Spring 1-1-2020

SET 404-452: Adjustment Computations II

Richard Carlson

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# SET 404 – Adjustment Computations II
## Spring 2020
### Syllabus

Online/Moodle (Section 452)
Instructor: Richard W. Carlson Jr., PLS, 201.841.2918, carlson@njit.edu

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Assign (Week)</th>
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<tr>
<td>1</td>
<td>01/21</td>
<td>Introduction – Least Squares Method</td>
<td>3.3-3.4(Mikhail)</td>
<td>HW1, Lab1</td>
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<td>2</td>
<td>01/27</td>
<td>Observation Equations</td>
<td>11.9-11.14</td>
<td>HW2, Lab2</td>
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<td>3</td>
<td>02/03</td>
<td>Adj. of Level Networks</td>
<td>12 &amp; 13</td>
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<td>4</td>
<td>02/10</td>
<td>Horizontal Networks</td>
<td>14,15&amp;16</td>
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<td>5</td>
<td>02/17</td>
<td>cont. &amp; GPS Networks</td>
<td>17.1-17.3,17.6-17.8</td>
<td>HW5/6, Lab 5/6</td>
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<td>6</td>
<td>02/24</td>
<td>Star*Net, Coordinate Transformations</td>
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<td>03/02</td>
<td>Condition Equations</td>
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<td>HW7, Lab7</td>
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<td>8</td>
<td>03/09</td>
<td>Example of Adj. using Cond. Equations</td>
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<td>03/15 – 03/22</td>
<td>Spring Break</td>
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<td>03/23</td>
<td>Midterm (will post test 03/16 – due 03/30)</td>
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<td>10</td>
<td>03/30</td>
<td>Combined (General) Adjustment</td>
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<td>04/06</td>
<td>Example of General Adjustment</td>
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<td>04/13</td>
<td>Intro to Stat. Analysis, Chi-Sq, t, F Distributions</td>
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<td>HW12-14,L12-14</td>
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<td>Review for Final</td>
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<td>05/04</td>
<td>Final Exam (will post test 05/02 – due 05/10)</td>
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**Description:**
This course will introduce the student to the concepts of observations and models as well as providing a continuation of the theory of least squares and the mathematical weighting of observations. Also included is the statistical evaluation of the least squares results.

**Textbook(s)/Material Required:**

**Grading:**
- Homework (10) 30%
- Lab/Weekly Report 10%
- Midterm 25%
- Final 35%

**Policies:**
Homework will be assigned at the beginning of each week (Monday) and due at the end of the week (Sunday night). A penalty will be assessed on late assignments and no credit will be given after the solution is posted.

“I__________________________as a student of New Jersey Institute of Technology, I will conduct myself in a professional manner and will comply with the provisions of the NJIT Academic Honor Code [available on the NJIT web site]. I also understand that I must subscribe to the following pledge on major work [when required by the instructor] submitted for credits as described in the NJIT Academic Code: ‘On my honor, I pledge that I have not violated the provisions of the NJIT Academic Honor Code.’ I also understand that the faculty place high importance on ethics and honor and pledge to submit only work that has been performed by myself except in assignments and projects where teamwork is required.”
COURSE NUMBER  SET 404

COURSE NAME  Adjustment Computations II

COURSE STRUCTURE  (3-0-4) (lecture hr/wk - lab hr/wk – course credits)

COURSE DESCRIPTION  This course will introduce the student to the concepts of observations and models as well as providing a continuation of the theory of least squares and the mathematical weighting of observations. Also included is the statistical evaluation of the least squares result.

OBJECTIVES  

1. To understand the concepts of adjustments of surveying observations by observation equations, condition equations and a combined method.
2. To effectively apply adjustment concepts to real-world surveying problems.
3. To understand the weighting of observations and the resultant statistical computations.
4. To introduce the student to the error ellipse.
5. To give the student a knowledge of statistical analysis of measurement.

COURSE LEARNING OUTCOMES (CLO)  The Course Learning Outcomes support the achievement of the following SET Student Outcomes and TAC of ABET Criterion 9 requirements

Student Outcome a - an ability to select and apply the knowledge, techniques, skills, and modern tools of their disciplines to broadly-defined engineering technology activities
CLO – 1, 2

Student Outcome b - an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
CLO – 3, 4

Student Outcome k - A commitment to quality, timeliness, and continuous improvement
CLO – 3, 5

Student Outcome l - an ability to utilize modern measurement technologies to acquire spatial data
CLO – 1, 4

Student Outcome m - an ability to utilize industry-standard software to solve technical problems
CLO – 4, 5

Student Outcome o – an ability to design and implement procedures, and analyze data for conformance with precision and accuracy requirements
CLO – 2, 3, 5

MODIFICATION TO COURSE  The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course Outline.

COURSE COORDINATED BY  Dr. L. Potts