Cover Sheet: Request 9607

ucc2-SUR3501 Spatial Measurement Systems

Info

Process	Course|Modify|Ugrad/Pro
Status	Pending
Submitter	Sager,Scott A sasager@ufl.edu
Created	9/26/2014 2:05:21 PM
Updated	8/28/2015 8:20:14 AM
Description	combining lecture and lab, revising title and description

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Forest Resources and Conservation 514946000	White, Tim		2/20/2015
Replaced ucc2_SUR3501C Foundations of UAS Mapping.pdf Replaced letter_SUR3501C-SUR6XXXC Foundations of UAS Mapping.doc Added differences_SUR3501C-SUR6XXXC Foundations of UAS Mapping.doc					10/2/2014 10/2/2014 10/2/2014
College	Approved	CALS - College of Agricultural and Life Sciences	Brendemuhl, Joel H	Approved by CALS CC.	8/28/2015
Replaced syllabus_SUR3501C Foundations of UAS Mapping.docx Replaced syllabus_SUR6XXXC Foundations of UAS Mapping.docx Replaced ucc2_SUR3501C Foundations of UAS Mapping.pdf Replaced ucc2_SUR3501C Foundations of UAS Mapping.docx Replaced syllabus_SUR3501C Foundations of UAS Mapping.docx Replaced syllabus_SUR6XXXC Foundations of UAS Mapping.docx Replaced ucc2_SUR3501C Foundations of UAS Mapping.docx Added syllabus_SUR4501C Foundations of UAS Mapping2.docx Added ucc2_SUR3501C Foundations of UAS Mapping2.docx Added syllabus_SUR6XXXC Foundations of UAS Mapping2.docx					3/3/2015 3/3/2015 3/3/2015 3/4/2015 4/27/2015 4/27/2015 4/27/2015 4/27/2015 4/27/2015 4/27/2015
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			8/28/2015
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					

Step	Status	Group	User	Comment	Updated
College Notified					
No document changes					

UCC2: Change Course Transmittal Form

UF | UNIVERSITY of FLORIDA

Current SCNS Course Identification

1. Prefix SUR   2. Level 3   3. Number 501   4. Lab Code None

5. Course Title   Spatial Measurement Systems

Requested Action

6. Effective Term Earliest Available   7. Effective Year Earliest Available

8. Action: Terminate Course ☐   Other ☒
(Skip to item 24 on this form.)   (Indicate all changes below.)

If you select "yes" to change any item below, complete the corresponding "current" and "proposed" fields.

Item	Change?	Current	Proposed
9. Course Prefix	Yes ☐	XXX	XXX
10. Course Level	Yes ☒	3	4
11. Course Number	Yes ☐	XXX	XXX
12. Lab Code*	Yes ☒	Select	C
13. Course Title	Yes ☒	Spatial Measurement Systems	Foundations of UAS Mapping
14. Transcript Title (21 characters max)	Yes ☒	Click here to enter transcript title.	FOUNDAT UAS MAPPING
15. Credit Hours*	Yes ☒	2	3
16. Variable Credit*	Yes ☐	Min # and max # credits per semester	Min # and max # credits per semester
17. S/U Only	Yes ☐	Select	Select
18. Contact Type*	Yes ☐	Select Contact Type	Select Contact Type
19. Rotating Topic	Yes ☐	Select	Select
20. Repeatable Credit*	Yes ☐	Select	Select
21. Course Description* (50 words or fewer.)	Yes ☒	Geodetic instrumentation, azimuth determination by astronomy, geodetic leveling, geodetic coordinate systems and plane projections.	Covers the fundamental components of small unmanned aerial systems (UASs) and how they are used to produce high resolution, spatially accurate, planimetric maps and 3-D models of the terrain.
22. Prerequisites	Yes ☐	Click here to enter text.	Click here to enter text.
23. Co-requisites	Yes ☐	Click here to enter text.	Click here to enter text.

* If the request is for a change in lab code, credit hours, contact type or course description, a syllabus must be attached and the syllabus checklist on the next page of this form must be completed.

