EMBEDDED SYSTEMS (Minor Elective-III)

Semester III (Computer Engineering)
SUB CODE: MECE302-A

Teaching Scheme (Credits and Hours):

Teaching scheme				Total	Evaluation Scheme					
L	T	P	Total	Credit	Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
03	00	02	05	04	3	70	30	20	30	150

LEARNING OBJECTIVES:

The objective of this course is to introduce students to the following concepts of

- Describe the Introductory and Fundamental issues of Real time systems.
- Understand the core theories underlying the development of practical real time and embedded systems
- Discuss the Important features of commercial Embedded Systems.
- Explain the network for Embedded Systems.
- To study different issue with Embedded Systems.

OUTLINE OF THE COURSE:

Unit No	Topics
1	Introduction:
2	General-purpose processors: Software
3	Standard single-purpose processors: Peripherals
4	Custom single-purpose processors: Hardware
5	Memories
6	Interfacing
7	Computation models
8	ARM Processor

Total hours (Theory): 45

Total hours (Practical): 30

Total hours: 75

DETAILED SYLLABUS:

Sr. No	Topic	Lecture Hours	Weight age (%)
1	**Introduction:** Design challenge – optimizing design metrics, Embedded processor technology, IC technology, Design technology.	04	10
2	**General-purpose processors: Software:** Basic architecture, Pipelining, Programmer's view, Microcontrollers, Selecting a microprocessor.	05	15
3	**Standard single-purpose processors: Peripherals:** Timers, counters, and watchdog timers, UART, Pulse width modulator, LCD controller, Keypad controller, Stepper motor controller, Analog-digital converters, Real-time clocks	05	15
4	**Custom single-purpose processors: Hardware** Combinational logic design, Sequential logic design, Custom single-purpose processor design.	05	15
5	**Memories:** Read-only memory – ROM, Read-write memory – RAM, Memory hierarchy and cache.	05	10
6	**Interfacing** : Timing diagrams, Hardware protocol basics, Arbitration.	08	10
7	**Computation models :** Sequential program model, State machine model, Concurrent process model, Other models.	08	15
8	**ARM Processor**	05	10

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

STUDENTS LEARNING OUTCOMES:

On successful completion of the course, the student will:
1. Understand how the Embedded Systems require most of the knowledge acquired during their study.
2. Develop a firm and enlightened grasp of concepts of different issues related with network and database.
3. Apply the ideas, the techniques, and the knowledge acquired for the purpose of Research on area of real time system.
4. Working skills in theory and application of Embedded Systems.

REFERENCE MATERIAL:

Books:
1. Embedded System Design: A Unified Hardware/Software Approach by Frank Vahid and Tony Givargis
2. Computer as Components principals of Embedded computing system Design by Wayne Wolf
3. David E Simon, " An embedded software primer ", Pearson education Asia, 2001
4. Dreamteach Software team," Programming for Embedded Systems"
5. J.W. Valvano, "Embedded Microcomputor System: Real Time Interfacing"