CI514

Embedded Systems

Module Aims & Objectives

- Introduce Students to the hardware Architecture of embedded processors.

- Enable students to understand the architecture of embedded processors and their interactions with peripheral hardware.

- Enable students to develop application programs in assembly and C languages.

Module Content

- Basic elements and functions of Microcontrollers.
- Microcontroller systems architecture.
- Internal registers, embedded memory architecture.
- Input/output (Ports) interfacing in an embedded platform.
- Interrupts (Hardware/Software). Interrupts handling.
- Analogue to Digital conversion. Timer/Counter functions.

- Assembler environment. Assembly process.
- Simple assembly program developments.
- Uploading and executions of assembly programmes.
- Development environment for C Language for embedded platforms.
- Application program developments in C.

Learning Outcomes

1: **Explain the architecture of embedded processors.**

2:

Identify the basic elements in hardware development tools for embedded platforms.

3:

Demonstrate an understanding of hardware/software interaction using assembly language.

4:

Develop real-time application programs using a range of programming techniques and tools.

Assessment tasks

There are two assessments for the whole module as learning Journals and each contributes 50% to the final grade.

Each learning journal consists of a number of practical exercises in the lab.

Task1(Semester One)

Task 1 (50%) Assessing the learning outcomes 1,2,3 Using 'C' language

- **Exercise 1:**
- Familiarisation Contribution to Final grade (10%)

- **Exercise 2:**
- Traffic light simulation
  Contribution to Final grade (10%)

- **Excersise 3:**
- Number Sorting
  Contribution to Final grade (15%)

- **Exercise 4 :**

- Array Sorting & Assembly_Language
  Contribution to Final grade (15%)

Task 2 (Semester Two)

- **Task 2 (50%) Assessing the learning outcomes 1,2,3 Using Assembly language**

- **Exercise 1:**
- Traffic light simulation

  Contribution to Final grade (2%)

- **Excersise 2:**
- Number Sorting

  Contribution to Final grade (15%)

- **Exercise 3 :**

- Array Sorting & Assembly_Language

  Contribution to Final grade (15%)

Module Leader

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