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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

Week	Date	Topic	Readings	Assign (Week)
1	01/21	Introduction – Least Squares Method	3.3-3.4(Mikhail)	HW1, Lab1
2	01/27	Observation Equations	11.9-11.14	HW2, Lab2
3	02/03	Adj. of Level Networks	12 & 13	HW3, Lab3
4	02/10	Horizontal Networks	14,15&16	HW4, Lab4
5	02/17	cont. & GPS Networks	17.1-17.3,17.6-17.8	HW5/6, Lab 5/6
6	02/24	Star*Net, Coordinate Transformations	18	
7	03/02	Condition Equations	-----	HW7, Lab7
8	03/09	Example of Adj. using Cond. Equations	-----	
	03/15 – 03/22	Spring Break		
9	03/23	Midterm (will post test 03/16 – due 03/30)		
10	03/30	Combined (General) Adjustment	22	HW10, Lab10
11	04/06	Example of General Adjustment	22	HW11, Lab11
12	04/13	Intro to Stat. Analysis, Chi-Sq, t, F Distributions	4	HW12-14,L12-14
13	04/20	Conf. Int., Stat. Test, Error Ellipses, Blunder Det.	19, 21	
14	04/27	Review for Final		
15	05/04	Final Exam (will post test 05/02 – due 05/10)		

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:

- Adjustment Computations Spatial Data Analysis, Ghilani, Charles D. 5th Edition, John Wiley & Sons, Inc., 2010 ISBN 978-0-470-46491-5 (Required Text)**
- Supplemental Material (posted on Moodle) Analysis and Adjustments of Survey Measurements, Mikhail, Gracie, Van Nostrand Reinhold 1981.
- Star*Net Evaluation/Demo Version ([link](#)), Word, Excel.

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