



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Name of the programme and specialization	B.TECH. COMPUTER SCIENCE AND ENGINEERING		
Course Title	REAL TIME SYSTEMS		
Course Code	CSPE13	No. of Credits	03
Course Code of Pre-requisite subject(s)	OS		
Session/Semester	January 2022/ VIII Semester	Section (if, applicable)	A / B
Name of Faculty	B. SHAMEEDHA BEGUM	Department	CSE
Official Email	shameedha@nitt.edu	Telephone No.	0431-2503215
Name of Course Coordinator(s) (if, applicable)	-		
Official E-mail	-	Telephone No.	-
Course Type (please tick appropriately)	<input type="checkbox"/> Core course	<input checked="" type="checkbox"/> Elective course	

Syllabus (approved in BoS)

Unit – I

Introduction to real-time computing - Structure of a real-time system - Characterization of real-time systems and tasks - Performance measures.

Unit – II

Task Assignment and Scheduling - Uniprocessor scheduling algorithms - Task assignment - Mode changes - Fault tolerant scheduling.

Unit – III

Real-time Communication - Network topologies and architecture issues - Protocols - Contention-based, token-based, polled bus - Fault tolerant routing.

Unit – IV

Real-time Databases - Transaction priorities and aborts - Concurrency control issues - Scheduling algorithms - Two-phase approach to improve predictability.

Unit – V

Programming Languages and Tools - Hierarchical decomposition - Run-time error handling - Overloading - Timing specification - Recent trends and developments.



COURSE OBJECTIVES	
<ul style="list-style-type: none"> To study issues related to the design and analysis of systems with real-time constraints. To learn the features of Real time OS. To study the various Uniprocessor and Multiprocessor scheduling mechanisms. To learn about various real time communication protocols. To study the difference between traditional and real time databases 	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
<ul style="list-style-type: none"> Knowledge about Schedulability analysis. 	1, 2
<ul style="list-style-type: none"> Ability to learn Real-time programming environments. 	3, 4, 5
<ul style="list-style-type: none"> Knowledge about real time communication and databases. 	6, 8
<ul style="list-style-type: none"> Ability to develop real time systems. 	6, 8

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>The course addresses basic concepts of real-time systems, presents examples of real-time systems, covers real-time systems analysis and design, and gives an in-depth treatment of timing analysis and scheduling. The course is organized around the issue of real-time requirements and their impact on the architecture of a system. The considered system domain will be networked embedded. Topics include the description/application of real time systems, system architectures, programming concepts, inter-process communication and synchronization, real-time databases, and design methodology. Applications will be introduced using appropriate programming models or simulation tools.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			(Add more rows)
S.N o.	Week/Contact Hours	Topic	Mode of Delivery(Online)
1	1/1	Introduction to real-time systems	PPT
2	1/1	Structure of a real-time system	
3	1/1	Characterization of real-time systems	
4	2/1	Tasks	
5	2/1	Performance measures	
6	2/1	Performance measures	
7	3/1	Uniprocessor scheduling algorithms	
8	3/1	Uniprocessor scheduling algorithms	
9	3/1	Uniprocessor scheduling algorithms	
10	4/1	Problems	
11	4/1	Task assignment	



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12	4/1	Problems	PPT
13	5/1	Mode changes	
14	5/1	Fault tolerant scheduling	
15	5/1	Fault tolerant scheduling	
16	6/1	Problems	
17	6/1	Network topologies	
18	6/1	Architecture issues	
19	7/1	Protocols	
20	7/1	Contention-based	
21	7/1	Token-based	
22	8/1	Polled bus	
23	8/1	Problems	
24	8/1	Fault tolerant routing	
25	9/1	Transaction priorities	
26	9/1	Aborts	
27	9/1	Problems	
28	10/1	Concurrency control issues	
29	10/1	Scheduling algorithms	
30	10/1	Problems	
31	11/1	Scheduling algorithms	
32	11/1	Two-phase approach to improve predictability	
33	11/1	Hierarchical decomposition	
34	12/1	Run-time error handling	
35	12/1	Overloading	
36	12/1	Timing specification	
37	13/1	Recent trends and developments	
38	13/1	Problems	
39	13/1	Discussions	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S. No.	Mode of Assessments	Week / Date	Duration	% Weightage
1.	Cycle Test – 1-Online	As per Schedule	1 Hr	30
2.	Cycle Test – 2 - Online	As per Schedule	1 Hr	30
3.	Assignment -1	Mid week of April	1 Week	10
CPA *	Compensation Assessment	-	-	-
5.	Final Assessment - Online		2 Hours	30%
Total				100%



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COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Online feedback
2. Live feedback in the class

COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

Email correspondence is preferable.

COMPENSATION ASSESSMENT

To be absent from cycle test 1 & 2 prior permission from the faculty is required.

ATTENDANCE POLICY :NA

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.


ADDITIONAL INFORMATION, IF ANY

Students can contact the faculty to clarify their doubts in person any time during working hours.

FOR APPROVAL


Course Faculty _____

CC- Chairperson  _____

HOD  _____