24. Rationale and Placement in Curriculum

Combining lecture and lab (see separate request to terminate SUR3501L), updating title and course description. Co-taught with SUR6XXXC Foundations in UAS Mapping (see separate request).

Syllabus Requirements Checklist
   The University's complete Syllabus Policy can be found at:
   http://www.aa.ufl.edu/Data/Sites/18/media/policies/syllabi_policy.pdf

The syllabus of the proposed course **must** include the following:

☐ Course title

☒ Instructor contact information (if applicable, TA information may be listed as TBA)

☒ Office hours during which students may meet with the instructor and TA (if applicable)

☒ Course objectives and/or goals

☒ A weekly course schedule of topics and assignments.

☒ Methods by which students will be evaluated and their grades determined

☒ Information on current UF grading policies for assigning grade points. This may be achieved by
   including a link to the appropriate undergraduate catalog web page:
   https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

☒ List of all required and recommended textbooks

☒ Materials and Supplies Fees, if any

☒ A statement related to class attendance, make-up exams and other work such as: *"Requirements for
   class attendance and make-up exams, assignments, and other work in this course are consistent with
   university policies that can be found in the online catalog at:
   https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx."*

☒ A statement related to accommodations for students with disabilities such as: *"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."*

☒ A statement informing students of the online course evaluation process such as: *"Students are
   expected to provide feedback on the quality of instruction in this course based on 10 criteria. These
   evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during
   the last two or three weeks of the semester, but students will be given specific times when they are
   open. Summary results of these assessments are available to students at
   https://evaluations.ufl.edu/results."*

It is **recommended** that the syllabus contain the following:

☒ Critical dates for exams or other work

☒ Class demeanor expected by the professor (e.g. tardiness, cell phone usage)

☒ The university's honesty policy regarding cheating, plagiarism, etc.

   *Suggested wording: UF students are bound by The Honor Pledge which states, "We, the members of the
   University of Florida community, pledge to hold ourselves and our peers to the highest standards of
   honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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." The Honor Code
   (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors
   that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report
   any condition that facilitates academic misconduct to appropriate personnel. If you have any
   questions or concerns, please consult with the instructor or TAs in this class.*

☒ Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/,
   392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies

COURSE SYLLABUS
SUR4501C *FOUNDATIONS OF UAS MAPPING*

M/W 4th Period + M 5-6th Period
Spring Semester
(3 Credits)

Prerequisites
SUR3103C (or Permission of Instructor)

Instructors
Dr. Grenville Barnes gbarnes@ufl.edu (352) 392 4998 **Reed Lab 406B**
Dr. Ben Wilkinson benew@ufl.edu (352) 392-3465 **Reed Lab 406A**
Office Hours – Tuesday 3pm-5pm in Reed Lab 406A (or as arranged)

Course Description and Learning Objectives
Covers the fundamental components of small unmanned aerial systems (UASs) and how they are used to produce high resolution, spatially accurate, planimetric maps and 3-D models of the terrain.

By the end of this course, the student will be able to:

- summarize the history and evolution of UASs
- identify the essential hardware components of UASs
- plan, acquire, and adjust global positioning system/global navigation satellite system (GPS/GNSS) and total station measurements
- summarize the fundamentals of onboard GPS/GNSS and inertial measurements, and their role in airborne navigation and control for UASs
- summarize the fundamental concepts of photogrammetry and Light Detection and Ranging (LiDAR)
- describe standard UAS mapping workflow

Method of Instruction
This course is based on the concept of experiential learning or "learning by doing." Where possible, the material is learned primarily through a series of hands-on field projects. The field data collection component of the project is done in small teams (2-4 students). Analysis of the data and submission of project reports, however, is the responsibility of each student individually. The project deliverables are due at specified dates (***deadlines***) throughout the semester according to a set schedule; the deadlines are not flexible, but may vary for non-Gainesville students.

Meeting Times and Places
The class meets weekly on Monday morning (11:45am-12:35pm) in ***302 Reed Lab*** for a lecture focused on the topic for that week. For those topics that require a field project this lecture will provide background information on the specific technology being used as well as the requirements of the weekly project. Distance students attend these lectures

virtually at the scheduled time through the Polycom system or view the recorded version at a later time.

