



The University of Southern Queensland

## Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.  
Please consult the web for updates that may occur during the year.

### Description: Introduction to Global Positioning System

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
SVY	1110	90708	2, 2009	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES05
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	031101

### STAFFING

Examiner: Albert Kon-Fook Chong  
Moderator: Peter Gibbings

### RATIONALE

Throughout the centuries, people have sought a simple way of determining where they are on Earth, and where they are heading. Positioning and navigation have always been one of the most basic problems facing civilisation. Today GPS has provided us with the ability to know where we are and where we are heading. GPS provides this worldwide navigation service by using a constellation of satellites orbiting the Earth. It is essential that surveyors, GIS specialists, and other casual users be familiar with the fundamentals of GPS and that they have a sound understanding of its uses, and the accuracy achievable by different GPS observation and reduction techniques.

### SYNOPSIS

The use of the Global Positioning System (GPS), for accurately determining positions on earth, has grown exponentially since the late 1980s and early 1990s. Today GPS is firmly entrenched in the general operations of professional surveying and GIS organisations. This course presents fundamental information on structure, characteristics and use of GPS and other Global Navigation Satellite Systems (GNSS). Background information is provided and the basic principles of using the GNSS systems are introduced. The course has a bias towards the code observable and the use of GPS for asset mapping, but several sections dealing with higher accuracy measurement techniques make this course relevant to a wide range of students. Consequently, the information will be relevant to those seeking fundamental knowledge in areas of general GPS surveying, agriculture, machine guidance, mapping and general data collection.

### OBJECTIVES

The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. discuss the features and applications of GPS and its importance in society today; (Exam)

2. define coordinates systems likely to be encountered by GPS users and calculate and discuss GPS coordinates; (Assignment 1 and Exam)
3. describe global satellite navigation systems, satellite orbital characteristics, and satellite signal structure; (Exam)
4. define the fundamental characteristics of GPS and outline its development; (Exam)
5. discuss the principles of GPS observations, make observations using a GPS receiver, and calculate and analyse findings; (Assignment 1 and Exam)
6. explain GPS observations techniques, and calculate and evaluate levels of accuracy associated with GPS observations; (Assignment 1 and Exam)
7. demonstrate an understanding of error sources in GPS observations, and explain the uses and critical factors of Differential GPS techniques; (Assignment 1 and Exam)
8. identify and discuss project planning features when using GPS, and discuss the key steps in planning a GPS data collection project for asset mapping; (Assignment 1 and Exam)
9. explain GPS data collection and processing procedures, including Differential GPS, and evaluate collected and processed data; (Assignment 1 and Exam)
10. describe the use of GPS for asset mapping, and other common uses; (Assignment 1 and Exam)

## TOPICS

	Description	Weighting (%)
1.	Introduction	5.00
2.	GPS Coordinates	10.00
3.	GPS Fundamentals	15.00
4.	Code observable	15.00
5.	Differential GPS	15.00
6.	Phase observable	10.00
7.	Project Planning	10.00
8.	Collection and Processing	10.00
9.	Asset Mapping and other Applications	10.00

## 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).

## 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.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	30.00
Directed Study	48.00
Examinations	2.00
Private Study	75.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	200.00	20.00	14 Sep 2009
PART A OF 2 HOUR CLOSED EXAM	400.00	40.00	END S2 (see note 1)
PART B OF 2 HOUR CLOSED EXAM	400.00	40.00	END S2

### NOTES

1. The 2 hour examination is in two parts. Part A requires an Examination Answer Sheet. Part B requires an Answer Booklet. 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 C-) for each assessment item.
- 3 Penalties for late submission of required work:  
If students submit assignments after the due date without extenuating circumstances then a penalty of 5% of the assigned mark may apply for each working day late up to a maximum of ten working days at which time a mark of zero can be recorded for that assignment.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of receiving a passing grade in a course a student must obtain at least 50% of the total weighted marks for the course.
- 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 a Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination.
  - 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/SECARIAT/calendar/Part5/> or on USQ online handbook.

## **ASSESSMENT NOTES**

- 1 The due date for an assignment is the date by which a student must despatch the assignment to USQ. The onus is on the student to provide proof of the dispatch 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. The following temporary grade may be awarded: IDM (Incomplete Deferred Make up).

## **OTHER REQUIREMENTS**

- 1 Students will require access to e-mail and internet access to USQ Connect for this course.
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