

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME – I Year (Spl Digital Communication) Semester- A			
Subject Code & Name	Instructions Hours per Week			Credits			
	L	T	P	L	T	P	Total
DCR1E3 Embedded RTOS	3	1	0	3	1	0	4
Duration of Theory Paper: 3 Hours							

**Objective:** provide an understanding of general embedded system concept, Embedded Software development, RTOS essentials, advantages and trade-offs. It will provide practical experience necessary to use an RTOS in an embedded system development

**Prerequisites :** Operating system, Microcontrollers and C Programming

### COURSE CONTENTS

#### UNIT – I:

##### Introduction

Introduction to UNIX/LINUX, Overview of Commands, File I/O ( open, create, close, lseek, read, write), Process Control ( fork, vfork, exit, wait, waitpid, exec).

#### UNIT - II:

##### Real Time Operating Systems

Brief History of OS, Defining RTOS, The Scheduler, Objects, Services, Characteristics of RTOS, Defining a Task, Tasks States and Scheduling, Task Operations, Structure, Synchronization, Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use

#### UNIT - III:

##### Objects, Services and I/O

Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem

#### UNIT - IV:

##### Exceptions, Interrupts and Timers

Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines (ISR), Soft Timers, Operations.

##### Embedded Firmware:

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

#### UNIT - V:

##### Case Studies of RTOS

RT Linux, MicroC/OS-II, Vx Works, Embedded Linux, Tiny OS, and Basic Concepts of Android OS.

#### Books Recommended:

- [1]. Real Time Concepts for Embedded Systems – Qing Li, Elsevier, 2011
- [2]. Embedded Systems- Architecture, Programming and Design by Rajkamal, 2007, TMH.
- [3]. Advanced UNIX Programming, Richard Stevens
- [4]. Embedded Linux: Hardware, Software and Interfacing – Dr. Craig Hollabaug