Data, Audio, Graphics and Image Signal Processing with MATLAB

Module No: CM0268


About This Course

METHODS OF TEACHING:

- Single Module
- Up to 22 one hour lectures
- Labs — Multimedia Lab (C 2.10) 1 hour per student weekly from week 2 to 11 (11-12pm, 1-2pm, 2-3pm Fridays).

Assessment

- Exam 70%
  - 2 hr Exam End of Spring Semester
- Coursework 30%
  - One Digital Signal Processing Mini-Project





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Practical Work

Assessed Coursework

A small assessed practical programming "mini-project" based on **Multimedia digital audio signal processing** will also be incorporated.

It will build upon lab exercises.

Important Dates:
Hand Out: Week 4
Hand In: Week 11


Lab Classes

MATLAB programming help sessions

Try out Lecture/Tutorial examples

Extended reasoning and programming through Lab Worksheet Questions

Build a solid basis for Assessed Coursework

Lab classes are compulsory.

All Lecture and Lab Class material is Examinable




Course Web Site

http://www.cs.cf.ac.uk/Dave/CM0268/

- PDFs of Slides (Colour)
- PDF — Additional Notes, Lab Worksheets, *etc.*.
- Lots of Links to related material
- Under Development — More to be added




Precusor Module for Year 3 Modules

CM0340 : Multimedia

CM0304 : Computer Graphics

CM0311 : Image Processing

CM0363 : Evolutionary Computing

CM0368 : Scientific Computing

CM0369 : Machine Vision

which either use MATLAB as a base programming language and/or build on some theory developed in this module.




Aims of Module

- To give students a broad grounding in MATLAB programming and associated theory with applications in data, audio, graphics and image signal processing.
- To provide selected continuous mathematical and programming skills necessary for a computer scientist specialising in Multimedia, Graphics, Image Processing or Scientific Computing.




Syllabus Outline

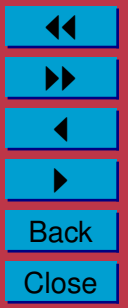
MATLAB Programming :
IDE, Basic MATLAB functions, Vectors, Arrays/Matrices
MATLAB Graphics: 2D/3D plotting
MATLAB GUIs: Dialogs, Uicontrol elements, callbacks.

Basic Digital Signal Processing : Analogue and Digital signals, Sampling, Waveforms and Filtering, Applications to Filtering (Audio and Images)

Digital Audio Signal Processing : Audio Effects.
E.g. Equalisers, Wah-Wah, Phasing, Vibrato, Modulation, Distortion, Reverb

Basic Geometric Computing for Computer Graphics : 2D/3D Coordinates, Curves, Tangents, Normals, Geometric shape

Linear Algebra : Linear systems, Least Squares Fit, Geometric Transformations

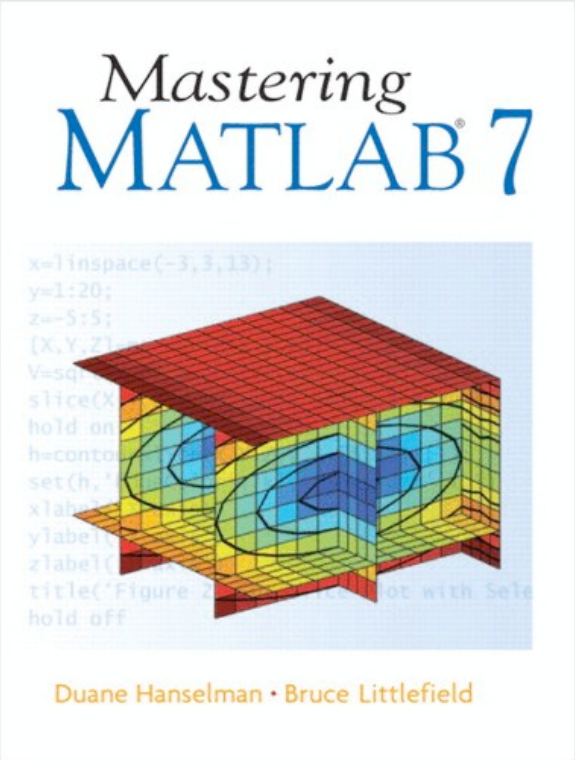


Recommended Course Book

Mastering MATLAB
Duane C. Hanselman and Bruce L. Littlefield
Prentice Hall, 2004
(ISBN-13: 978-0131857148)

Excellent coverage of Basic MATLAB programming

Copies in library



Other Texts Used In This Module

DAFX: Digital Audio Effects
Udo Zolzer
John Wiley and Sons Ltd , 2002
(ISBN-13: 978-0471490784)

Excellent coverage of audio signal processing effects and synthesis
plus a lot more
All MATLAB examples
Expensive but copies in library