Course Code: 13EC2209

Course Outcomes
At the end of the course the student will be able to
CO1: Comprehend concepts of UML architectures, CPU architectures
BUS architectures for Embedded computations.
CO2: Design of generic compilers for Embedded systems and its test
procedures.
CO3: Demonstrate operating system concepts.
CO4: Discuss real time task scheduling context switching.
CO5: Outline design aspects of real-time operating system, modeling
and working on Real-time environment.

UNIT-I
INTRODUCTION TO DESIGN AND ARCHITECTURE:
Requirements, specifications, structural and behavioral descriptions,
UML; Embedded Processors: RISC, super scalar, and VLIW
architectures, memory organization and Instruction level parallelism;
CPU architectures: Input/output, interrupts, modes, cache memories
Embedded bus architectures: Bus architectures and transactions,
Serial interconnects, Networked embedded systems: Bus protocols,
I2C bus and CAN bus; Internet-Enabled Systems, Design Example-
Elevator Controller

UNIT-II
DESIGN OF COMPILERS:
Compilers and optimization. Testing, Performance Analysis,
Hardware Accelerators: FPGA architectures, RISC IP Cores, Verilog
HDL.

UNIT-III
OPERATING SYSTEMS &RTOS-I:
Operating system concepts: Embedded operating systems ,Network
operating systems, Layers, functions kernel, Tasks, Scheduling
Thread, Interrupt process, communication, Device drivers, codes,
pseudo codes for OS.Introduction, Modeling Timing constraints
Scheduling Real-Time Tasks: Types of Schedulers Table-driven
scheduling cyclic schedulers EDF  RMA.
UNIT-IV
OPERATING SYSTEMS & RTOS-II:
Handling Resource sharing among real-time tasks Scheduling Real-Time Tasks in Multiprocessor and Distributed systems Commercial Real-time operating systems: Tasks, context switches, Operating system support (inter-process communication, networking), Scheduling, Development environment.

UNIT-V
DESIGN COMPUTATIONS & EMBEDDED SYSTEM APPLICATION:
Database Systems, Product design process and testing Design Computations Design challenge – optimizing design metrics, processor technology, design technology; real time-operating system: system modeling, static scheduling, Priority drive scheduling, Synchronization & mutual exclusion (real-time and non-real-time); H/W and S/W co-design; embedded multiprocessor.

TEXT BOOKS:


REFERENCES:
