

REAL TIME OPERATING SYSTEMS

Subject Code	: 10EC842	IA Marks	: 25
No. of Lecture Hrs/Week	: 04	Exam Hours	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Introduction to Real-Time Embedded Systems: Brief history of Real Time Systems, A brief history of Embedded Systems.

System Resources: Resource Analysis, Real-Time Service Utility, Scheduling Classes, The Cyclic Executive, Scheduler Concepts, Preemptive Fixed Priority Scheduling Policies, Real-Time OS, Thread Safe Reentrant Functions.

Processing: Preemptive Fixed-Priority Policy, Feasibility, Rate Monotonic least upper bound, Necessary and Sufficient feasibility, Deadline – Monotonic Policy, Dynamic priority policies.

I/O Resources:

Worst-case Execution time, Intermediate I/O, Execution efficiency, I/O Architecture.

Memory:

Physical hierarchy, Capacity and allocation, Shared Memory, ECC Memory, Flash filesystems.

Multiresource Services:

Blocking, Deadlock and livelock, Critical sections to protect shared resources, priority inversion.

Soft Real-Time Services:

Missed Deadlines, QoS, Alternatives to rate monotonic policy, Mixed hard and soft real-time services.

Embedded System Components:

Firmware components, RTOS system software mechanisms, Software application components.

Debugging Components:

Exceptions assert, Checking return codes, Single-step debugging, kernel scheduler traces, Test access ports, Trace ports, Power-On self test and diagnostics, External test equipment, Application-level debugging.

Performance Tuning:



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