

<b>FAU</b> <b>FLORIDA ATLANTIC UNIVERSITY</b>	<b>NEW COURSE PROPOSAL</b> <b>Graduate Programs</b>		UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner _____ Catalog _____	
	<b>Department</b> <b>CEGE</b> <b>College</b> Engineering and Computer Science (To obtain a course number, contact <a href="mailto:erudolph@fau.edu">erudolph@fau.edu</a> )			
<b>Prefix</b> <b>SUR</b> <b>Number</b> 6331	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) <b>Lab</b> <b>Code</b> C	<b>Type of Course</b> Select one	<b>Course Title</b> Digital Photogrammetry and Image Interpretation	
<b>Credits</b> (Review Provost Memorandum) 3	<b>Grading</b> (Select One Option) <b>Regular</b> <input checked="" type="radio"/> <b>Sat/UnSat</b> <input type="radio"/>	<b>Course Description</b> (Syllabus must be attached; see <a href="#">Guidelines</a> ) 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.		
<b>Effective Date</b> (TERM & YEAR) Fall 2021				
<b>Prerequisites</b> Graduate Standing in Engineering		<b>Academic Service Learning (ASL) course</b> <input type="checkbox"/> Academic Service Learning statement must be indicated in syllabus and approval attached to this form.		
<b>Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.</b>		<b>Corequisites</b> <b>Registration Controls</b> (For example, Major, College, Level)		
<b>Minimum qualifications needed to teach course:</b> Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)		<b>List textbook information in syllabus or here</b>		
<b>Faculty Contact/Email/Phone</b> Sudhagar Nagarajan, <a href="mailto:snagarajan@fau.edu">snagarajan@fau.edu</a>		<b>List/Attach comments from departments affected by new course</b>		

<b>Approved by</b> Department Chair _____ College Curriculum Chair <b>Francisco Presuel-Moreno</b> College Dean _____ UGPC Chair _____ UGC Chair _____ Graduate College Dean _____ UFS President _____ Provost _____	<b>Date</b> 3/30/2021 4/5/2021
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Email this form and syllabus to [UGPC@fau.edu](mailto:UGPC@fau.edu) 10 days before the UGPC meeting.

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

<b>1. Course title/number, number of credit hours</b>	
Digital Photogrammetry and Image Interpretation 6331C	3 credit hours
<b>2. Course prerequisites, corequisites, and where the course fits in the program of study</b>	
Prerequisite: Graduate standing in Engineering	
<b>3. Course logistics</b>	
Semester: Fall 2022	
<b>4. Instructor contact information</b>	
<i>Instructor's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i>	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: <a href="mailto:snagarajan@fau.edu">snagarajan@fau.edu</a>
<b>5. TA contact information</b>	
<i>TA's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i>	Not Applicable
<b>6. Course description</b>	
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.	
<b>7. Course objectives/student learning outcomes/program outcomes</b>	
<i>Course objectives</i>	To provide a fundamental level of understanding of using aerial images for surveying and mapping
<i>Student learning outcomes &amp; relationship to ABET 1-7 outcomes</i>	<ol style="list-style-type: none"> <li>1. Ability to understand the basic geometry of vertical and near-vertical aerial imagery. (1).</li> <li>2. Ability to understand how to measure horizontal and vertical positions of objects visible in single and stereo digital aerial images (1).</li> <li>3. Ability to understand and digital image orientation procedures. (1, 2, 6).</li> <li>4. Ability to understand and apply photogrammetry in Civil and Geomatics Engineering fields (1, 2, 3, 5, 6, 7).</li> </ol>
<b>8. Course evaluation method</b>	
Midterm(s)      25% Final Exam      30% Class Assignments, Laboratories    45% <i>Attendance</i> 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	

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

letter. Participation in University-approved activities or religious observances, with prior notice, will not be penalized.
<b>9. Course grading scale</b>
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.
<b>10. Policy on makeup tests, late work, and incompletes</b>
<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>3. Late work is not acceptable.</li> <li>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.</li> </ol>
<b>11. Special course requirements</b>
<p>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 <a href="http://www.fau.edu/UCEW">www.fau.edu/UCEW</a> for assistance.</p> <p>If you need help finding appropriate research or background information for reports, try the libguide: <a href="http://libguides.fau.edu/basic_engineering">http://libguides.fau.edu/basic_engineering</a> - boca</p> <p>Report all technical problems in canvas to the IRM helpdesk (<a href="http://www.fau.edu/helpdesk">http://www.fau.edu/helpdesk</a>)</p>
<b>12. Classroom etiquette policy</b>
<p>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 <a href="http://www.fau.edu/irm/about/netiquette.php">http://www.fau.edu/irm/about/netiquette.php</a>.</p> <p>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.</p>
<b>13. Attendance policy statement</b>
<p>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.</p> <p>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.</p>
<b>14. Disability policy statement</b>

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

<p>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 <a href="http://www.fau.edu/sas/">www.fau.edu/sas/</a>.</p>
<p><b>15. Counseling and Psychological Services (CAPS) Center</b></p>
<p>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 <a href="http://www.fau.edu/counseling/">http://www.fau.edu/counseling/</a></p>
<p><b>16. Code of academic integrity policy statement</b></p>
<p>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.</p>
<p><b>17. Required texts/reading</b></p>
<p>None</p>
<p><b>18. Supplementary/recommended readings</b></p>
<ol style="list-style-type: none"> <li>1. Toni Schenk, Digital Photogrammetry, Volume 1, Terra Science, 1<sup>st</sup> Edition</li> <li>2. Wolf, Dewitt and Wilkinson, Elements of Photogrammetry with Applications in GIS, 4<sup>th</sup> ed.</li> <li>3. Manual of Photogrammetry by J. Chris McGlone, Edward M. Mikhail, James S. Bethel, Roy Mullen, Fifth Edition 2004, American Society of Photogrammetry</li> <li>4. Class handouts</li> </ol>
<p><b>19. Course topical outline, including dates for exams/quizzes, papers, completion of reading</b></p>
<p>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)</p>

**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