ELEC9722
Digital Image Processing

COURSE INTRODUCTION—session 1, 2008

Course Staff
Course convener: Dr. E. Aboutanios, room EE325, 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: Tuesdays, 6pm–7pm, room EE325

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 EEG24

Course Information
Context and aims
ELEC9722 aims to give the students the fundamentals of digital image processing, covering topics from the following list: image models and physical imaging systems; visual perception; rendering systems; linear filtering; linear transforms; mathematical morphology; compression; tomographic image reconstruction; inverse problems in imaging; image enhancement; edge detection; feature extraction; and geometric diffusion.

Assumed knowledge: Although the course has no pre-requisites, a basic knowledge of signal processing concepts is highly desirable and will facilitate the handling of the introduced concepts by the students. Brief review of
Old courses: The course replaces previous course ELEC9350.

Learning outcomes
Upon successfully completing the course, the student should have an appreciation of the fundamentals of Digital image processing including the topics of filtering, transforms and morphology, and image analysis and compression. The student should be able to implement basic image processing algorithms in MATLAB.

Teaching strategies
The primary method of material dissemination will be the lectures and tutorials. The tutorials will be run as needed during lecture times and students will be advised of a tutorial at least a week before. The lectures and tutorials will also be reinforced with a quiz and a project which are intended to examine the student's progress and understanding during semester.
Assessment
There are three components of the assessment in this course:

Quizzes:
There will be two quizzes each counting 10% towards the subject total mark.

Project:
The project will count 20% towards the final mark. It will be handed out in the lecture in week 3 and the project submission deadline is 12pm (midday) Friday 30 May (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 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, contact me by email, by phone on x55010, or come and see me in my office.

Final examination:
The final exam will count 60% 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.

<table>
<thead>
<tr>
<th>week</th>
<th>topic</th>
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<tbody>
<tr>
<td>1: Ch1</td>
<td>Introduction to Image Processing, introduction to 1D and 2D dimensional filtering.</td>
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<tr>
<td>2: Ch2</td>
<td>Imaging systems. Models, sampling, interpolation and resampling.</td>
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<tr>
<td>3: Ch3</td>
<td>LSI filtering and the Fourier Transform. FIR filters, the FFT, FIR Filter Examples.</td>
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<td>4: Ch4</td>
<td>Colour Representation and Display. Colour imaging systems, perception, representations.</td>
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<td>5: Ch5</td>
<td>Morphology.</td>
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<td>6: Ch6</td>
<td>Introduction to image analysis.</td>
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<td>7: Ch7</td>
<td>Image Transforms. Second Order Statistics and the KLT, the DCT, pyramid transforms, wavelet transforms.</td>
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<td>8: Ch7</td>
<td>Image Transforms, continued.</td>
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<td>9: Ch6</td>
<td>Image Analysis. Edge detection, segmentation, pattern matching, classification</td>
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<td>10: Ch6</td>
<td>Image Analysis, continued. Ch8</td>
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<tr>
<td>11: Ch8</td>
<td>Image compression, continued. Introduction to video compression. Ch9</td>
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<tr>
<td>12:</td>
<td>Revision.</td>
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Resources for Students

Recommended textbook

On-line resources
The subject website is located at https://subjects.ee.unsw.edu.au/elec9370/. 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 heath and safety, enrolment, rights, and general expectations of students, please refer to the School policies, see http://scoff.ee.unsw.edu.au/.