

COURSE CODE	COURSE TITLE	L	T	P	C
1153EC104	REAL TIME OPERATING SYSTEMS	3	0	0	3

Course Category:

Allied Elective(3)

a. Preamble:

This Course deals with fundamentals of Operating Systems, implementation aspects of real time concepts and few applications on RTOS.

b. Prerequisite Courses:

Problem Solving using C
Microprocessor & Microcontroller

c. Related Courses:

Embedded System Design
Embedded Processors

d. Course Educational Objectives :

- To make the student learn fundamentals of Operating Systems,
- Providing the knowledge on the implementation aspects of real time concepts
- Providing the knowledge to build few applications on RTOS.

e. Course Outcomes :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Explain the fundamentals of interaction of OS with a computer and User computation	K2
CO2	Explain the fundamental concepts of how process are created and controlled with OS	K2
CO3	Describe the programming logic of modeling Process based on range of OS features	K2
CO4	1.Develop the target system by porting RTOS 2.Compare types and Functionalities in commercial OS,	K3 K2
CO5	Application development using RTOS	K3

f. Correlation of COs with POs :

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	L										
CO2	H	M	L									
CO3	M	L	L									
CO4	H	L										
CO5	M	M	L									

H- High; M-Medium; L-Low

g. Course Content :

UNIT I: REVIEW OF OPERATING SYSTEMS

9

Basic Principles - Operating System structures – System Calls – Files – Processes – Design and Implementation of processes – Communication between processes – Introduction to Distributed operating system -Distributed scheduling-Fault & recovery.

UNIT II: OVERVIEW OF RTOS

9

Multiple Processes in an Application – Multiple Threads in an Application - Task and Task state – Shared data – Interprocess Communication - Semaphores - Message queues– Mail boxes -pipes

UNIT III: REAL TIME MODELS AND LANGUAGES

9

Event Based – Process Based and Graph based Models – Real Time Languages – RTOS Tasks –RT scheduling - Interrupt processing – Synchronization – Control Blocks – Memory Requirements.

UNIT IV: REAL TIME KERNEL

9

Principles – Design issues – Polled Loop Systems – RTOS Porting to a Target – Comparison and Basic study of various RTOS like – VX works – Linux supportive RTOS – C Executive.

UNIT V: APPLICATION DEVELOPMENT USING OS

9

Basics of Linux supportive RTOS – uCOS-C Executive for development of RTOS Application –introduction to Android Environment -The Stack – Android User Interface – Preferences, the File System, the Options Menu and Intents, with one Application

Total: 45 Periods

h. Learning Resources

i.Text Books :

1. Silberschatz, Galvin, Gagne” Operating System Concepts, 6th ed, John Wiley, 2003
2. Charles Crowley, “Operating Systems-A Design Oriented approach” McGraw Hill, 1997
3. Raj Kamal, “Embedded Systems- Architecture, Programming and Design” Tata McGraw Hill, 2006.
4. Karim Yaghmour, “Building Embedded Linux System”, O’ reilly Pub, 2003

ii.Reference:

1. Marko Gargenta, ”Learning Android “, O’ reilly 2011.
2. Herma K., “Real Time Systems – Design for distributed Embedded Applications”, Kluwer Academic, 1997.
3. C.M. Krishna, Kang, G. Shin, “Real Time Systems”, McGraw Hill, 1997.
4. Raymond J.A. Bhur, Donald L. Bailey, “An Introduction to Real Time Systems”, PHI, 1999
5. Mukesh Sigal and N G Shi “Advanced Concepts in Operating System”, McGraw Hill, 2000
6. D.M.Dhamdhere, ” Operating Systems, A Concept-Based Approach, TMH, 2008

iii. Online resources:

1. <http://etutorials.org/Linux+systems/embedded+linux+systems>
2. <http://www.freertos.org>
3. rtosonline.com.au/rto-courses-units
4. E-books for Android

i. Practice Aspects:

Building Android based Applications