CE 208   ADVANCED COMPUTER APPLICATIONS IN ENGINEERING
Co-ordinator: Professor R.J. Sobey (Room 330), r.j.sobey@imperial.ac.uk

Lecturers: Professor R.J. Sobey (Room 330)

Structure: A 20 contact hour sequence of combined lecture/computer laboratories in the Autumn Term.

Links: see below

Aims
Computation is a fundamental tool in modern civil and environmental engineering. This module builds on all engineering and mathematics modules in Year 1. It provides a coursework focussed introduction to MATLAB and its application to problem solving in civil and environmental engineering. Students will be introduced to a modern general−purpose engineering/scientific software platform, using MATLAB as the context. The students will learn, by hands−on experience, concepts of computer assisted engineering computation, graphical presentation and programming. Examples and problems will be drawn from Year 1 and Year 2 courses.

Links with Other Course Modules
The computational background provided by this module will become an implicit element of instruction and coursework in almost all courses in Year 2, 3 and 4.

SYLLABUS
The instructional sessions will cover the following topics:
1. Introduction, Script files
2. Scalars and scalar operations; Vectors and vector operations
3. Files and file operations; Functions − internal, user−defined and function functions.
4. Graphics − XY, interpolation, XYZ, Animation.
5. Programming − Relational operators, Logical operators and functions, Conditional structures, Algorithms and pseudocode, Strings, Loop structures, Vectorized code
6. Calculus and Differential Equations − numerical Differentiation, numerical Integration, Ordinary Differential Equations
7. Introduction to Advanced Applications − Matrices and Systems of Linear Equations, Statistics, Analytical calculus

Coursework
Coursework assignments each week of the Autumn Term.

Assessment
By coursework assignment. There is no written examination.

Recommended Textbooks
MAGRAB, E. et al (2000), An Engineer's Guide to MATLAB, Prentice Hall.
PALM, W.J. (2001), Introduction to Matlab 6 for Engineers, McGraw−Hill.
PRATAP, R (2002), Getting Started with MATLAB, Oxford University Press.

Learning Outcomes
Intellectual skills: rational organization of and progression through an engineering problem. Practical skills: experience in computer−assisted engineering problem solving. Transferable/key skills: establish/reinforce skills in computer literacy, an essential skill in modern engineering.