3.1 Assignments & Deliverables

Participation

Class participation is encouraged. Discussions and questions can take place with the instructor during scheduled office hours or via phone or email. Discussion can also take place on the eLearning course site's message boards.

Quizzes

There will be 8 quizzes presented during the semester, worth 10 points each. All quizzes will be available on Canvas from 12:45 PM to 11:45 PM after a homework assignment is to be turned in. Quizzes will assess mastery of material in the homework, but cumulative skills may be needed due to the nature of the course content. **There are no provisions for making up a missed quiz.** Exceptions will be made only for extenuating circumstances. A missed quiz will result in a score of zero, and each quiz can be taken only once. To accommodate a potential missed quiz, the lowest quiz score will be dropped.

Starting with quiz 1, there will be an opportunity to make up half of the points missed on each quiz. This opportunity is optional. For each quiz question missed you may make up half of the points by posting a "hypothetical" quiz question and answer for that module's content in the provided discussion board topic for the module. Posts that are deemed of appropriate quality and content will be accepted if

submitted by the corresponding homework deadline. These discussion board posts of questions and answers should be of a quality that would be helpful to study for the exams and final exam.

Homework Assignments

There will be 8 homework exercises presented during the semester, worth 25 points each. If you submit them for grading, they must be complete solutions. Each homework assignment deliverable must include an excel file, .pdf, and/or project feedback as specified in the assignment instructions. Refer to the included schedule for due dates. The instructor reserves the right to modify the schedule if necessary. Any modifications will be announced through the eLearning course site. All homework projects are to be completed **individually**. Assignments must be submitted by the deadline, as **late work will not be accepted. There is not provision for late or missed homework assignments** aside from being included in the policy of dropping the lowest homework score.

Submitted files for homework assignments should conform to the following naming convention: Course Prefix & Number – HW# - Student Last Name – First Initial (for example: **SUR4201-HW2-Thomas-J.XXX**). Additional submission instructions will be included in each homework assignment.

Exams

The exams for the course are scheduled as live and in-person. Exams 1 and 2 will be 50-minute exams during the normal class period (11:45 – 12:35 PM). The instructor reserves the right to modify the schedule if necessary. The Final Exam will be 120 minutes and by UF policy it is scheduled for December 10th from 12:30 PM – 2:30 PM

- Exam 1: September 30th
- Exam 2: November 13th
- Final Exam: December 10th

3.2 Grades & Grading Scale

Grading Item	Points	Description
Introductions	5 Points	See Class Introductions in “Discussions”
Quizzes	7 @10 points (70 points total)	7 Online quizzes. See “Quizzes” section. Lowest quiz grade dropped. See also opportunity to make up half of points on discussion boards.
Homeworks	7 @ 25 points (175 points total)	7 homework assignments. See "Assignments" section Lowest homework dropped.
Exams	Exam 1: 100 Points Exam 2: 100 Points Final Exam: 150 points	December 10: Final Exam
Total	600	Total Possible Points

The final grade will be calculated by dividing the number of cumulative points received by the total possible points. The instructor reserves the right to modify the grading scheme as necessary. Individual assignments, quizzes, and exams will not be curved. Grades may or may not be curved at the end of the semester. Final grades are based on the +/- grading scale used at UF. For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Corresponding Course Score	93	90	88	83	80	78	73	70	68	63	60	0-59
Grade Points	4	3.67	3.33	3	2.67	2.33	2	1.67	1.33	1	0.67	0

4 Course Content

Order of Learning Topics and Exams

Lec.	Topic	Reading assignment
1	Syllabus Review & Short Intro	
2	Overview of Route Design	
3-4	Angles, Azimuths, Bearings	Elementary Surveying: Chap 7
5	Traverse	Elementary Surveying: Chap 9
6-7	Traverse Adjustment	Elementary Surveying: Chap 10
8	State Plane Coordinates	Browse Elementary Surveying: Chap 20
9-10	Horizontal Alignments and Curves	Elementary Surveying: Chap 24
11	Horizontal Route Design Calculations	
12	Profiles and Vertical Route Tangents	Browse Elementary Surveying: Chap 25
13-14	Vertical Curves	Elementary Surveying: Chap 25
	Exam 1	
15	Vertical Alignment Design	
16	Cross Sections - 1	Browse Elementary Surveying: Chap 26
17	Cross Sections - 2	
18	End Areas and Volumes	Elementary Surveying: Chap 26
19	Surface Models, DEM and TIN	
20	Intro to Spirals	
21	Spiral Computations	Elementary Surveying: Chap 24
22-24	Spiral Design	
25	Intro to Super-Elevation	
26	Super-Elevation Design Standards	
27-28	Super-Elevation Transitions	
29-31	Earthwork Analysis –Mass Diagram	
	Exam 2	
32-34	Geometric Design Standards	Florida Green Book – Chap. 3
35	Route Project Time Line	
36	Review of Plans	

Schedule for Lectures, Exams, Assignments and Quizzes.

