

**CENTRAL UNIVERSITY OF KERALA  
DEPARTMENT OF COMPUTER SCIENCE  
M.Sc. COMPUTER SCIENCE**

ELECTIVE COURSE					
COURSE CODE	COURSE TITLE	CONTACT HRS/WEEK			CREDITS
		LEC	LAB	TUT	
CSC5009	Embedded Systems	2	2	1	4

Lec = Lecture, Tut = Tutorial, Lab = Practical

This is a participatory and experimental **skill development course**.

Course Objective:

The objective of the course is to provide theoretical and practical aspects of embedded systems.

By completing this course, students will obtain the following course/learning outcomes:

1. Knowledge gained:
  - (i) fundamental concepts of embedded systems.
2. Skill gained:
  - (ii) Critical analyzing and logic skills in developing embedded codes.
3. Competency gained:
  - (iii) Development of embedded systems for a variety of real world problems

Prerequisites: Basic knowledge of electronic components and programming

Grading:

Lab implementation	– 15%
Participatory based group Project	– 10%
Assignment/Quiz/presentation	– 5%
Class Test	– 10%
Final Exam	– 60%

### CSC5009 – Embedded Systems

#### Module 1

Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices in a System, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems

#### Module 2

8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization - Devices and Communication Buses for Devices Network: Serial and parallel Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols

#### Module 3

Real – Time Operating Systems: OS Services, Process and Memory Management, Real – Time Operating Systems, Basic Design Using an RTOS, Task Scheduling Models, Interrupt Latency, Response of Task as Performance Metrics - RTOS Programming: Basic functions and Types of RTOSes, RTOS VxWorks, Windows CE

#### Module 4

Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-Design - Testing, Simulation and Debugging Techniques and Tools: Testing on Host Machine, Simulators, Laboratory Tools

#### Text Book:

1. Raj Kamal, *Embedded Systems*, Second Edition TMH, 2008

#### Reference:

1. K.V.K.K.Prasad, *Embedded/Real-Time Systems*, dreamTech press, 2003
2. Muhammad Ali Mazidi, *The 8051 Microcontroller and Embedded Systems*, Pearson, 2007
3. Kenneth J. Ayala, Thomson, *The 8051 Microcontroller*, Third Edition, 1997
4. David E. Simon, *An Embedded Software Primer*, Pearson Education, 2005
5. Ajay V Deshmukhi, *Micro Controllers*, TMH, 2005
6. Raj kamal, *Microcontrollers*, Pearson Education, 2009
7. Shibu K.V., *Introduction to Embedded Systems*, TMH, 2009