Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME I Year Electronics (Sp. Digital Instrumentation) Semester- B			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
DIP3G2:Embedded Real Time Operating Systems (RTOS)	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
Duration of Theory Paper: 3 Hours	**3**	**1**	**0**	**3**	**1**	**0**	**4**

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.

Text Books and References

[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