SCHEME OF COURSE WORK

Course Details:

Course Title	**:Embedded Systems**		
Course Code	**:13EE2203**	**L T P C**	**:4 1 0 3**
Program:	**: M.Tech**		
Specialization:	**: Power Electronics &Drives**		
Semester	**:1**		
Prerequisites	**:Basic Knowledge on microcontrollers**		
Courses to which it is a prerequisite	**:---------**		

Course Outcomes (COs):

At the end of the course, the student will be able to

CO1	Describe the design aspects of Embedded Systems.
CO2	Describe the fundamentals of 8051 architecture
CO3	Explain the working of Real Time Operating Systems
CO4	Analyze the design process of Real time Operating systems.
CO5	Describe the advanced architectures of ARM and SHARC processors

PROGRAMME OUTCOMES(POs):

PO1	The graduate will be a professional workforce in the areas of "Static Power Electronics Converters", "Power Electronic Converter fed Electrical Drives" and "Power Quality".
PO2	The graduate will be able to apply soft computing techniques for Power Electronic Systems and Electric Drives
PO3	The graduate will be trained to understand large scale Power Electronic Converter Systems, Electric Drives and issues involved through modeling, analysis and simulation
PO4	The graduate will be able to apply present day techniques and tools to solve Power electronic and electric drives problems relevant to India and other countries
PO5	The graduate will be able to use state-of-the-art simulation tools such as PLEXIM, SABER, OPAL-RT Lab, DSPACE, MULTISIM, LABVIEW and other Tools
PO6	The graduate will be capable of contributing positively to collaborative and multidisciplinary research to achieve common goals.
PO7	The graduate will demonstrate knowledge and understanding of power system engineering and management principles and apply the same for efficiently carrying out projects with due consideration to economical and financial factors.
PO8	The graduate will be able to communicate confidently, make effective presentations and write good reports to engineering community and society.
PO9	The graduate will recognize the need for life-long learning and have the ability to do it independently.
PO10	The graduate will become aware of social issues and shall contribute to the community for sustainable development of society.
PO11	The graduate will be able to independently observe and examine critically the outcomes of his/her actions and apply corrective measures subsequently and move forward positively through a self corrective approach

Course Outcome Versus **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO-1	M	S	M	S	S	S	S	M	S
CO-2	S	S	M	S	M	S	S	M	M
CO-3	M	S	M	S	M	S	S	S	M
CO-4	S	S	S	M	M	M	S	M	S
CO-5	S	M	M	S	S	S	M	M	S

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction,Complex Systems and microprocessor	1	How complex systems are designed using microprocessor	▫ Lecture through Black Board & LCD ▫ Discussion	Seminar/Mid test
2	The embedded system design process,Formalisms of Embedded system design process	1	Explain the process of design of embedded systems	▫ Lecture through Black Board & LCD ▫ Discussion	Seminar/Mid test
3	Introduction to 8051 microcontroller and its hardware	2	Explain about hardware of 8051 microcontroller	▫ Lecture through Black Board & LCD ▫ Discussion	Seminar/Mid test
4	I/O ports and circuits,external memory,Counter and timers,serial data I/O,interrupts	2	Explain counters ,timers of 8051	Lecture through Black Board & LCD Discussion	Seminar/Mid test
5	ALP, Tools and techniques ,programming 8051	2	xplain how to program 8051	Lecture through Black Board & LCD Discussion	Seminar/Mid test
6	Instructions,Operations,Interfacing with keyboard,A/D and D/A	2	Explain the program for interfacing 8051 with keyboard	Lecture through Black Board & LCD Discussion	Seminar/Mid test
7	Task and Task states,Task and Data, Semaphores and shared data Message Queues	3	Describe semaphores, message queues with examples	Lecture through Black Board & LCD Discussion	Seminar/Mid test
8	Mail boxes and pipes Timer functions, events ,memory management	3	Explain mailboxes, timer functions	Lecture through Black Board & LCD Discussion	Seminar/Mid test
9	Interrupt routines	3	Explain interrupt routines	Lecture through Black Board & LCD discussion	Seminar/Mid test
10	**Mid Test -1**				
11	Principles, Semaphores and queues, hardRTOS, memory and power, host and target machines	4	Explain about hard real time scheduling considerations	Lecture through Black Board & LCD Discussion	Seminar/Mid test
12	Linker. Locators for embedded software	4	Explain about linkers, Locators	Lecture through Black Board & LCD Discussion	Seminar/Mid test
13	Debugging techniques	4	Explain process of testing on host machines	Lecture through Black Board & LCD	Seminar/Mid test

				Discussion	
14	ARM and SHARC processors,memory organization bus protocols,I2C bus,CAN bus	5	Expain the architecture of ARM processor	Lecture through Black Board & LCD Discussion	Seminar/Mid test
15	Internet enabled Systems	5	Explain about internet enabled systems.	Lecture through Black Board & LCD Discussion	Seminar/Mid test
16	Design example-1	5	Explain any design example with SHARC processor	Lecture through power point &LCD discussion	Seminar/Mid test
17	Design example-2	5	Explain any design example with ARM processor	Lecture through power point &LCD discussion	Seminar/Mid test
18	**Mid Test-2**				
19/20	END EXAM				