

MODULE TITLE: 4C8 Digital Media Processing

CODE: EE4C08

LEVEL: Senior Sophister (Mandatory module)

CREDITS: 5

LECTURER(S): Professor Anil Kokaram (anil.kokaram@tcd.ie)

MODULE ORGANISATION

Semester	Start Week	End Week	Associated Practical Hours	Lectures		Tutorials	
				Per week	Total	Per week	Total
2	1	12	0	3	33	1	11
Total Contact Hours: 44							

MODULE DESCRIPTION

This module builds on ideas in DSP as they apply to higher level system concepts in the application area of Digital Media Systems. Students begin with an introduction to digital video processing algorithms that form the core of important devices such as the iPod, SKY set top boxes and the DVD/BluRay player. Attention is also given to emerging technology in digital cinema postproduction where hardware/software co-design issues are increasingly becoming relevant for the Digital Intermediate Workflow. Core aspects of this technology will be discussed within the context of implementation on embedded devices e.g. ARM cores for the consumer market. There will be guest lectures given by some of the major industry names involved in broadcast visual product manufacture e.g. BBC, SONY and The Foundry. By the end of this module, students should have a basic knowledge of MPEGx, Motion Estimation, Film Pre-production and Visual Media storage systems/formats. Also included in this module is an introduction to the rapidly evolving use of 3D visual media in consumer broadcasting.

LEARNING OUTCOMES

On completion of this module, the student will be able to:

- describe the elements of current media broadcast formats;
- describe the building blocks of emerging compression systems and select processing modules to enable efficient compression;
- design building blocks for image up/down sampling;
- implement a simple motion estimator in Matlab, and the essential building block in an embedded device, and assess its performance for real image sequences;
- diagnose problems leading to visual quality degradation in visual communications systems.

RECOMMENDED TEXT(S)

- *Digital Signal processing for Multimedia Systems*, Parhi and Nishitani, Marcel Dekker, 1999
- *Digital Video an Introduction to MPEG2*, Haskell, Puri and Netravali, Chapman and Hall, 1997
- *JPEG2000*, Acharya and Tsai, Wiley, 2005
- *Two Dimensional Image Processing*, J Lim, Prentice Hall

TEACHING STRATEGIES

The teaching strategy for this module is a mixture of lectures, problem-solving laboratories and interactive class demonstrations. During tutorials, students work on design problems with the aid of the lecturer. Material covered in classes preceding the tutorial are examined and questions relating to this are posed by the lecturer. Once a realistic attempt has been attempted by the class, the lecturer then proceeds to go through the solution piecemeal, encouraging the students to actively engage in questioning the proposed solutions and its merits based on material presented in class.

ASSESSMENT

The final written end-of-year examination counts for 70% of overall mark with the remaining 30% comprised of continuous assessment made from laboratory work and one design problem. Note that it is expected that the student should be able to complete the problems posed in laboratories during the timetabled hours.