The field data acquisition part of projects occurs on Monday afternoon (3:00-6:00p.m.) for Gainesville students unless equipment constraints or weather dictate otherwise. All field work is done on campus and students should read the project instructions prior to going to the field. Distance students do their projects through our programs at Ft. Lauderdale or Plant City Research and Education Centers (RECs), and coordinate with local staff (identified the first week of the course) to schedule project field work.

In the Wednesday lab session (11:45am-12:35pm) data reduction, analysis, etc., is done independently by each student under the supervision of the Instructor and/or the Teaching Assistant in *402 Reed Lab*, or at respective RECs.

Readings
Recommended:

Ghilani and Wolf (2015). *Elementary Surveying: An Introduction to Geomatics* (14th Edition), Pearson-Prentice Hall, New Jersey

Trimble (2007). *GPS – The First Global Navigation Satellite System*, Trimble Navigation Ltd, Sunnyvale, CA

Required:

Anderson, C. (2012). "Here Come the Drones." *Wired Magazine*, London, UK, pp. 102–111 http://www.wired.com/2012/06/ff_drones/all/

Anderson, C. (2007-2014). DIY Drones Blog. http://diydrones.com/profiles/blog/list?user=zlitezlite

Wolman, D. (2012). Drone's Day Scenario. *The Pennsylvania Gazette*, Nov/Dec. pp. 28-33. http://www.upenn.edu/gazette/1112/PennGaz1112_feature1.pdf

Communication
The course is managed through the Canvas system and all communication with instructors should be done through the facilities in that system.

Course Evaluation
Grading is based on project deliverables, on-line quizzes, a final project presentation, and participation and is distributed as follows:

a) Project reports and assignments……..…….. 40%
b) Attendance and participation ………….…...10%
c) Weekly on-line quizzes ………………...…. 30%
d) Final project presentation ……………...…... 10%
e) Final quiz …………………………………... 10%

Project Reports (40%)
Project reports are required for the following 10 Projects:
- Project 1 - Establish Ground Control using total stations
- Project 2 - Compare GPS Single Point Positioning and Differential GPS (DGPS)

- Project 3 – GPS/GNSS Static Baselines using continuously operating reference stations (CORS) and the Online Positioning User System (OPUS)
- Project 4 – GPS/GNSS Static Network
- Project 5 – Inertial Navigation System (INS) Assignment
- Project 6 – Produce geo-spatial products using a small set of UAS data
- Project 7 – Measurements on 3-D Model
- Project 8 – Google Earth spatial quality analysis
- Project 9 – Lidar model and analysis
- Project 10 – Comparison of UAS Processing Software options

A project assignment will be provided each week through the course website. Each student should submit a project report back through the Canvas system before mid-night the following Sunday. No reports will be accepted after the deadline.
*Report Format***:** Students are given a report template for each project assignment. Each student ***individually*** must submit their report using the template provided.

Attendance and Participation (10%)

Students are expected to attend all lecture, lab, and field sessions. Ten percent of the grade is dedicated to attendance of Mon and Wed classes. More than two unexcused absences will result in a deduction of the student final grade. 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.

Weekly On-line Quizzes (30%)

A short weekly quiz covering the main principles, concepts and content of the weekly topic is done on-line outside of class. These are open-book so no proctoring will be necessary.

Final Presentation and Summary Reports (10%)

Each student is given 10 minutes to present a summary of one of the topics or projects completed during the semester. The presentation should include a brief summary of the objective, methodology, data processing, analysis, results and conclusion(s) reached.

Final Quiz (10%)

A final 50 minute quiz will be given on the last Wednesday class of the semester in RLA 402, an REC, or at some other instructor-approved site. This quiz covers the concepts and principles associated with the topics covered during the semester and will comprise thirty multiple-choice and true-false questions.

Grade Scale

A   95 -100%
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   0 - 59.99%

For information on current UF policies for assigning grade points, see
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Distance Students Complaints
Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See http://distance.ufl.edu/student-complaints for more details.

