**Description: Engineering Problem Solving 1**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-Nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
</tr>
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<tr>
<td>ENG</td>
<td>1101</td>
<td>10546</td>
<td>1, 2002</td>
<td>EXT</td>
<td>1.00</td>
<td>TW MBA</td>
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**Academic Group:** FOENS

**Academic Org:** FOENSV

**HECS Band:** 2

**ASCED Code:** 039999

**STAFFING**

Examiner: Lyn Brodie

Moderator: Mark Porter

**RATIONALE**

This course represents an introduction to the complex world of engineering. It is the first of four such courses that will be presented using a ‘problem based learning approach’. These courses seek to 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. The student learning experience will be different in this course to other more traditionally taught courses in the program. Problem-based learning was developed in the 1950's and 1960's in order to improve the quality of education by shifting from a subject and lecture-based curriculum to an integrated curriculum structured around ‘real life’ problems which crossed traditional discipline boundaries. Problem-based learning is now used world-wide in higher education in areas such as medicine and health studies, architecture, computing, engineering and business. The principles of problem-based learning encourage students to use their existing knowledge in order to learn and the process of enquiry fosters self-directed learning. 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. [http://www.csd.uwa.edu.au//newsletter/issue0496/pbl.html](http://www.csd.uwa.edu.au//newsletter/issue0496/pbl.html)

It is intended to introduce this basic approach to problem solving within an engineering context. The concept of a system is introduced and used to show how most complex problems can be reduced to a set of inter-relating sub-systems, which are solvable using a range of problem solving approaches. The student is introduced to some basic concepts that will form the foundation for their future engineering development. Understanding of skills in the measurement of physical properties such as temperature, flow and pressure will be developed together with applications of basic statistics. In addition an understanding of the use of computers is introduced within the engineering work environment. The use of teamwork is emphasized as the normal work situation in engineering tasks.
SYNOPSIS

This course introduces the student to some important measurement and analytical tools that will provide the basis for future work. The student will be introduced to the concept of a system and to the need for teamwork in most engineering activities. Aspects of physical properties are explained together with statistical concepts and both these are applied to the analysis of complex systems. The course is presented as an initial introduction to problem based learning, and the use of teamwork is emphasized throughout. All students are expected to contribute to and interact in a positive manner with other team members. This interaction is assessed.

OBJECTIVES

On successful completion of this course students will be able to:

- Co-operate and participate in a team working on defined technical problems.
- Identify the requirements for leadership in a successful team.
- Apply an understanding of group dynamics by negotiating, establishing and documenting roles and timelines for a given task.
- Seek and evaluate the input of other team members.
- Apply prior knowledge and experience to assist in solving a problem as part of a team, recognising the value of such prior knowledge from team members with diverse backgrounds.
- Identify and use appropriate scientific and mathematical techniques and procedures to explain phenomena encountered in the set range of problems.
- Communicate results in an acceptable professional manner.
- Outline the requirements for measuring physical properties.
- Apply basic statistics to analyse measurements and examine the variation that occurs in properties.
- Distinguish between "data" and "information"
- Use a computer for general communication and the production of technical reports.
- Define the concepts of Systems Analysis.
- Apply systems analysis to well defined simple systems/problems.
- Evaluate and solve simple technical problems.

TOPICS

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tbody>
<tr>
<td>1. Engineering and Surveying Problem Solving Solve/analyse a number of 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; basic physics as a tool for understanding complex systems and an introduction to measurement. Specific topics may include . Windows Operating System . Computer Terminology . Spreadsheets and Wordprocessing . Use of the Internet . Use of the WWW and Library facilities . Statistical Distributions . Statistical Relationships . Producing</td>
<td>100.00</td>
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**TEXT and MATERIALS required to be PURCHASED or ACCESSED:**

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at http://bookshop.usq.edu.au by entering the author or title of the text.

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.

Resources kit containing at least the following texts:


**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**

<table>
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<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Assessment</td>
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<tr>
<td>Directed Study</td>
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</tr>
<tr>
<td>Tutorial</td>
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**ASSESSMENT DETAILS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks Out of</th>
<th>Wtg(%)</th>
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<td>04 Mar 2002</td>
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<td>REPORT 4</td>
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</table>
NOTES:
1. Further details about the due dates are detailed in the assessment section of the Course Specifications.
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3. Further details about the due dates are detailed in the assessment section of the Course Specifications.
4. Further details about the due dates are detailed in the assessment section of the Course Specifications.
5. Further details about the due dates are detailed in the assessment section of the Course Specifications.

OTHER REQUIREMENTS
1. The final grades for students will be assigned on the basis of the aggregate of the marks obtained for each of the assessments in the course.
2. To be certain of gaining a passing grade in this course, students must: gain at least 50% of the total marks available and a minimum of 30% for each of the assignments.
3. This course employs a team-based approach to learning in which students must participate in small groups towards the solution of a number of engineering problems. To meet the team based objectives of the course, students studying on-campus will have to participate in at least 80% of the scheduled activities. External students must participate in their assigned group activities through the USQ electronic discussion group for the course on at least a weekly basis. Contributions to this group will be monitored and assessed.
4. Students are required to prepare a portfolio of reflections on their individual learning in the course which will be assessed at the end of semester. However, this portfolio may be requested by the examiner at anytime throughout the semester to monitor student progress and provide feedback to the students. The portfolio will be further developed in subsequent Problem Based Learning courses.
5. The time specified in Student Workload allocated to Tutorials/ Workshops should be dedicated to interaction/communication with other team members.
6. The Due Date for assessments is the date by which a student must dispatch an assignment to the USQ. The onus is on the students to provide proof of the dispatch date, if requested by the Examiner.
7. In accordance with University's Policy on Assignments (Regulation 5.6.1), the Examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances. This policy may be found in the USQ Handbook or the Distance Education Study Guide. All students are advised to study and follow the guidelines associated with this policy.
8. Students must retain a copy of any assignment submitted. This must be produced within 48 hours if required by the Examiner.
9. 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 the temporary grade: IM (Incomplete - Make up). An IM 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.

10 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; IDSM (Incomplete Deferred Examination and Make-up).