



COURSE CHANGE REQUEST Graduate Programs

**FLORIDA
ATLANTIC
UNIVERSITY**

Department CEGE

College Engineering and Computer Science

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

**Current Course
Prefix and Number** CEG5304C

Current Course Title
Terrestrial Laser Scanning

Syllabus must be attached for ANY changes to current course details. See [Guidelines](#). Please consult and list departments that may be affected by the changes; attach documentation.

Change title to:

Change description to:

Change prefix

From: _____ **To:** _____

Change prerequisites/minimum grades to:

Change course number

From: 5304C **To:** 6304C

Change credits*

From: _____ **To:** _____

Change corequisites to:

Change grading

From: _____ **To:** _____

Change registration controls to:

Academic Service Learning (ASL) **

Add **Remove**

* Review [Provost Memorandum](#)
 ** Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade.

**Effective Term/Year
for Changes:** Spring 2022

**Terminate course? Effective Term/Year
for Termination:**

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

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 09:42:42 -0400'

3/30/2021

College Curriculum Chair _____

M. Cardo

Digitally signed by Mibaelly Cardo
 DN: cn=Mibaelly Cardo, cn=Florida Atlantic University,
 ou, email=mcardo@fau.edu, c=US
 Date: 2021.04.05 18:36:59 -0400'

4/5/2021

College Dean _____

UGPC Chair _____

UGC Chair _____

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	
TERRESTRIAL LASER SCANNING, CEG 6304C	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisite: Graduate standing in Engineering/Sciences/Planning or permission by instructor	
3. Course logistics	
Semester: Spring 2021 Classroom: GS 102 Class time: T 7:10-10:00 P.M	
4. Instructor contact information	
<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 Virtual Office: https://fau.webex.com/meet/snagarajan Office hours: M 3:00 – 4:00 PM and T 6:00 PM – 7:00 PM Phone: (561) 297 3104 E-mail: snagarajan@fau.edu
5. TA contact information	
<i>TA's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i>	Ishwarya Srikanth isrikanth2016@fau.edu Tuesdays and Wednesdays 11 a.m. to 12 p.m. https://fau.webex.com/meet/isrikanth2016 Join by phone +1-415-655-0003 US Toll Access code: 735 886 365
6. Course description	
This course gives an introduction to applications of terrestrial laser scanning systems in geosciences, engineering, urban planning, forestry, architecture, emergency planning and forensics.	
7. Course objectives/student learning outcomes/program outcomes	
<i>Course objectives</i>	The students will have strong understanding on 1) working principles of terrestrial laser scanning systems, 2) applying laser scanning to various engineering and science problems.
<i>Student learning outcomes & relationship to ABET 1-7 outcomes</i>	1. Ability to understand the principles of laser scanning (1, 6) 2. Ability to understand the sources of errors in laser scanning (1, 6) 3. Ability to understand the concepts of georeferencing/registration of laser scanning data (1, 6) 4. Ability to process point cloud data and make measurements (1, 3, 6)
8. Course evaluation method	
Lab exercises: 15% Assignments: 25% Project: 20% Exam: 40%	
9. Course grading scale	

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

93-100 = A
90-92 = A-
87-89 = B+
83-86 = B
80-82 = B-
77-79 = C+
73-76 = C
70-72 = C-
67-69 = D+
63-66 = D
60-62 = D-
0 – 59 = F

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](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

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

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

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

1. Lecture Slides
2. Lecture notes provided by instructor

18. Supplementary/recommended readings

1. Theory and practice on Terrestrial Laser Scanning, Training material based on practical applications, http://jllerma.webs.upv.es/pdfs/Leonardo_Tutorial_Final_vers5_ENGLISH.pdf
2. Airborne and Terrestrial Laser Scanning, ISBN 9781439827987, Editor(s): George Vosselman, Hans-Gerd Maas, Published: March 5, 2010 by CRC Press
3. Terrestrial laser scanning: Error sources, self-calibration and direct georeferencing, 2009, Yuriy Reshetyuk, ISBN-13: 978-3639175509, VDM Verlag (July 9, 2009)
4. Topographic Laser Ranging and Scanning: Principles and Processing. Jie Shan and Charles K. Toth (Eds.) CRC Press: Boca Raton, FL. 2009
5. Bahadır Ergün (2011). Terrestrial Laser Scanning Data Integration in Surveying Engineering, Laser Scanning, Theory and Applications, Prof. Chau-Chang Wang (Ed.), ISBN: 978-953-307-205-0, InTech, DOI: 10.5772/14728. Available from: <http://www.intechopen.com/books/laser-scanning-theory-and-applications/terrestrial-laser-scanning-data-integration-in-surveying-engineering>

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

Week 1: Principles of laser scanning technology
Week 2: Terrestrial laser scanning sensors, Scanning techniques
Week 3: Lab 1: Data collection with laser scanners (tentative)
Week 4: Georeferencing of terrestrial laser scanning data
Week 5: Lab 2: Laser Scanning data registration (tentative)
Week 6: Errors and calibration
Week 7: Co-registration of multiple scans, Positioning with GPS and INS
Week 8: Planning and field procedures

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

Week 9: Lab 3: Modeling and measuring with TLS data (tentative)
Week 10: Mid-term
Week 11: Data formats, modelling and surveying with TLS data
Week 12: Project proposal presentation
Week 13: Introduction to Mobile Mapping System
Week 14: Seminar on advanced topics
Final Project Presentation and Demo: (Apr 27) 7:00pm – 9:30pm

20. Academic Service Learning Statement

This course is designated as an “academic service-learning” course. The assistance you provide to the agency/organization during your academic service-learning (AS-L) experience is a service to the community and will allow you to apply knowledge from the course to local, national, and/or global social issues. Throughout this course you will be participating in AS-L activities while demonstrating civic engagement at campus, local, national, and/or global community levels. You will also reflect on your AS-L experience and the impact on the community as well as your professional development. Academic service-learning notation of hours will post to your transcript with submission of hours to your faculty instructor. An Academic Service-Learning Student Survey is required to be taken at the end of your AS-L project. Please visit the Weppner Center for LEAD & Service-Learning website, www.fau.edu/leadandserve, for the survey link and more information on FAU’s Academic Service-Learning program.

Minimum project hours: 10

Assumption of Risk Statement for Student* I understand that there are certain physical risks inherent in every form of service-learning. I understand the risks associated with this Academic Service-Learning assignment. I nonetheless agree to assume those risks so as to gain the benefits from participation in this valuable learning experience. I hereby release the State of Florida, the Board of Trustees, Florida Atlantic University and its agents and employees from any and all liability associated with my participation in this assignment at Florida Atlantic University.

Assessment of your performance in this aspect of the course is accomplished using your Professional Practice Assignments/Presentations/Reports, the Final Report, and Class Assignments, as evaluated using the rubrics at the end of this syllabus and also found in course LMS.

If you are selected to participate in the university-wide **Academic Service-Learning** program, you will be required to document a minimum of 10 hours of student service to the community agency.