Weekly Lecture, Project, and Quiz Schedule
Please note that bad weather and/or other unpredictable factors may cause this schedule to change during the semester. Lectures in 302 Reed will be available through Polycom and will also be recorded for distance students who cannot 'attend' those classes. Lab locations are shown below for Gainesville only (*), but will take place on FTL and PC campuses as well at a time to be scheduled by the instructors at those locations. Project deliverables are generally due by midnight on the Sunday following the fieldwork.

Day	Week Activity	Mode	Location
	Week 1 Jan 6 - 9		
Wed	**Topic**: History and evolution of UASs	Lecture	302 Reed
Fri	Online Quiz 1	Quiz	
	Week 2 Jan 12 - 16		
Mon	**Topic:** UAS components and integration	Lecture	302 Reed
Mon	**Lab:** Ground control using total stations (Project 1)	Fieldwork	UF campus*
Wed	**Topic:** Process total station data	Lab Work	402 Reed
Fri	Online Quiz 2	Quiz	
	Week 3 Jan 19 - 23		
Mon	*MLK Jr. Day – NO CLASS (Jan 19)*		
Wed	**Topic:** Process total station data	Lab Work	402 Reed*
	Week 4 Jan 26 - 30		
Mon	**Topic:** Computation of ground control coordinates and image control using a digital level and total station	Lecture	302 Reed
Mon	**Lab:** Complete control survey work	Fieldwork	UF campus*

Wed	**Topic:** Process traverse and radial survey data ***Deliverable:*** *Project 1 Report*	Lab Work	402 Reed
Fri	Online Quiz 3	Quiz	
Week 5 Feb 2 - 6			
Mon *Mon*	**Topic:** GPS/GNSS **Lab:** GPS Single Point Positioning and DGPS (acquire uncorrected and WAAS-corrected GPS data) (Project 2)	Lecture Fieldwork	302 Reed UF campus*
Wed	**Topic:** Analyze and compare accuracy and precision of GPS observations ***Deliverable:*** *Project 2 Report*	Lab Work	402 Reed*
Fri	Online Quiz 4	Quiz	
Week 6 Feb 9 - 13			
Mon *Mon*	**Topic:** GPS/GNSS **Lab:** Acquire GPS static baselines and draw obstruction diagrams (Project 3)	Lecture Fieldwork	302 Reed UF campus*
Wed	**Topic:** Process differentially corrected GPS baselines using Continuously Operating Reference Stations (CORS) and the Online Positioning User Service (OPUS) ***Deliverable:*** *Project 3 Report*	Lab Work	402 Reed
Fri	Online Quiz 5	Quiz	
Week 7 Feb 16 – 20			
Mon *Mon*	**Topic:** GPS/GNSS mission planning and networks **Lab:** Acquire GPS static network data (Project 4)	Lecture Fieldwork	302 Reed UF campus*
Wed	**Topic:** Process and analyze locally-referenced GPS network **Deliverable:** Project 4 Report	Lab Work	402 Reed
Fri	Online Quiz 6	Quiz	
Week 8 Feb 23 - 27			
Mon *Mon*	**Topic:** Inertial navigation systems – INS **Lab:** INS Project (Project 5)	Lecture Field/Lab	302 Reed UF campus*
Wed	**Topic:** Analyze results ***Deliverable:*** *Project 5 Report*	Lab Work	402 Reed
Fri	Online Quiz 7	Quiz	
Week 9 Mar 2 – 6 Spring Break			
Week 10 Mar 9 – 13			
Mon *Mon*	**Topic:** UAS Work Flow **Lab:** Process small set of UAS-based imagery (Project 6)	Lecture Lab Work	302 Reed 402 Reed

