

COURSE CODE: <b>1154EE102</b>	COURSE TITLE: <b>EMBEDDED SYSTEM</b>	L	T	P	C
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>COURSE CATEGORY:</b>					
University Elective					
<b>PREAMBLE :</b>					
This Course aims to enable the students to gain a fair knowledge on concepts, characteristics and applications of embedded systems to Electrical Engineering and also it will make the students familiarize with real-time.					
<b>PREREQUISITE COURSES:</b>					
<ul style="list-style-type: none"> <li>• Microprocessor &amp; Microcontroller</li> </ul>					
<b>RELATED COURSES:</b>					
<ul style="list-style-type: none"> <li>• Embedded System Design</li> </ul>					
<b>COURSE EDUCATIONAL OBJECTIVES:</b>					
<p>The objectives of the course are to make the students,</p> <ul style="list-style-type: none"> <li>• To teach students all aspects of the design and development of an embedded system, including hardware and embedded software development.</li> <li>• To learn and understand the characteristics of embedded systems and its architectures.</li> <li>• Understanding and experience of state of – the - practice industrial embedded systems and intelligent embedded system development.</li> <li>• To understand the operation of real time systems.</li> </ul>					
<b>COURSE OUTCOMES :</b>					
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 definitions, components and requirements of the Embedded System.	K2			
CO2	Describe the processor, architecture and memory organisation of the Embedded System.	K2			
CO3	Develop the interfacing and communication techniques of the Embedded System.	K3			
CO4	Explain the I/O, testing and applications of the Embedded System.	K2			
CO5	Describe the definitions, characteristics and issues of real time systems.	K2			

**CORRELATION OF COs AND POs**

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

**COURSE CONTENT:****UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9**

Introduction to Embedded Systems - definitions and constraints; Structures - Components - Hardware and Processor Requirements - Device and Device drivers - Examples of embedded systems.

**UNIT II EMBEDDED PROCESSORS & MEMORY 9**

Special Purpose Processors - General Purpose Processors - Architectural Issues: ARM, PIC, CISC, RISC, DSP Architectures - Memory - Memory Organization.

**UNIT III EMBEDDED INTERFACING & COMMUNICATION 9**

Memory Interfacing - Bus, Protocols & ISA Bus Interfacing - USB Interfacing - AD/DA interfacing - Parallel Data Communication - Serial Data Communication - Network Communication - Wireless Communication.

**UNIT IV EMBEDDED SYSTEM I/O, TESTING & APPLICATION 9**

Timer – Interrupts – DMA – USB & IrDA - Testing - BIST - Open-loop and Closed Loop Control Systems - Application Examples: Washing Machine, Automotive Systems, Auto-focusing digital camera, Air-conditioner, Elevator Control System, ATM System.

**UNIT V REAL TIME EMBEDDED SYSTEM 9**

Introduction - Definition & characteristics of real-time systems - Issues in real time computing - Structure and performance measures of a real time system - Classical Uniprocessor scheduling algorithms - Uniprocessor scheduling of IRIS tasks - Mode changes - Fault tolerant scheduling.

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. Raj Kamal, "Embedded Systems", Tata McGraw Hill, 1st Edition, 2004
2. David Simon, "An Embedded Software Primer", Addison Wesley, 2000.
3. RTS: Real-Time Systems, by C.M. Krishna and Kang G. Shin, McGraw-Hill, 1997, ISBN 0-07-057043.
4. Jean J.Labrosse, "Embedded system building blocks", CMP books, 2nd Edition, 1999.

**REFERENCE BOOKS:**

1. R. Mall, Real Time Systems Theory and Practice, Pearson, 2008.
2. T. Noergaard, "Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers", Newness 2005.
3. Dr. Prasad, "Embedded Real Time System", Wiley Dreamtech, 2004