

Branch Name:	Computer Engineering / Information Technology
Semester/Year:	Semester VIII / Final Year
Subject Title:	Real Time Operating System (Elective-IV)
Subject Code:	1ET1030806
Pre-requisite:	Operating Systems

Course Objective:

Syllabus deals with issues in real time operating systems, importance of deadlines and concept of task scheduling. Student will understand and design real time operating systems which are backbone of embedded industry.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	70	30	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Introduction Structures of Real-Time System, Need for RTOS, Issues in Real-Time Computing, Task Classes, Performance Measures for Real-Time Systems	5	15
2	Embedded software and Task Scheduling Scheduling algorithms: round robin, round robin with interrupts, function queue scheduling, real time operating system selection, CPU scheduling algorithms: Rate monotonic, EDF, MLF, Priority Scheduling, Priority Ceiling and Priority inheritance, Real time operating system: Tasks and task states	10	25
3	Real-Time Databases Basic Definitions, Real-Time Vs General-Purpose Databases, Main Memory Databases Transaction Priorities, Transaction Aborts, Concurrency Control Issues , Disk scheduling algorithms	7	20
4	Features of Real Time Operating System Messages ,queues ,mailboxes ,pipes ,timer function , events, memory management , Interrupt basic system design using an RT (OS design principles, interrupt routines, task structures and priority), Current research in RTOS.	7	20
5	Fault Tolerant Techniques Causes of failure, Fault types, Fault detection, Fault and error containment, Redundancy: hardware redundancy, software redundancy, Time redundancy, information redundancy, Data diversity, Integrated failure handling.	7	20

Course Outcome:

After successful completion of this course, student will be able to

- summarize the issues in real time computing
- Solve scheduling problems and can apply them in real time applications in industry.
- Analyze the situation of fault occurrence and will be able to apply solutions accordingly.

List of References:

1. Krishna and Shin, "Real-Time Systems," Tata McGraw Hill. 1999.
2. Jane W. Liu, "Real-Time Systems" Pearson Education, 2001.
3. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008.

4. Doug Abbott, “Linux for Embedded and Real-Time Applications”, Third Edition, Elsevier, 2013
5. Ivan Cibrario Bertolotti and Gabriele Manduchi, “Real Time Embedded Systems”, CRC press, 2012
6. An Embedded Software Primer, David E. Simon Pearson Education Asia Publication

List of E-Resources

1. www.nptel.ac.in/courses/106105036/
2. faculty.cs.tamu.edu/bettati/Courses/663/2013C/course_homepage.html
3. <https://www.cl.cam.ac.uk/teaching/1011/OpSystems/os1a-slides.pdf>

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

1. Prepare comparison of commercial real time operating system.
2. To study about Real time databases.
3. To Study about Real time Video Surveillance System
4. To Study of Real time clock.
5. To Study of how to Interface a Seven Segment Display.
6. To Study about air traffic control system.
7. To Study about Fast tag road toll tax collection system.
8. To Study about burglar alarm system.
9. To study about IoT devices.
10. To study about use of real time system in the field of Agriculture.