The University Of Sheffield.

Electronic & Electrical Engineering.

EEE226 ENGINEERING SOFTWARE DESIGN

Credits: 10

Course Description including Aims

This module builds on the C programming learned in year 1 by exploring both the higher level issues of programming, modelling, and embedded programming. The aim is to develop in students the habits of object orientation (e.g. modularity, data hiding, etc.) using C and MATLAB, both commonly used industry standard tools, and writing software for embedded systems. This is done in the belief that these are skills that a 'normal' Electronic Engineer should possess. Three mini projects using C and MATLAB and drawn from across the department are used as a focus for the various activities and to enable students to demonstrate achievement of the module outcomes.

Outline Syllabus

Program structure and organisation;
Approaches to design (e.g. waterfall, spiral, concurrent, agile) and associated tools and methodologies;
Verification and validation;
Modelling;
Hierarchical design: Object orientation (e.g. modularity, data hiding/scope);
Libraries/Toolboxes/interfaces and reuse;
Embedded concepts (relevant to C) e.g. interrupts, hardware support. Real-time software and operating systems;
Projects: small problems looking at modeling aspects (i.e. Matlab) or embedded design targeted towards microcontroller-based systems accentuating interfacing with sensors and control of a larger system.

Time Allocation

100 hours in total with 1 lecture and 1 practical classe per week for 24 weeks (including case studies), and additional set of 24 hours of open access practical classes. There is the assumption of a further 24 hours of independent practical work and 4 hours for reporting of the mini-projects.

Recommended Previous Courses

Knowledge equivalent to first year C programming (part of EEE160).

Assessment

Assessment will be via three mini projects with a 5% allocation for attendance in the labs.

Recommended Books

Objectives

By the end of the unit, a candidate will be able to:

1 Use standard languages in a practical context, confidently (as evidenced by a student's ability to address the final year project)

2 Design and implement a well-structured program for a 'small' hardware/software system mindful of real-time constraints.

3 Use Matlab effectively for modeling problems congruent to various aspects of electronics