Wed	**Topic:** Analyze results ***Deliverable:*** *Project 6 Report*	Lab Work	402 Reed
Fri	Online Quiz 8	Quiz	
Week 11 Mar 16 – 20			
Mon	**Topic:** 3-D modeling from stereo-imagery	Lecture	302 Reed
Mon	**Lab:** Measurements on provided 3-D model (Project 7)	Fieldwork	402 Reed
Wed	**Topic:** Continue measurements on 3-D model ***Deliverable:*** *Project 7 Report*	Lab Work	402 Reed
		Quiz	
Fri	Online Quiz 9		
Week 12 Mar 21 – 27			
Mon	**Topic:** Spatial Data Sharing using Google Earth (GE)	Lecture	302 Reed
Mon	**Lab:** Analyze spatial quality of GE imagery	Lab Work	402 Reed
Wed	**Topic:** Continue analysis of GE Imagery ***Deliverable:*** *Project 8 Report*	Lab Work	402 Reed
Fri	Online Quiz 10	Quiz	
Week 13 Mar 30 – April 3			
Mon	**Topic:** Lidar/Laser Scanning	Lecture	302 Reed
Mon	**Lab:** Scan terrestrial object and process	Fieldwork	UF campus*
Wed	**Topic:** Analyze scanned data ***Deliverable:*** *Project 9 Report*	Lab Work	402 Reed
Fri	Online Quiz 11	Quiz	
Week 14 April 6 - 10			
Mon	**Topic:** Commercial software options	Lecture	302 Reed
Mon	**Lab:** Research and analyze different options	Lab Work	402 Reed
Wed	**Topic:** Continue analysis ***Deliverable:*** *Project 10 Report*	Lab Work	402 Reed
Fri	Online Quiz 12	Quiz	
Week 15 April 13 - 17			
Mon	**Topic:** How to make a good presentation	Lecture	302 Reed
Mon	**Lab:** Presentation preparation	Lab Work	402 Reed
Wed	**Topic:** Presentation preparation	Lab Work	402 Reed
Week 16 April 20 - 22			
Mon	**Topic:** Final student presentations	Present	302 Reed
Mon	**Lab:** Final student presentation (3-6 pm)		
Wed	**Topic:** Final on-line Quiz	Quiz	

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.

UF Academic Honesty

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/process/student-conduct-honor-code.

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.

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/**

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/**
  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/**

Other Requirements

Cellular phones must be silenced during class. They may be used in field sessions for field work communication pertaining to this course work only.

<div align="center">

COURSE SYLLABUS
SUR6XXXC *FOUNDATIONS OF UAS MAPPING*

M/W 4th Period + M 5-6th Period
Spring Semester
(3 Credits)

</div>

Prerequisites
SUR3103C (or Permission of Instructor)

Instructors
Dr. Grenville Barnes gbarnes@ufl.edu (352) 392 4998   **Reed Lab 406B**
Dr. Ben Wilkinson benew@ufl.edu (352) 392-3465   **Reed Lab 406A**
Office Hours – Tuesday 3pm-5pm in Reed Lab 406A (or as arranged)

Course Description and Learning Objectives
Covers the fundamental components of small unmanned aerial systems (UASs) and how they are used to produce high resolution, spatially accurate, planimetric maps and 3-D models of the terrain.

By the end of this course, the student will be able to:

- summarize the history and evolution of UASs
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- summarize the fundamentals of onboard GPS/GNSS and inertial measurements, and their role in airborne navigation and control for UASs
- summarize the fundamental concepts of photogrammetry and Light Detection and Ranging (LiDAR)
- describe standard UAS mapping workflow

Method of Instruction
This course is based on the concept of experiential learning or "learning by doing." Where possible, the material is learned primarily through a series of hands-on field projects. The field data collection component of the project is done in small teams (2-4 students). Analysis of the data and submission of project reports, however, is the responsibility of each student <u>individually</u>. The project deliverables are due at specified dates (***deadlines***) throughout the semester according to a set schedule; the deadlines are not flexible, but may vary for non-Gainesville students.

Meeting Times and Places
The class meets weekly on Monday morning (11:45am-12:35pm) in ***302 Reed Lab*** for a lecture focused on the topic for that week. For those topics that require a field project this lecture will provide background information on the specific technology being used as well as the requirements of the weekly project. Distance students can attend these lectures

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Communication
The course is managed through the Canvas system and all communication with instructors should be done through the facilities in that system.

