Spatial Computations and Adjustments GISC 4340
Department of Computing Sciences
Spring 2015

A. COURSE INFORMATION
   Course number/section: GISC 4340
   Class meeting time: Online Only
   Class location: N/A
   Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION
   Instructor: Tony Nettleman, PhD, JD
   Office location: CBI 105
   Office hours: M/W 11am – 2pm
   Telephone: TBA
   e-mail: Charles.Nettleman@gmail.com
   Appointments: email for times

C. COURSE DESCRIPTION
   Use of matrices for the solution of equations of geospatial phenomena. Theory of least squares adjustment of spatial data. Propagation of variances and statistical testing of adjustment solutions. Use of spatial data reduction software.

D. PREREQUISITES AND COREQUISITES
   Prerequisites
   GISC 2470-Plane Spatial Measurement I
   MATH 2413-Calculus I
   MATH 2342-Statistics for Physical & Life Sciences

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
   Required Textbook(s)

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
   Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more
efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Solve mathematical problems using arithmetic, algebra, linear algebra, trigonometry, and calculus
2. Describe how different mathematical techniques are used to adjustment surveying measurements
3. Compute and adjustment total station, GPS, and differential leveling surveying measurements
4. Detect blunders and differentiate blunders from errors
5. Describe three types of errors and three sources of errors
6. Compute adjustments, both using industry software and manual calculations, using the general method of least squares

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Knowledge and understanding will be assessed using skill checks, quizzes, and exams.

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Labs</td>
<td>70%</td>
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<tr>
<td>Quizzes</td>
<td>20%</td>
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<tr>
<td>Attendance and Skill Checks</td>
<td>10%</td>
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I. COURSE CONTENT/SCHEDULE

[Delete and insert a list of topics (by day or week) including dates, reading assignments, homework problems, or other activities. Indicate exam dates, holidays, and any other important dates for students such as the last day to drop the class.]

<table>
<thead>
<tr>
<th>DATE (WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>1</td>
<td>Overview and Introduction to Measurements</td>
<td>1</td>
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<td>2</td>
<td>Confidence Intervals and Statistical Testing</td>
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<td>3</td>
<td>Propagation of Random Errors</td>
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<tr>
<td>4</td>
<td>Weights of Observations and Principles of Least Squares</td>
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<td>5</td>
<td>Angles and Distances</td>
<td>7</td>
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<td>6</td>
<td>Adjustment of Triangulation Networks and Adjustment of Traverses and Networks</td>
<td>15</td>
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<tr>
<td>7</td>
<td>MIDTERM</td>
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<tr>
<td>8</td>
<td>Indirect Measurements</td>
<td>13</td>
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<tr>
<td>9</td>
<td>Error Ellipse and Constraints and Constraint Equations</td>
<td>19</td>
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<tr>
<td>10</td>
<td>Blunder Detection in Horizontal Control Networks</td>
<td>21</td>
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<td>11</td>
<td>General Least Squares Method and Its Applications</td>
<td>22</td>
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<td>12</td>
<td>Adjustment of Level Networks</td>
<td>14</td>
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<td>13</td>
<td>TBA</td>
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<tr>
<td>14</td>
<td>Analysis of Adjustments</td>
<td>25</td>
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<tr>
<td>15</td>
<td>Course Review</td>
<td>8-9</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.
J. COURSE POLICIES

Attendance/Tardiness
Lack of attendance will reduce final grade.

Late Work and Make-up Exams
None without a valid excuse.

Extra Credit
None.

Cell Phone Use
None.

Laptop Use
Laptops are permitted.

Food in Class
Food is permitted.

Missed Exam
Missed exams are not allowed to be made-up with prior approval.

Participation
Lack of participation will reduce final grade.

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

• Classroom/Professional Behavior
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students
engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning
environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

**L. OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.