

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

1. Course title/number, number of credit hours	
Surveying Data Analysis (SUR3643)	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
<i>Prerequisite: MAC2282 or MAC2312 with minimum grade of "C"; Corequisite: STA4032</i>	
3. Course logistics	
<p>Semester: Fall 2013 This is a live, on-line course Class time: Thursday, 7:10PM – 10:00PM</p>	
4. Instructor contact information	
<p>Dr. Mustafa Berber, P. Eng. Civil, Environmental and Geomatics Engineering College of Engineering and Computer Science Florida Atlantic University 777 Glades Road, Building 36, Room 213 Boca Raton, FL, 33431 Phone: (561) 297 3090 Fax: (561) 297 0493 E-mail: mberber@fau.edu</p>	
5. Course description	
Applications of mathematics in surveying. Measurement theory, analysis of measurements, computation, and adjustment of spatial data. Emphasis on computer applications for adjustments and analysis.	
6. Course objectives/student learning outcomes/program outcomes	
<i>Course objectives</i>	To provide a fundamental level of understanding of Geomatics data estimation, analysis and interpretation. To teach students the concepts and principles related to the adjustment of observations and the estimation of derived quantities.
<i>Student learning outcomes & relationship to ABET a-k objectives</i>	<ol style="list-style-type: none"> 1. Understand random error theory and statistical testing (a, b, e, k) 2. Apply error propagation and obtain optimum results using LSE (a, b, e, k) 3. Adjust Geodetic Networks and transform coordinates if needed (a, b, e, k) 4. Understand error detection and error ellipses (a, b, e, k) 5. Perform general Least Squares including 3D adjustment and combining Terrestrial and GPS observations (a, b, e, k)

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<i>Relationship to program outcomes</i>	<p>Outcome 1: An understanding of professional and ethical responsibility (Medium)</p> <p>Outcome 2: A working knowledge of fundamentals, engineering tools, and experimental methodologies (High)</p> <p>Outcome 3: An understanding of the social, economic, and political contexts in which engineers must function (Low)</p> <p>Outcome 4: An ability to plan and execute an engineering design to meet an identified need (High)</p> <p>Outcome 5: An ability to function on multi-disciplinary teams (Medium)</p> <p>Outcome 6: An ability to communicate effectively (Medium)</p> <p>Outcome 7: Graduates will have proficiency in the following areas of civil engineering: (i) structural engineering, (ii) transportation engineering, (iii) geotechnical engineering, (iv) water resources, and (v) environmental engineering (High)</p> <p>Outcome 8: Graduates will have an adequate appreciation for the role of civil engineering in infrastructure planning and sustainability including safety, risk assessment, and hazard mitigation (Medium)</p> <p>Outcome 9: Graduates will be successful in finding professional employment and/or pursuing further academic studies (High)</p>
7. Course evaluation method	
<p>Course attendance: 5%</p> <p>Assignments: 50%</p> <p>Mid-Term Test: 20%</p> <p>Final exam: 25%</p>	
8. Policy on makeup tests, late work, and incompletes	
<p>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.</p>	
<p>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.</p>	
9. Special course requirements	
<p>Assignments must be handed in on the due date. Per day 10% penalty will be enforced for all late submissions.</p>	
10. Classroom etiquette policy	
<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 class sessions.</p>	
11. Disability policy statement	
<p>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.</p>	
12. Code of Academic Integrity Policy	
<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</p>	

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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 http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf

13. Required texts/reading

Charles D. Ghilani (2010). Adjustment Computations: Spatial Data Analysis, 5th Edition, Wiley, New Jersey.

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

Week 1: Overview and Introduction to Measurements
 Week 2: Confidence Intervals and Statistical Testing
 Week 3: Propagation of Random Errors
 Week 4: Weights of Observations and Principles of Least Squares
 Week 5: Adjustment of Level Networks and Adjustment of Trilateration Networks
 Week 6: Adjustment of Triangulation Networks and Adjustment of Traverses and Networks
 Week 7: Mid-Term Test
 Week 8: Adjustment of GPS Networks and Coordinate Transformations
 Week 9: Error Ellipse and Constraints and Constraint Equations
 Week 10: Blunder Detection in Horizontal Control Networks
 Week 11: General Least Squares Method and Its Applications
 Week 12: 3D Geodetic Network Adjustment
 Week 13: Combining GPS and Terrestrial Observations
 Week 14: Analysis of Adjustments
 Week 15: Course Review