ELEC9721
Digital Signal Processing Theory

COURSE INTRODUCTION— session 2, 2008

Course Staff
Course convener: Dr. E. Aboutanios, room EE308, elias@unsw.edu.au

Consultations: Students are encouraged to use the open consultation hour rather than contact by email; students may seek consultation with the course convener at other times by appointment.
Consultations: Wednesdays, 12pm–1pm, room EE308

Course details
Credits: The course is a 6 UoC post-graduate course.
Contact hours: The course consists of 3 hours of lectures per week which also include the tutorials. The tutorials will be held every second week in the last hour of the lecture starting from week 2.
Lectures: Thursdays, 6pm–9pm, room EE418

Course Information
Context and aims
ELEC9721 Digital Signal Processing and Applications, is a 6 UoC post-graduate course, that aims to give students the fundamentals of digital signal processing as well as exploring some important and illustrative applications. We will start by defining and understanding signals which will enable us to see the need and aims of processing them. We will then study a number of signal processing tools and the mathematical concepts they are based on. Finally we study some applications in order to elucidate the concepts learned. Topics from the following list will be covered: digital signals; digital filter design; statistical and adaptive signal processing; multi-rate systems and filterbanks; time-frequency analysis; sub-band and wavelet transforms; DSP applications.

Assumed knowledge: Although the course has no pre-requisites, a basic knowledge of linear algebra and statistical theory is highly desirable and will facilitate the handling of the introduced concepts by the students.
Old courses: The course replaces previous course ELEC9342.

Learning outcomes
Upon successfully completing the course, the student should have an appreciation of the fundamentals of Digital signal processing as well as knowledge of some of its applications. The student should then be familiar with signals and transforms, vector spaces and inner products, filters, random variables and statistical signal processing, and time-frequency analysis among other topics.
Teaching strategies
The primary method of material dissemination will be the lectures and tutorials. The tutorials will be run every second week in the last hour of the lecture starting in week 2. The tutorial questions for each class will be posted on the website one week prior to the class. The lectures and tutorials will also be reinforced with a quiz and a project that are intended to examine the student's progress and understanding during semester.

Assessment
There are three components of the assessment in this course:

Quiz:
There will be one quiz accounting for 10% of the subject total mark. The quiz will be held in the first hour of the lecture on week 7 (11 September) and will cover all material up to and including week 6.

Project:
The project will count 25% towards the final mark. It will be posted on the subject website on Monday 18 August and discussed in the lecture in week 4 (21 August) and the project submission deadline is 5pm Monday 13 October (week 11). The project is to be submitted by email and a printed copy of the report is to be handed in to the school office (The hard copy will be stamped with the date and time by the person in the school office. This date and time will be used to penalise late submissions). Also the email submission is not valid until you get an email acknowledgment from me. This is to avoid problems and to make sure that I have received your project. This acknowledgement constitutes your receipt. If you do not receive it by 12pm Tuesday 14 October, contact me by email, by phone on x55010, or come and see me in my office.

Final examination:
The final exam will count 65% towards your final mark.
Course Schedule

The preliminary lecture program is shown in the table below. Note that this program is subject to change as required.

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<tr>
<th>week</th>
<th>Date</th>
<th>Class</th>
<th>topic</th>
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<tbody>
<tr>
<td>0:</td>
<td>23/07</td>
<td>Lecture</td>
<td>Orientation and Background</td>
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<tr>
<td>2:</td>
<td>07/08</td>
<td>Lecture</td>
<td>Ch3 – Systems and Signal Characterisation in the z-Domain</td>
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<td>3:</td>
<td>14/08</td>
<td>Lecture</td>
<td>Ch4 – Digital Filters and Structures</td>
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<td>4:</td>
<td>21/08</td>
<td>Lecture</td>
<td>Ch5 – Digital Filter Design</td>
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<td>5:</td>
<td>28/08</td>
<td>Lecture</td>
<td>Ch6 – Finite Word Length Effects</td>
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<td>6:</td>
<td>04/09</td>
<td>Lecture</td>
<td>Ch7 – The Discrete Fourier Transform</td>
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<td>7:</td>
<td>11/09</td>
<td>Lecture</td>
<td>Ch8 – Random Processes and Power Spectral Estimation</td>
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<td>8:</td>
<td>18/09</td>
<td>Lecture</td>
<td>Ch9 – Linear Prediction and Adaptive Filtering.</td>
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<td>9:</td>
<td>25/09</td>
<td>Lecture</td>
<td>Ch10 – Multirate Signal Processing</td>
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<td>10:</td>
<td>09/10</td>
<td>Lecture</td>
<td>Ch11 – Time-Frequency Analysis</td>
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<td>11:</td>
<td>16/10</td>
<td>Lecture</td>
<td>Revision</td>
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<td>12:</td>
<td>23/10</td>
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Resources for Students

Recommended textbook

On-line resources
The subject website is located under https://subjects.ee.unsw.edu.au/. This is an internal access website. Offsite access requires the student's unipass. This website is a very important resource and the students are required to regularly check it for announcements and posting of relevant material.

Other Matters

Academic Honesty and Plagiarism
Plagiarism is the unacknowledged use of other peoples work, including the copying of assignment works and laboratory results from other students. Plagiarism is considered a serious offence by the University and severe penalties may apply. For more information about plagiarism, please refer to http://www.lc.unsw.edu.au/plagiarism.
Continual Course Improvement
Students are advised that the course is under constant revision in order to improve the learning outcomes of its students. Please forward any feedback (positive or negative) on the course to the course convener or via the Course and Teaching Evaluation and Improvement Process.

Administrative Matters
On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrolment, rights, and general expectations of students, please refer to the School policies, see http://scoff.ee.unsw.edu.au/.