

Devi Ahilya University, Indore, India Institute of Engineering & Technology				III Year B.E. (Computer Engg.) (Full Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
CER5E4 Embedded Systems	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Objectives:

To impart knowledge on the following Topics:

1. Building Blocks of Embedded System
2. Various Embedded Development Strategies
3. Bus Communication in processors, Input/output interfacing.
4. Various processor scheduling algorithms.
5. Basics of Real time operating system.

Prerequisite:

Understanding of Digital Electronics, Basics of Analog Electronics, C/C++ Programming skills, Understanding of at least one Micro-controller or Micro-processor.

COURSE CONTENTS

UNIT I

Introduction to Embedded Systems –Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

UNIT II

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols RS232 standard – RS42 – RS 485 – CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C) –used for device drivers.

UNIT III

Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modeling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

UNIT IV

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multiasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing-, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance.

UNIT V

Case Study of Washing Machine- Automotive Application- Smart card System Application- ATM machine –Digital camera

Learning Outcomes:

After completion of the course the students will have ability to understand and analyse, linear and digital electronic circuits.

BOOKS RECOMMENDED:

- [1] Rajkamal, ‘Embedded System-Architecture, Programming, Design’, Mc Graw Hill, 2013.
- [2] Peckol, “Embedded system Design”, John Wiley & Sons,2010
- [3] Lyla B Das,” Embedded Systems-An Integrated Approach”, Pearson, 2013
- [4] Shibu. K.V, “Introduction to Embedded Systems”, Tata Mcgraw Hill,2009.
- [5] Elicia White,” Making Embedded Systems”, O’ Reilly Series,SPD,2011.
- [6] Tammy Noergaard, “Embedded Systems Architecture”, Elsevier, 2006.
- [7] Han-Way Huang, ”Embedded system Design Using C8051”, Cengage Learning,2009.
- [8] Rajib Mall “Real-Time systems Theory and Practice” Pearson Education, 2007.