STAFFING
Examiner: John Billingsley
Moderator: Nigel Hancock

RATIONALE
There is an expectation that students who complete postgraduate studies would be equipped to undertake research and development work. This requires an ability to analyse and evaluate information to determine its usefulness, and to apply information appropriately in their research. It is also necessary to be able to develop a systematic investigation that will result in sound conclusions being drawn and to formulate a research proposal. This course will enable students to build knowledge of the process of engineering and surveying research and the tools that are available to facilitate the conduct of that research, and to develop some basic research skills. For students who are undertaking or intending to progress to the Master of Engineering Technology the proposal prepared in this course will form the basis of their research project and dissertation (course "ENG8002 Project and Dissertation"). For Master of Engineering (MENG) Master of Geomatic (MGEO) students undertaking this course, the proposal prepared in this course will be based on their research project.

SYNOPSIS
The course provides students with the ability to (critically) evaluate research literature including conference papers and journal articles in order to determine the current state of knowledge. In addition, the course will instruct students in the principles of research to enable them to conduct research and prepare an original project in their professional area of interest. Students will be instructed how to propose and justify an appropriate research plan for a particular research problem, to choose and apply appropriate methodology, to judge the degree to which conclusions are supported by data, to judge the logical consistency of written material and evaluate the outcome of a research project in terms of useable knowledge, and to design, defend and evaluate research proposals, and to apply techniques for writing clear and well expressed technical papers and reports.
OBJECTIVES

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

- use information systems effectively;
- judge the degree to which conclusions are supported by data and the logical consistency of written material, and to write a critical review of the relevant literature;
- understand and analyse the ethical issues raised in a range of research situations, and have a clear appreciation of the foundations of ethics in research;
- propose and justify an appropriate research plan for a particular research problem;
- choose and apply an appropriate experimental design to a particular research problem;
- perform standard statistical analyses;
- understand and apply a range of standard techniques for instrumentation and data acquisition;
- understand the principles of good writing, and be able to analyse and edit technical papers written by others;
- prepare a well written and concise research paper or report;
- develop and write a research proposal for their discipline area; and
- (if appropriate) commence their project (course ENG8002 Project and Dissertation) in the semester following based on the proposal developed.

TOPICS

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tr>
<td>1. Research in Engineering and Surveying</td>
<td>3.00</td>
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<tr>
<td>2. Information Systems</td>
<td>5.00</td>
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<tr>
<td>3. Literature Surveys and Reviews</td>
<td>8.00</td>
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<td>4. Ethical Issues</td>
<td>10.00</td>
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<td>5. Preparation of Research Plans</td>
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<td>6. Instrumentation and Data Acquisition</td>
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<td>7. Design of experiments and statistical analysis</td>
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<td>8. Good writing and analysis of technical papers</td>
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<tr>
<td>9. Writing Research Papers and Reports</td>
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<td>10. Development of Research Proposals</td>
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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.

Coley, S. M. & Scheinberg, C. A 2000, Proposal Writing, 2nd edn, Newbury Sage Publications,

Day, R. A 1995, How to Write and Publish a Scientific Paper, 4th edn, Cambridge University Press,

Leedy, P. D 2001, Practical Research: Planning and Design, 7th edn, Merrill Prentice Hall,

Montgomery, D. C 2001, Design and Analysis of Experiments, Wiley & Sons,


STUDENT WORKLOAD REQUIREMENTS:

<table>
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<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
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<td>Assessment</td>
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<td>Directed Study</td>
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<td>Private Study</td>
<td>42.00</td>
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<td>Report Writing</td>
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ASSESSMENT DETAILS

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<th>Due date</th>
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<td>ASSIGNMENT 1</td>
<td>250.00</td>
<td>25.00</td>
<td>23 Apr 2004</td>
</tr>
<tr>
<td>ASSIGNMENT 2</td>
<td>250.00</td>
<td>25.00</td>
<td>04 Jun 2004</td>
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<tr>
<td>RESEARCH PROPOSAL</td>
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IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
   (i) 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. (ii) Students must participate in discussions posted on the USQOnline site in WebCT.

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

3 Penalties for late submission of required work:
   If students submit assignments after the due date without prior approval then a penalty of 10% of the total marks gained by the student for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:
   (i) To be assured of receiving a passing grade a student must submit all of the summative assessment items and achieve at least 50% of the available weighted marks for those items. (ii) Student who do not qualify for a Passing grade may, at the discretion of the Examiner, be assigned additional work to demonstrate to the Examiner that they have achieved the required standard. It is expected that such students will have gained at least 45% of the total marks available for all 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:
   There is no examination in this course.

7 Examination period when Deferred/Supplementary examinations will be held:
   Not applicable.

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 produced within five days 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 In this course students may submit assignments electronically in the format specified in the assignment requirements.

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 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.

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).