The University of Southern Queensland

Course specification

Description: Survey Computations B						
Subject	Cat-nbr	Class	Term	Mode	Units	Campus
SVY	2105	44919	2, 2005	EXT	1.00	Toowoomba

Academic group: FOENS
Academic org: FOES05
Student contribution band: 2
ASCED code: 031101

STAFFING

Examiner: Kevin McDougall
Moderator: Frank Young

REQUISITES

Pre-requisite: SVY2106

RATIONALE

This course provides students with the necessary skills to collect, analyse and adjust survey measurement data for a variety of applications. The Least Squares technique is normally used to calculate adjusted values and precision indicators, with the results presented in one or more coordinate systems.

SYNOPSIS

A view of statistical theory is followed by its application to the analysis and adjustment of survey observations using the Least Squares method. Both manual methods, using hand held programmable calculators, and computer software packages are used to process the data from a variety of practical problems. Students are taught to analyse and understand the results of adjustments. The course examines the adjustment of terrestrial and GPS observations, coordinate transformations and computations on the UTM Map Grid.

OBJECTIVES

On completion of this course, students should be able to:

1. apply statistical concepts and techniques to the adjustment and analysis of survey data;
2. mathematically adjust survey networks by the method of least squares, using both manual methods and computer software packages;
3. analyse the stochastic model to determine the degree of precision of a survey;
4. complete computations on the UTM map grid.

TOPICS

	Description	Weighting (%)
1.	REVIEW OF RELEVANT STATISTICAL CONCEPTS Precision and accuracy, theory of errors, normal distribution, confidence limits, rejection criteria, T-Test, Fishers F-Test, Chi Square Test.	10.00
2.	INTRODUCTION TO LEAST SQUARES ADJUSTMENT Functional Models, linear and non linear, Stochastic Model, Concept of Weights, the Law of Propagation of Variances, Least Square description, curve fitting Linear Regression, Redundant Observations, Parametric Method of Least Squares, Limitations of Method.	15.00
3.	LEAST SQUARES APPLICATION 1-Dimensional network (Levelling); 2-D network (traverse, EDM calibration); 3-D network (GPS) networks). Coordinate Transformations	40.00
4.	ANALYSIS OF OBSERVATIONS Variance - Covariance matrices, "a priori" and "a posteriori" variance factors, correlation, error ellipses.	15.00
5.	OPTIMISATION OF NETWORKS Analysis of different results from different computer softwares.	5.00
6.	COMPUTATIONS ON THE AUSTRALIAN MAP GRID (AMG) and MAP GRID AUSTRALIA (MGA) Properties of AMG and MGA, bearings, azimuth, arc to chord correction, transformation of coordinates of one system to another (eg WGS 84 to AMG coordinates) using established transformation parameters, zone to zone transformations.	15.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

1980, *Eton Statistical and Math Tables*, 4th edn, Heinemann Publishers NZ Ltd,

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Harvey, BR 1991, *Practical Least Squares and Statistics for Surveyors*, School of Surveying University of NSW,

(Monograph 13)

Leick, A 1994, *GPS Satellite Surveying*, 2nd edn, John Wiley & Sons, New York.

Mikhail, EM & Gracie, G 1981, *Analysis and Adjustment of Survey Measurements*, Van Nostrand Reinhold, New York.
(ISBN 0-442- 25369-9)

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	50.00
Directed Study	48.00
Examinations	3.00
Private Study	54.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT 1	250.00	25.00	29 Aug 2005
ASSIGNMENT 2	250.00	25.00	10 Oct 2005
3 HOUR OPEN EXAMINATION	500.00	50.00	END S2 (see note 1)

NOTES

1. Student Administration will advise students of the dates of their examinations during the semester.

IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2 Requirements for students to complete each assessment item satisfactorily:
To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assessment item.

3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 20% of the total marks available for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade a student must achieve at least 50% in each of the summative assessments and at least 50% of the available weighted marks for the summative assessment items.

5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.

6 Examination information:

In an Open Examination, candidates may have access to any material during the examination except the following: electronic communication devices, bulky materials, devices requiring mains power and material likely to disturb other students.

7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.

8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ Handbook.

ASSESSMENT NOTES

1 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.

2 Students must retain a copy of each item submitted for assessment. This must be despatched to USQ within 24 hours if required by the Examiner.

3 In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.

4 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.

5 The Faculty will NOT accept submission of assignments by facsimile.

6 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.

7 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.

8 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded one of the temporary grades: IM (Incomplete - Make up), IS (Incomplete - Supplementary Examination) or ISM (Incomplete -Supplementary Examination and Make up). A temporary grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.

9 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).