



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: Engineering Problem Solving 2

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ENG	2102	90285	2, 2009	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOENSV
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	039999

### STAFFING

Examiner: John Worden  
Moderator: Lyn Brodie

### REQUISITES

Pre-requisite: ENG1101

### RATIONALE

This is the second of four courses that use a 'problem based learning approach' to extend the students knowledge of the complex world of engineering. In course ENG1101 Engineering Problem Solving 1, the student was introduced to the concept of systems analysis and used a number of given case studies to acquire relevant knowledge and skills. This course now enhances the students skills in team-work, communications, systems analysis and engineering problem solving. The four courses seek to continuously develop distinct engineering skills that surround and incorporate a range of different content material. Student learning is to be driven by the need to solve various engineering problems employing design concepts. The student learning experience will be different in this course to other more traditionally taught courses in the program. The principles of problem-based learning (PBL) acknowledge prior knowledge and encourage self-directed learning. Today's engineers must actively pursue life-long learning which requires this latter attribute. Thus students will 'learn how to learn' so that they are better able to apply problem-solving to new situations in the workplace and in the community throughout their professional career. This course is intended to develop the student's skills in problem solving within an engineering design context. A number of real world problems are analysed in a systematic way. It is intended that this course will develop a student's ability for independent learning. The student will undertake a sequence of problem solving tasks, working as part of a team. The student will also need to develop an understanding and application of analytical tools as prescribed in this course.

### SYNOPSIS

This course will increase a student's ability to work as part of an engineering team. It presents a range of engineering theory and applications through engineering design concepts that are learnt within the context of solving a range of real world problems. This course focuses primarily on the

use of statistical analysis to analyse data, propose solutions, solve problems and to evaluate possible solutions. In addition the student is required to further develop their computer skills (especially Excel) to illustrate and present the results of their work.

## **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. work as part of a multi-disciplinary and multi-cultural team to analyse, research, synthesise and evaluate solutions for defined engineering and surveying problems and systems (Report 1, Report 2);
2. contribute as part of a team working on defined engineering and surveying problems to develop engineering design solutions (Report 1, Report 2,);
3. appraise and reflect on team roles and group dynamics, and the self-learning journey (Report 1, Report 2, Portfolio of Reflections);
4. earn the trust and confidence of colleagues through the competent and timely completion of allocated tasks within resource constraints (Report 1, Report 2, Portfolio of Reflections);
5. lead a team, value the views of other members and facilitate decision making in team situations to solve an engineering problem or complete a project (Report 1, Report 2);
6. undertake a program of self-directed independent learning to acquire the necessary learning within an allocated sub-discipline area to contribute to the team's solution of the set problem. This knowledge should be communicated to other team members by means of mentoring during regular team meetings (Report 1, Report 2, Portfolio of Reflections, Online Test);
7. demonstrate the ability to apply appropriate Engineering, Mathematical and Statistical principles and techniques on an individual basis (Online Test);
8. work as part of a team to apply appropriate engineering, mathematical and statistical techniques to explain phenomena encountered in the set range of problems, utilising the knowledge base gained from individual self-learning (Report 1, Report 2);
9. describe the characteristics of a solution that will resolve a problem (Report 1, Report 2);
10. communicate findings in an appropriate technical format (Report 1, Report 2);
11. establish individual learning/project planning/team related strategies (Report 1).

## TOPICS

	Description	Weighting (%)
1.	<b>ENGINEERING AND SURVEYING PROBLEM SOLVING</b> Analyse, research, propose and evaluate solutions, for technical problems/systems as part of a team. Particular skills to be developed/enhanced will vary for each individual and may include the use of the computer as a tool for problem solving, research and presenting material in a professional manner; basic statistics applied to given or researched data; and physical science/engineering principles as a tool for understanding complex systems. Specific topics may include:  1.1. Spreadsheets and Wordprocessing.  1.2. Use of the Internet.  1.3. Use of the WWW and Library facilities.  1.4. Statistical Distributions.  1.5. Statistical Relationships.  1.6. Producing and Evaluating Statistical Data.  1.7. Map Interpretation.  1.8. Basic Electromagnetic Theory.  1.9. Project Management/Leading teams.  1.10. Engineering principles applied to problems employing design concepts.	100.00

## 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).

Students will need access to a computer for this course with the following facilities: access to the Internet and email on a weekly basis; Microsoft Office software or similar.

Moaveni, S 2008, *Engineering fundamentals - an introduction to engineering*, 3rd edn, Thomson Publishers,

## 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.

Eide, AR, Jenison, RD, Mashaw, LH & Northup, LL 2002, *Introduction to Engineering Design and Problem Solving*, 2nd edn, McGraw Hill,

Gottfried, BS 2007, *Spreadsheet tools for engineers using Excel*, 3rd edn, McGraw Hill,

Greenlaw, R & Hepp, E 1999, *Introduction to the Internet for Engineers*, McGraw Hill,

Smith, KA 2000, *Project Management and Teamwork*, McGraw Hill,

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	45.00
Directed Study	110.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ONLINE TEST 1 (STATISTICS)	100.00	10.00	14 Aug 2009 (see note 1)
REPORT 1 (PLANNING)	300.00	30.00	21 Aug 2009
ONLINE TEST 2	200.00	20.00	16 Oct 2009 (see note 2)
REPORT 2 (FINAL)	300.00	30.00	23 Oct 2009
PORTFOLIO OF REFLECTIONS	100.00	10.00	30 Oct 2009

### NOTES

1. This summative on-line test will be opened for three days from 14/8/09 to 16/8/09. It will test that mastery of statistics concepts is adequate prior to final report preparation.
2. The summative on-line test will be opened for three days from 0600 hours on 16/10/2009 to 2400 hours on 18/10/2009. Formative on-line tests will be available to independently assist students to assess their mastery of concepts and acquired learning during the semester.

## IMPORTANT ASSESSMENT INFORMATION

### 1 Attendance requirements:

This course employs a team-based approach to learning in which students are expected to participate in small groups towards the solution of a number of engineering problems. On-campus students are expected to attend and participate appropriately in all activities scheduled for them.

### 2 Requirements for students to complete each assessment item satisfactorily:

To satisfactorily complete an individual assessment item a student must achieve at least 50% of the marks or a grade of at least C-. (Depending upon the requirements in Statement

- 4 below, students may not have to satisfactorily complete each assessment item to receive a passing grade in this course.)
- 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:  
There is no examination in this course.
  - 7 Examination period when Deferred/Supplementary examinations will be held:  
As there are no examinations in this course, there will be no deferred or supplementary examinations.
  - 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. (a) Since all three report assessments are team-based, no team extensions will normally be granted on the basis of a single team member's illness or incapacity. It is expected that the team will devise alternative solutions to cover the shortfall in allocated duties or roles amongst other team members. (b) The examiner may vary this requirement only when there are substantial grounds such as re-forming of teams due to high levels of student withdrawals or attrition. (c) Individual submissions such as the portfolio of reflections will not be bound by these strictures and the examiner may at his/her discretion grant such extensions of the due date as are compatible with the timely reporting of final grades.
- 4 In this course students must submit all team and individual assignments electronically in the format specified in the assignment requirements. Clear file designation and naming protocols must be adhered to at all times.
- 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 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.
- 8 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).

### **OTHER REQUIREMENTS**

- 1 Students will require access to email and have internet access to UConnect for this course.
  - 2 Students are required to prepare a portfolio of reflections on their individual learning in the course. This portfolio may be audited and the examiner may require any student to submit this portfolio from week 2 onwards.
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