Course Evaluation
Grading is based on project deliverables, on-line quizzes, a final project presentation, and participation and is distributed as follows:

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    c) Weekly on-line quizzes ………………...…. 30%
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    e) Final quiz ……………………………….... 10%

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Project reports are required for the following 10 Projects:
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Weekly On-line Quizzes (30%)
A short weekly quiz covering the main principles, concepts and content of the weekly topic is done on-line outside of class. These are open-book so no proctoring will be necessary.

Final Presentation and Summary Reports (10%)
Each student is given 20 minutes to present an analysis of one of the topics or projects completed during the semester. The presentation should include analysis beyond what was done in the assigned project (such as comparisons of different methods from different projects) and should show a thorough understanding of the technology and techniques involved

Final Quiz (10%)
A final 50 minute quiz will be given on the last Wednesday class of the semester in RLA 402, an REC, or at some other instructor-approved site. This quiz covers the concepts and principles associated with the topics covered during the semester and will comprise thirty multiple-choice and true-false questions.

Grade Scale
A   95 -100%
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	0 - 59.99%

For information on current UF policies for assigning grade points, see
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Distance Students Complaints
Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See http://distance.ufl.edu/student-complaints for more details.

Weekly Lecture, Project, and Quiz Schedule
Please note that bad weather and/or other unpredictable factors may cause this schedule to change during the semester. Lectures in 302 Reed will be available through Polycom and will also be recorded for distance students who cannot 'attend' those classes. Lab locations are shown below for Gainesville only (*), but will take place on FTL and PC campuses as well at a time to be scheduled by the instructors at those locations. Project deliverables are generally due by midnight on the Sunday following the fieldwork.

Day	Week Activity	Mode	Location
	Week 1 Jan 6 - 9		
Wed	**Topic**: History and evolution of UASs	Lecture	302 Reed
Fri	Online Quiz 1	Quiz	
	Week 2 Jan 12 - 16		
Mon	**Topic:** UAS components and integration	Lecture	302 Reed
Mon	**Lab:** Ground control using total stations (Project 1)	Fieldwork	UF campus*
Wed	**Topic:** Process total station data	Lab Work	402 Reed
Fri	Online Quiz 2	Quiz	
	Week 3 Jan 19 - 23		
Mon	*MLK Jr. Day – NO CLASS (Jan 19)*		
Wed	**Topic:** Process total station data	Lab Work	402 Reed*
	Week 4 Jan 26 - 30		

Mon	**Topic:** Computation of ground control coordinates and image control using a digital level and total station	Lecture	302 Reed
Mon	**Lab:** Complete control survey work	Fieldwork	UF campus*
Wed	**Topic:** Process traverse and radial survey data ***Deliverable:*** *Project 1 Report*	Lab Work	402 Reed
Fri	Online Quiz 3	Quiz	
Week 5 Feb 2 - 6				
Mon	**Topic:** GPS/GNSS	Lecture	302 Reed
Mon	**Lab:** GPS Single Point Positioning and DGPS (acquire uncorrected and WAAS-corrected GPS data) (Project 2)	Fieldwork	UF campus*
Wed	**Topic:** Analyze and compare accuracy and precision of GPS observations ***Deliverable:*** *Project 2 Report*	Lab Work	402 Reed*
Fri	Online Quiz 4	Quiz	
Week 6 Feb 9 - 13				
Mon	**Topic:** GPS/GNSS	Lecture	302 Reed
Mon	**Lab:** Acquire GPS static baselines and draw obstruction diagrams (Project 3)	Fieldwork	UF campus*
Wed	**Topic:** Process differentially corrected GPS baselines using Continuously Operating Reference Stations (CORS) and the Online Positioning User Service (OPUS) ***Deliverable:*** *Project 3 Report*	Lab Work	402 Reed
Fri	Online Quiz 5	Quiz	
Week 7 Feb 16 – 20				
Mon	**Topic:** GPS/GNSS mission planning and networks	Lecture	302 Reed
Mon	**Lab:** Acquire GPS static network data (Project 4)	Fieldwork	UF campus*
Wed	**Topic:** Process and analyze locally-referenced GPS network **Deliverable:** Project 4 Report	Lab Work	402 Reed
Fri	Online Quiz 6	Quiz	
Week 8 Feb 23 - 27				
Mon	**Topic:** Inertial navigation systems – INS	Lecture	302 Reed
Mon	**Lab:** INS Project (Project 5)	Field/Lab	UF campus*
Wed	**Topic:** Analyze results ***Deliverable:*** *Project 5 Report*	Lab Work	402 Reed
Fri	Online Quiz 7	Quiz	
Week 9 Mar 2 – 6 Spring Break				
Week 10 Mar 9 – 13				

Mon	**Topic:** UAS Work Flow	Lecture	302 Reed
Mon	**Lab:** Process small set of UAS-based imagery (Project 6)	Lab Work	402 Reed
Wed	**Topic:** Analyze results ***Deliverable:*** *Project 6 Report*	Lab Work	402 Reed
Fri	Online Quiz 8	Quiz	
Week 11 Mar 16 – 20		
Mon	**Topic:** 3-D modeling from stereo-imagery	Lecture	302 Reed
Mon	**Lab:** Measurements on provided 3-D model (Project 7)	Fieldwork	402 Reed
Wed	**Topic:** Continue measurements on 3-D model ***Deliverable:*** *Project 7 Report*	Lab Work	402 Reed
		Quiz	
Fri	Online Quiz 9		
Week 12 Mar 21 – 27		
Mon	**Topic:** Spatial Data Sharing using Google Earth (GE)	Lecture	302 Reed
Mon	**Lab:** Analyze spatial quality of GE imagery	Lab Work	402 Reed
Wed	**Topic:** Continue analysis of GE Imagery ***Deliverable:*** *Project 8 Report*	Lab Work	402 Reed
Fri	Online Quiz 10	Quiz	
Week 13 Mar 30 – April 3		
Mon	**Topic:** Lidar/Laser Scanning	Lecture	302 Reed
Mon	**Lab:** Scan terrestrial object and process	Fieldwork	UF campus*
Wed	**Topic:** Analyze scanned data ***Deliverable:*** *Project 9 Report*	Lab Work	402 Reed
Fri	Online Quiz 11	Quiz	
Week 14 April 6 - 10		
Mon	**Topic:** Commercial software options	Lecture	302 Reed
Mon	**Lab:** Research and analyze different options	Lab Work	402 Reed
Wed	**Topic:** Continue analysis ***Deliverable:*** *Project 10 Report*	Lab Work	402 Reed
Fri	Online Quiz 12	Quiz	
Week 15 April 13 - 17		
Mon	**Topic:** How to make a good presentation	Lecture	302 Reed
Mon	**Lab:** Presentation preparation	Lab Work	402 Reed
Wed	**Topic:** Presentation preparation	Lab Work	402 Reed
Week 16 April 20 - 22		
Mon	**Topic:** Final student presentations	Present	302 Reed
Mon	**Lab:** Final student presentation (3-6 pm)		

Wed	**Topic:** Final on-line Quiz	Quiz

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.

UF Academic Honesty

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/process/student-conduct-honor-code.

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.

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/**

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/**
  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/**

Other Requirements

Cellular phones must be silenced during class. They may be used in field sessions for field work communication pertaining to this course work only.

Institute of Food and Agricultural Sciences   406 Reed Lab
School of Forest Resources & Conservation   PO Box 110565
Geomatics Program   Gainesville, FL
32611-0565

September 3, 2014

Dear Curriculum Committee:

**RE: Undergraduate/graduate differentiation in dual enrolled SUR3501C/
SUR6XXXC *Foundations of UAS Mapping***

We appreciate your consideration of the undergraduate and graduate sections of *Foundations of UAS Mapping* for formal approval and assignment of a course number. The course is co-taught – designed for upper division (junior and senior) undergraduates or early stage graduate students.

Graduate students are required to provide a longer and more in-depth presentation which is required to include analysis beyond what was required in the weekly projects (e.g. comparative analysis of results from more than one project that compares different technologies or techniques). In addition, the final quiz will be at a higher level than the final quiz given to the undergraduates.

Sincerely,

Grenville Barnes
Professor

Ben Wilkinson
Assistant Professor