# SUR 4201 – Route Geometrics and Design Course Syllabus

**INSTRUCTOR:** Prof. David Gibson

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Course Website: access through UF ELearning,

or through the Geomatics web site: http://sfrc.ifas.ufl.edu/geomatics select Course

Materials, select SUR 4201

or by a direct link: <a href="http://sfrc.ifas.ufl.edu/Class/SUR4201/index.html">http://sfrc.ifas.ufl.edu/Class/SUR4201/index.html</a>

Office Hours: Open Door Policy: If my door is open, please come in. I'm on campus

generally from 10AM to 3 PM.

**TEXT:** Course Handouts

No Required Text

Recommended Reference: Elementary Surveying, Wolf and Ghilani

#### **COURSE OVERVIEW:**

This course covers computer route geometry along with the basics of surveying. Included are: horizontal route design and calculation, vertical route design and calculation, cross section design and calculation, earthwork volume calculation, spirals, earthwork analysis, superelevation, AASHTO geometric design, route project flow, route plans, right of way, bearings, azimuths, elevations, coordinate systems.

**GRADING:** A final grade for the course will be assigned based on the following point system

ITEMPOSSIBLE POINTS2 Midterm Quizzes @100 pts each200 poss. pointsFinal exam (comprehensive)100 poss. pointsRequired "HW8 – Safe Road Evaluation"20 poss. pointsTotal poss. pts=320 poss. points

Optional HWs 1-7 -- Submit for grading, receive +5 course points each for complete solution, no partial credit.

Grade assignment will be by the UF Grade Scheme: A:greater than 95, A-::90-94.99, B+:87-89.99, B:83-86.99, B-:80-82.99, C+:77-79.99, C:73-76.99, C-:70-72.99, D+:67-69.99, D:63-66.99, D-:60-62.99, E:59.99 or less. Grades are assigned by straight cut-off with NO ROUNDING. (see UF policy below)

### **NOTE: Academic Honesty:**

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action.

This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

UF Plus and Minus Grades: Note as of the summer 2009, UF has adopted a new grade policy of giving letter grades A, B, C, D, E but also optional PLUS grades B+, C+, D+ and optional MINUS grades A-, B-, C-, D-. The instructor has the option of using PLUS and/or MINUS grades. For further information on the new university grading policy see: <a href="http://www.isis.ufl.edu/minusgrades.html">http://www.isis.ufl.edu/minusgrades.html</a>

## SUR 4201 LECTURE TOPICS, Readings, Key text problems:

Lecture 1: Intro to Route Geometrics and Design

Lecture 2: Angles, Azimuths, Bearings
Lecture 3: Base Line Control Traverse
Assignment: see HW1 on eLearning

Lecture 4: <u>Horizontal Alignments and Curves</u>

Lecture 5: Horizontal Route Design Calculations, Horizontal Baseline Plotting

Assignment: see HW2 on eLearning Vista

Lecture 6: <u>Profiles and Vertical Route Tangents</u>

Lecture 7: <u>Vertical Curve Theory</u>
Lecture 8: <u>Vertical Alignment Design</u>
Assignment: see HW3 on eLearning

Lecture 9: <u>Plotting Cross Sections</u>
Lecture 10: Design Typical Sections

Lecture: 11: End Areas

Lecture 12: <u>Earthwork Volume Calculations</u>

Lecture 13: <u>Surface Models, TIN</u>
Assignment: see HW4 on eLearning

Lecture 14: Intro to Spirals

Lecture 15: Spiral Comps and Formulas 2&3

Lecture 16: <u>Insertion of Spirals</u>

Lecture 17: <u>Spirals Design Processes</u> Assignment: see HW5 on eLearning

Lecture 18: Intro to Superelevation, Eq

Lecture 19: Superelevation Design Standards

Lecture 20: <u>Superelevation Transitions</u>
Assignment: see HW6 on eLearning

Lecture 21: <u>Intro to Quantities, Earthwork</u>

Lecture 22: Mass Diagram Construction

Lecture 23: Mass Diagram Analysis (\*wmv)

Assignment: see HW7 on eLearning

Lecture 24: Geometric Design Standards

Lecture 25: Sight Distance Design

Lecture 26: Safe Road Evaluation

Assignment: see HW8 on eLearning

Lecture 27: A Route Project Time Line

Lecture 28: Review of Plans 1

Lecture 29: Review of Plans 2 Review of Plans 2 Excel (pull this up and printout to help track the video)

## **Optional Content:**

Lecture 30: Right of Way Acquisition

Lecture 31: Construction Layout Surveys:

Lecture 32: <u>Tutorial Labs 2 and 3</u> Intro to Microstation:

Lecture 33: <u>Tutorial Labs 4 and 5</u> Convert Graphics, Surface Modeling by TIN

Lecture 34: <u>Tutorial Labs 6 and 8</u> Ground Profile, Vertical Design, Superelevation Shapes

Lecture 35: <u>Tutorial Labs 9 and 10</u> Cross Sections, Slope Limits, Earthwork

Assignment: none