Monday	Tuesday	Wednesday	Thursday	Friday
8/19	8/20 First Day of UF Classes	8/21 Lec. 1	8/22	8/23 Lec. 2
8/26 Lec. 3	8/27	8/28 Lec. 4	8/29	8/30 Lec. 5
9/2 Labor Day	9/3	9/4 Lec. 6	9/5	9/6 Lec. 7
9/9 Lec. 8	9/10	9/11 Lec. 9	9/12	9/13 Lec. 10
9/16 HWK 1 Due Quiz 1 Due Lec. 11	9/17	9/18 Lec. 12	9/19	9/20 Lec. 13
9/23 Lec. 14	9/24	9/25 HWK 2 Due Quiz 2 Due Lec. 15	9/26	9/27 Lec. 16
9/30 Exam 1	10/1	10/2 Exam 1 discussion	10/3	10/4 Homecoming
10/7 HWK 3 Due Quiz 3 Due Lec. 17	10/8	10/9 Lec. 18	10/10	10/11 Lec. 19
10/14 Lec. 20	10/15	10/16 Lec. 21	10/16	10/18 HWK 4 Due Quiz 4 Due Lec. 22
10/21 Lec. 23	10/22	10/23 Lec. 24	10/24	10/25 Lec. 25
10/28 Lec. 26	10/29	10/30 Lec. 27	10/31	11/1 HWK 5 Due Quiz 5 Due Lec. 28
11/4 Lec. 29	11/5	11/6 Lec. 30	11/7	11/8 HWK 6 Due Quiz 6 Due Lec. 31
11/11 Veterans Day	11/12	11/13 Exam 2	11/14	11/15 Exam 2 Discussion
11/18 Lec. 32	11/19	11/20 HWK 7 Due Quiz 7 Due Lec. 33	11/21	11/22 Lec. 34
11/25 Lec. 35	11/26	11/27 Thanksgiving	11/28 Thanksgiving Day	11/29 Thanksgiving
12/2 HWK 8 Due Quiz 8 Due Lec. 36	12/3	12/4 Final Review Last Day of Class	12/5 Reading Day	12/6 Reading Day
12/9	12/10 Final Exam 12:30 PM – 2:30 PM	12/11	12/12	12/13

5 Policies and Requirements

This syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.

5.1 Late Submissions & Make-up Requests

It is the responsibility of the student to access on-line lectures, readings, quizzes, and exams and to maintain satisfactory progress in the course.

Late submissions will not be accepted except for under extenuating circumstances. Examples of extenuating circumstances can be found at

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues **MUST** be accompanied by the ticket number received from the Helpdesk when the problem was reported to them. The ticket number will document the time and date of the problem. You **MUST** e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number—352-392-HELP = 352- 392-4357 (option 2).

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>

5.2 Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning.

At approximately the mid-point of the semester, the School of Forest Resources & Conservation will request anonymous feedback on student satisfaction on various aspects of this course. These surveys will be sent out through Canvas and are not required, but encouraged. This is not the UF Faculty Evaluation!

At the end of the semester, students are expected to provide UF with feedback on the quality of instruction in this course using a standard set of university and college criteria (UF Faculty Evaluations). 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>.

5.3 Netiquette: Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office. <http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

Prepare emails as you would in a professional setting. Start emails with an appropriate subject line, including the course number (SUR 4201) followed by the subject of the email. Emails are typically responded to within a business day. Please try to avoid last minute emails as I may be unable to respond before a homework, quiz, or exam deadline.

5.4 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** unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct or 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/process/student-conduct-honor-code>.

Homework submissions for this course may not be copied in part or in whole. While students are allowed to discuss concepts from the assignments with other students, all work must be independently produced.

This policy, along with the principles of the Student Honor Code, will be vigorously upheld at all times in this course.

5.5 University Policy on Accommodating Students with Disabilities:

Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

5.6 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.

6 Getting Help

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

- Learning-support@ufl.edu | (352) 392-HELP - select option 2 | <http://elearning.ufl.edu>
- Library Help Desk support <http://cms.uflib.ufl.edu/ask>
- SFRC Academic Hub <https://ufl.instructure.com/courses/303721>

6.1 Student Life, Wellness, and Counseling Help

- Counseling and Wellness resources <http://www.counseling.ufl.edu/cwc/>
- U Matter, We Care <http://www.umatter.ufl.edu/>
- Career Resource Center <http://www.crc.ufl.edu/>
- Other resources are available at <http://www.distance.ufl.edu/getting-help> for online students.

6.2 Student Complaint Process

The School of Forest Resources & Conservation cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFRC Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

- Students in online courses: <http://www.distance.ufl.edu/student-complaint-process>
- Students in face-to-face courses: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf