FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner _____
Catalog _____

Department CEGE
College Engineering and Computer Science
*(To obtain a course number, contact **erudolph@fau.edu**)*

Prefix SUR **Number** 6331	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code** C	**Type of Course** Select one	**Course Title** Digital Photogrammetry and Image Interpretation
Credits *(Review Provost Memorandum)* 3	**Grading** *(Select One Option)* **Regular** (X) **Sat/UnSat** ( )	**Course Description** *(Syllabus must be attached; see Guidelines)* Use of aerial photographs for mapping, geometry of single photo and stereographic models, scale and relief displacement, vertical and titled photos, parallax, photo mosaics, ground control, stereoplotters, resection, orthophotos, oblique photos. This course will also provide an overview of digital photogrammetric principles and its applications in low altitude and close range mapping.	
Effective Date *(TERM & YEAR)* Fall 2021			

Prerequisites

Graduate Standing in Engineering

Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.

Academic Service Learning (ASL) course ☐

Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Corequisites

Registration Controls *(For example, Major, College, Level)*

Minimum qualifications needed to teach course:
Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)

List textbook information in syllabus or here

Faculty Contact/Email/Phone
Sudhagar Nagarajan,
snagarajan@fau.edu

List/Attach comments from departments affected by new course

Approved by	*Date*
Department Chair: Francisco Presuel-Moreno (Digitally signed by Francisco Presuel-Moreno, DN: cn=Francisco Presuel-Moreno, o, ou, email=fpresuel@fau.edu, c=US, Date: 2021.04.05 09:41:12 -04'00')	3/30/2021
College Curriculum Chair: M Cardei (Digitally signed by Mihaela Cardei, DN: cn=Mihaela Cardei, o=Florida Atlantic University, ou, email=mcardei@fau.edu, c=US, Date: 2021.04.05 18:31:31 -04'00')	4/5/2021
College Dean: Christopher Beattie	Sep 16, 2021
UGPC Chair: Paul Pounds	Sep 16, 2021
UGC Chair: Robert Stackman	Sep 16, 2021
Graduate College Dean	
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

Department of Civil Environmental and Geomatics Engineering
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Digital Photogrammetry and Image Interpretation 6331C	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisite: Graduate standing in Engineering	
3. Course logistics	
Semester: Fall 2022	
4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Dr. Sudhagar Nagarajan Building 36, Room 222 Boca Raton, FL, 33431 Office hours: MW 5:00 PM – 7:00 PM Phone: (561) 297 3104 E-mail: snagarajan@fau.edu
5. TA contact information	
TA's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Not Applicable
6. Course description	
This course will provide an overview of digital photogrammetric principles and its applications in geomatics engineering. It includes introducing the concept of digital cameras, perspective geometry, rigorous mathematical models to derive 3D coordinates of objects appear on digital images. Digital image processing, automated orientation procedures, Structure from Motion techniques to extract 3D point cloud from digital images are also included.	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	To provide a fundamental level of understanding of using aerial images for surveying and mapping
Student learning outcomes & relationship to ABET 1-7 outcomes	1. Ability to understand the basic geometry of vertical and near-vertical aerial imagery. (1). 2. Ability to understand how to measure horizontal and vertical positions of objects visible in single and stereo digital aerial images (1). 3. Ability to understand and digital image orientation procedures. (1, 2, 6). 4. Ability to understand and apply photogrammetry in Civil and Geomatics Engineering fields (1, 2, 3, 5, 6, 7).
8. Course evaluation method	
Midterm(s) 25% Final Exam 30% Class Assignments, Laboratories 45% *Attendance* to class is required. You are expected to participate in all class sessions and keep up with the material. Three (3) unexcused absences (as determined by the instructor) will reduce your grade by one full	

letter. Participation in University-approved activities or religious observances, with prior notice, will not be penalized.

9. Course grading scale

Course grades are assigned according to the attached Department of Civil, Environmental & Geomatics Engineering Grading Guidelines. Assignments and reports must be prepared according to the required formats. The overall performance as related to course objectives and outcomes is evaluated and considered during grading. See the supplementary Course Policies Document for the program guidelines on course grading.

10. Policy on makeup tests, late work, and incompletes

1. Exams will be given only at the scheduled times and places, unless previous arrangements have been made no less than one (1) full week in advance. No one is exempt from exams.
2. Makeups are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exams will be administered and proctored by department personnel unless there are other pre-approved arrangements.
3. Late work is not acceptable.
4. Incomplete grades are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation, incomplete grades will not be given. Note: Incomplete grades are only reserved for those students who were passing but could not complete the required work due to exceptional circumstances.

11. Special course requirements

The goal of integrating writing in this course is to improve students' ability to produce professional quality engineering reports. Contact the University Center for Excellence in Writing at 561-297-3498 or www.fau.edu/UCEW for assistance.
If you need help finding appropriate research or background information for reports, try the libguide: http://libguides.fau.edu/basic_engineering - boca
Report all technical problems in canvas to the IRM helpdesk (http://www.fau.edu/helpdesk)

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in face - to - face class sessions. Please review the university Netiquette policy guidelines at http://www.fau.edu/irm/about/netiquette.php.
Remember you are an adult—your communication with the professor and your classmates should be appropriate. You are responsible for reading all announcements posted by the instructor. Check the announcements each time you login to be sure you have read all of them since your last login session.

13. Attendance policy statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.
Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

14. Disability policy statement

Department of Civil Environmental and Geomatics Engineering
Florida Atlantic University
Course Syllabus

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

15. Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

16. Code of academic Integrity policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

17. Required texts/reading

None

18. Supplementary/recommended readings

1. Toni Schenk, Digital Photogrammetry, Volume 1, Terra Science, 1st Edition
2. Wolf, Dewitt and Wilkinson, Elements of Photogrammetry with Applications in GIS, 4th ed.
3. Manual of Photogrammetry by J. Chris McGlone, Edward M. Mikhail, James S. Bethel, Roy Mullen, Fifth Edition 2004, American Society of Photogrammetry
4. Class handouts

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

Week 1: Course introduction; introduction to photogrammetry and its applications
Week 2: Digital Image acquisition
Week 3: Camera Calibration and digital image measurements
Week 4: Ground coordinate systems; GNSS
Week 5: Analytical Photogrammetry
Week 6: Digital Photogrammetric Workstations
Week 7: Low altitude photogrammetry
Week 8: Mid-Term Test
Week 9: Digital Image Processing, Automatic Feature Extraction
Week 10: Image Matching for Orientation Procedures
Week 11: Project and flight planning
Week 12: Close range photogrammetric concepts
Week 13: Direct Orientation Procedures (GNSS/IMU)
Week 14: Accuracy standards and testing
Week 15: Map compilation, ortho photographs, mosaics
Final Exam: W (Dec 11) 7:00pm - 9:30pm
Lab exercises
Single vertical photo measurements
Analytical photogrammetry (3D coordinate computations using rigorous mathematical models)
UAS data Planning and Collection (Simulation)
UAS data Processing (Pix4D)
Close Range Photogrammetry (Accident site reconstruction)

From: Caiyun Zhang <czhang3@fau.edu>
Sent: Friday, September 3, 2021 11:00 AM
To: Sudhagar Nagarajan <snagarajan@fau.edu>
Cc: Zhixiao Xie <xie@fau.edu>; Ramesh Teegavarapu <rteegava@fau.edu>; Yan Yong <yongy@fau.edu>
Subject: RE: SUR 6331 New Course Support Letter from Geosciences

Dr. Nagarajan,
It looks good to us now. Good luck!
Caiyun

From: Sudhagar Nagarajan
Sent: Friday, September 3, 2021 10:35 AM
To: Caiyun Zhang <czhang3@fau.edu>
Cc: Zhixiao Xie <xie@fau.edu>; Ramesh Teegavarapu <rteegava@fau.edu>; Yan Yong <yongy@fau.edu>
Subject: Re: SUR 6331 New Course Support Letter from Geosciences

Good morning, Dr. Zhang,
It was nice talking to you on phone. I appreciate your time to discuss the concerns and overlap. I have updated the syllabus based on our conversation and changed the pre-requisite.
Please let me know if you have further questions to receive your support to move forward with the course.
Thank you,
Sudhagar