

Faculty of Computers & Information Technology

Real Time Systems

Information:

Course Code: DM419 Level: Undergraduate Course Hours: 3.00- Hours

Department : Digital Media Technology

Area Of Study:

- •Comprehend deeply the basic concepts of real time systems to be ready for further and continuous learning.
- •Show a complete understanding of theoretical foundations for the design and synthesis of real-time systems and applications.
- •Compare, evaluate and select from different solutions to design real time systems.
- •Understand appropriate methodologies to formulate and analyze problems in computing to solve them.
- •Deeply understand real time system to learn emerging concepts in theory and applications of computer science

Description:

Introduction to real time systems; Typical real time applications; Hard versus soft real time systems; A reference model of real time systems; Commonly used approaches to hard real time scheduling; Clock-driven scheduling; Priority-driven scheduling of periodic tasks; Scheduling periodic and Sporadic tasks; Resources and resource access control; Multiprocessor scheduling and resource access control; Scheduling flexible computations and tasks with temporal distance constraints; Real time communications; Real time operating system; Real time programming languages

Course ou	tcomes:				
a.Knowledge and Understanding: :					
1 -	. Discuss the basic concepts of time that arise in hard & soft real-time applications.				
2 -	Explain the principles and algorithms for real-time scheduling and resource access control protocols for single-processor and multi-processor systems				
3 -	Select the tools and techniques for analysis, design and development of real time systems				
b.Intellect	ual Skills: :				
1 -	Analyze different hardware interface problems related to real time systems				
2 -	Select appropriate algorithms for different real-time scheduling and resource access control protocols				
3 -	Analyze different problems description and construct requirements specification for real-time system software				
c.Professi	onal and Practical Skills: :				
1 -	. Apply effective information to acquire information about times, events, and sources of error arising in real-time applications				
2 -	Use different tools for implementation and documentation of static and dynamic scheduling mechanisms suitable for soft and hard real-time systems				
3 -	Deploy effective supporting tools for the development of real time system software				



d.General and Transferable Skills::

- 1 Work in a team effectively and efficiently considering time and stress management
- 2 Apply communication skills and techniques in presentations and report writing for range of audiences using various methods and tools

Course Topic And Contents :			
Topic	No. of hours	Lecture	Tutorial / Practical
Basic Real-Time concepts	4	2	2
Hardware Interfacing in Real Time Systems	4	2	2
Kernels of Real-Time Operating Systems	4	2	2
Process Scheduling in Real-Time Operating Systems	4	2	2
Inter-task Communication and Synchronization in Real-Time Operating Systems	4	2	2
Memory Management in in Real-Time Operating Systems	4	2	2
Requirements Specification for Real-Time System Software, Formal Methods in Software Specification	4	2	2
Structured and Object Oriented Analysis for Real-Time System	4	2	2
Mid-Term Exam	2		
Properties of Real-Time System Software, Procedural-Oriented and Object Oriented Design for Real Time System	4	2	2
Implementing Real Time Systems using Procedural and Object Oriented Languages	4	2	2
Performance Analysis of Real Time Systems	4	2	2
Fault Tolerance in Real Time Systems	4	2	2
Final Exam	2		

Teaching And Learning Methodologies:

Interactive Lectures including Discussions

Tutorials

Practical Lab Sessions

Self-Study (Project / Reading Materials / Online Material / Presentations)

Problem Solving

Course Assessment :			
Methods of assessment	Relative weight %	Week No	Assess What
Assignments	5.00	4	
Final Exam	40.00	14	
Midterm Exam (s)	30.00	9	
Others (Participations)	5.00		
Presentations	5.00	12	



Quizzes	10.00	5	
Research and Reporting	5.00		

Course Notes:

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

Recommended books:

Jane W. S. Liu, Real Time Systems, Prentice Hall, 1st Edition ISBN: 9780130996510