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| **1. Course title/number, number of credit hours** |
| SUR4331-Digital photogrammetry principles and applications (2-credits) and SUR4331L-Digital photogrammetry principles and applications lab (1-credit) | 3 credit hours (2 credit hours for lectures and 1 credit hour for Lab) |
| **2. Course prerequisites, corequisites, and where the course fits in the program of study** |
| *Prerequisites*: SUR 2101L-Fundamentals of Surveying Lab AND SUR2101-Fundamentals of Surveying OR SUR2104C-Fundamentals of Surveying with minimum grade of “C”;The course provides an emphasis on using digital images for mappingCorequisite: SUR 4331L-Digital photogrammetry principles and applications Lab (1-credit) |
| **3. Course logistics** |
| *Semester*: Fall 2015This is a live, on-line 2-credit lecture course with companion in person 1-credit labClass time: Tuesday, 7PM – 10PM  |
| **4. Instructor contact information** |
| Dr. Sudhagar NagarajanCivil, Environmental and Geomatics EngineeringCollege of Engineering and Computer ScienceFlorida Atlantic University777 Glades Road, Building 36, Room 222Boca Raton, FL, 33431Phone: (561) 297 3104Fax: (561) 297 0493E-mail: snagarajan@fau.edu |
| **4. Course description** |
| 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 also provides an overview of digital photogrammetric principles and its applications in low altitude and close range mapping. |
| **5. Course objectives/student learning outcomes/program outcomes**  |
| *Course objectives* | 1. Ability to understand the basic geometry of vertical and near-vertical aerial imagery.
2. Ability to understand how to measure horizontal and vertical positions of objects visible in single and stereo vertical aerial images.
3. Ability to understand and perform flight planning.
4. Ability to understand and apply photogrammetry in various fields
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| *Student learning outcomes**& relationship to ABET a-k objectives* | 1. Ability to understand the basic geometry of vertical and near-vertical aerial imagery. (a, k).
2. Ability to understand how to measure horizontal and vertical positions of objects visible in single and stereo vertical aerial images.(a, e, k).
3. Ability to understand and perform flight planning. (a, b, c, k).
4. IV. Ability to understand and apply photogrammetry in various fields (a, b, c, d, g).
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| *Relationship to Geomatics Engineering educational objectives* | **Objective A: Practice geomatics engineering** within the general areas of boundary and land surveying, geographic information systems (GIS), photogrammetry, remote sensing, mapping, geodesy, and global navigation satellite positioning systems in the organizations that employ them. | H |
| **Objective B: Advance their knowledge** of geomatics engineering, both formally and informally, by engaging in lifelong learning experiences including attainment of professional licensure, and/or graduate studies. | H |
| **Objective C: Serve as effective professionals**, based on strong interpersonal and teamwork skills, an understanding of professional and ethical responsibility, and a willingness to take the initiative and seek progressive responsibilities. | H |
| **Objective D: Participate as leaders** in activities that support service to, and/or economic development of, the region, the state and the nation. | H |
| **6. Course evaluation method** |
| Midterm(s) 25%Final Exam 30%Term paper 5%Class Assignments, Laboratories 40%*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. |
| **7. Policy on makeup tests, late work, and incompletes** |
| Makeup tests 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 exam should be administered and proctored by department personnel unless there are other pre-approved arrangements.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. |
| **8. Special course requirements** |
| All assigned homework problems will be submitted on or before the posted time and will be graded on for completeness, correctness, and acceptable technical report form. Per day 10% penalty will be enforced for late submissions.Attendance at lectures and other designated sessions is mandatory. You are allowed one unexcused absence from these presentations. For each unexcused absence over one, 5% will be deducted from your overall grade for each occurrence. If you have a valid reason for missing a session, notify the instructor by e-mail. |
| **9. Disability policy statement** |
| In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton campus, SU 133 (561) 297-3880 and follow all OSD procedures. |
| **10. Honor code policy** |
| 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 unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at [www.fau.edu/regulations/chapter4/4.001\_Code\_of\_Academic\_Integrity.pdf](https://exchange.fau.edu/owa/redir.aspx?C=LzsrykF9ck2R7YW3fuHlLFIz-xy2T9IIh5f4wovKPUUefxEzEO-vRapGunabCX6L64O2eED8PJs.&URL=http%3a%2f%2fwww.fau.edu%2fregulations%2fchapter4%2f4.001_Code_of_Academic_Integrity.pdf" \t "_blank) |
| **11. Required texts/reading** |
| 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.
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| **16. Supplementary/recommended readings** |
| 1. Manual of Photogrammetry by J. Chris McGlone, Edward M. Mikhail, James S. Bethel, Roy Mullen, Fifth Edition 2004, American Society of Photogrammetry
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| **12. Course topical outline, including dates for exams/quizzes, papers, completion of reading** |
| Week 1: Course introduction; introduction to photogrammetry and its applicationsWeek 2: Digital Image acquisition Week 3: Measurement of position in images Week 4: Ground coordinate systems; geometry of vertical imagesWeek 5: Stereoscopic viewing and measurement of pairs of vertical images. Week 6: Analytical photogrammetryWeek 7: Digital AerotriangulationWeek 8: Mid-Term TestWeek 9: Introduction to Digital PhotogrammetryWeek 10: Radiometry and PhotometryWeek 11: Digital Image Orientation proceduresWeek 12: Digital image Calibration, LIDAR Week 13: Automatic 3D feature extractionWeek 14: Accuracy standards and testing Week 15: Low altitude photogrammetry |
| Lab1 : Digital Interior Orientation procedureLab 2: Using low cost cameras for mappingLab 3: Digital photogrammetric workstation projectLab 4: Automatic 3D surface extraction from stereo imagesLab 5: Processing UAV images for mapping |