Description: Signal Processing

<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>
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<td>ELE 3107</td>
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<td>14600</td>
<td>2, 2002</td>
<td>WEB</td>
<td>1.00</td>
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**Academic Group:** FOENS
**Academic Org:** FOES04
**HECS Band:** 2
**ASCED Code:** 031399

**STAFFING**
Examiner: John Leis
Moderator: Jim Ball

**PRE-REQUISITES**
Pre-requisite: ELE2103

**SYNOPSIS**
Signal processing is the treatment of signals to enable detection, classification, transmission or enhancement. Such signals may, for example, be the apparent noise generated by a mechanical process, music, speech or other audio, or a video image. This course aims to give the student a thorough grounding in the theoretical and practical aspects of digital signal processing. Practical applications of signal processing are emphasised via directed experimentation and assignment work.

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

- distinguish clearly between a deterministic and a random or stochastic signal;
- describe any signal probabilistically in terms of amplitude and spatial, frequency or temporal functions;
- calculate the functions as indicated in 2 above for any deterministic signal;
- collect sufficient and appropriate data from a range of physical systems and analyse this data to make predictions about the system;
- apply the methods of mathematical statistics to solve appropriate problems of an engineering nature within their chosen major;
- explain the basic concepts of information theory;
- deduce appropriate digital filter algorithms for a signal conditioning problem;
- exploit the rapid conversion of signals to and from the frequency domain;
- extend the foregoing concepts to multi dimensional signal processing;
• be able to implement signal processing algorithms using a programming language.

TOPICS

<table>
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<tr>
<th>Description</th>
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<tr>
<td>1. Fourier analysis</td>
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<td>2. Random processes</td>
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<td>3. Digital signal processing</td>
<td>50.00</td>
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<td>4. Information theory</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.

MATLAB, Student Edition, Version 5 or later.


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.


Williams, C. S. 1986, *Designing Digital Filters*, Prentice-Hall,

STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Assessment</td>
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<tr>
<td>Examinations</td>
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<td>Private Study</td>
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ASSESSMENT DETAILS

<table>
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<tr>
<th>Description</th>
<th>Marks Out of</th>
<th>Wtg(%)</th>
<th>Required</th>
<th>Due Date</th>
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<tr>
<td>ASSIGNMENT 1</td>
<td>200.00</td>
<td>20.00</td>
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<td>06 Sep 2002</td>
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<td>ASSIGNMENT 2</td>
<td>200.00</td>
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<td>3 HOUR CLOSED EXAMINATION</td>
<td>600.00</td>
<td>60.00</td>
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NOTES:
3. Student Administration will advise students of the dates of their examinations during the semester.

OTHER REQUIREMENTS

1. A basic competence in a high-level computer language such as MATLAB is assumed.
2. In order to complete this course successfully a student must normally obtain 50% of the marks in both the individual assessments and overall.
3. A minimum standard of communication skills must be demonstrated in order for a passing grade to be achieved.
4. The due date for an assignment is the date by which a student must submit the assignment to the USQ. The onus is on the student to provide proof of the submit date, if requested by the Examiner.
5. Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
6. 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.
7. Students who wish to apply for an extension to an assignment date must do so in writing before the due date.
8. If students submit assignments after the due date without prior approval then a penalty of up to 10% of the total marks for the assignment will apply for each working day late.
9. 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.
10. The Faculty of Engineering and Surveying will NOT accept submission of hand written or typed assignments by facsimile, e-mail or computer diskette. Students in remote locations who do not have regular access to postal services may be given special consideration.
11. 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.
12. A closed examination is an examination where the candidates are allowed to bring only writing and drawing instruments into the examination.
13. The Faculty of Engineering and Surveying does not offer supplementary examinations.
14 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.

15 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).