



## Sub Committee - Specialization for Curriculum Development

### Post Graduate/ Under Graduate

**Course Name:** Real Time Operating System

**(UG/PG):** UG

**Number of Credits:** 4

**Level:** 3

**Learning Objective(s):** This course will help students to understand basic concepts, building blocks for embedded systems. It also teaches how to write program and peripheral interfacing of PIC microcontroller and develop the applications. . It covers the fundamental elements of real-time multitasking embedded application software design and development. The course teaches necessary skills to develop software for embedded computer systems using a real-time operating system.

#### **Pedagogy:**

- Lectures
- Class work discussion
- Case studies
- Video sessions
- Presentations
- Research by students

#### **Pre-learning:**

#### **Course Content:**

Sr. No.	Topic	Hours.
1.	Introduction to embedded system, Significance of ES, classifications of embedded systems, challenges and design issues in embedded systems, functional blocks	7
2.	Difference between generic computing and embedded computing, Microprocessor and Microcontroller, Memory and IO interfaces, functionalities for system design	8
3	RTOS : Real Time Operating System	10

	Why RTOS, RTOS Task and Task state –Multithreaded Preemptive scheduler- Process Synchronization, Message queues- Mail boxes -pipes – Critical section – Semaphores – Classical synchronization problem – Deadlocks  REAL TIME MODELS Event Based – Process Based and Graph based Models	
4	Principles – Design issues – Polled Loop Systems – RTOS Porting to a Target – Comparison and Basic study of various RTOS like – VX works – Linux supportive RTOS	15
5	RTOS APPLICATION DOMAINS  Case studies, Alarm clock, RTOS for network communication, fault tolerant application, RTOS control system  Project design and development	20
	<b>Total</b>	<b>60</b>

### Books Recommended:

1. James K.Peckol, "Embedded system Design",JohnWiley&Sons,2010
2. Elicia White,"Making Embedded Systems",O'Reilly Series,SPD,2011
3. Mohamammad Ali Mazidi & Mazidi ` 8051 Microcontroller and Embedded Systems',  
Pearson Education

### Suggested Evaluation Methods:

Quiz Examination  
Written Examination  
Group Projects  
Viva

### Benchmarked against similar courses in other national/ international universities /organizations

S.No.	Name of the course	Name of University where it was offered
<u>1</u>	Embedded System	University of Twente, Netherlands

Name of Member					
Designation					
Org. / Inst.					
Signature					

Name of the Expert:

Signature:

Date: