Department of Computer Science and Engineering
National Institute of Technology, Tiruchirappalli

COURSE OUTLINE			
Course Title	Distributed Algorithms		
Course Code	CSH011	No. of Credits	3
Department	CSE	Faculty	Swathy Murali Mohan
Pre-requisites	CSPC29		
Course Coordinator(s) (if, applicable)	Swathy Murali Mohan		
Teacher(s)/Tutor(s) E-mail	swathimuralimohan@gmail.com	Telephone No.	9496605124
Course Type	Honors Course		

COURSE OVERVIEW

This course deals with various algorithms and Synchronous & Asynchronous models used in Distributed Computing

COURSE OBJECTIVES

- To understand the fundamental algorithms and protocols that are commonly used in distributed computing
- To learn the basics about synchronous and asynchronous models

COURSE OUTCOMES

COs	**Aligned Programme Outcome (PO)**							
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
Ability to comprehend distributed protocols and algorithms	S	B	M	B	B	B	B	M
Ability to comprehend, develop, and analyze distributed algorithms for mission critical applications	S	M	S	M	M	M	M	M
Ability to design and develop distributed algorithms for real world problems	S	M	S	S	S	S	M	M

COURSE TEACHING AND LEARNING ACTIVITIES		
Sl. No.	**Topic**	**Mode of Delivery**
	UNIT - 1	
1	Introduction	Chalk-Board
2	Synchronous Network Model	Chalk-Board
3	Leader election in a synchronous ring	Chalk-Board
4	Algorithms in general synchronous networks- Breadth First Search, Shortest Path	Chalk-Board
5	Algorithms in general synchronous networks – Minimum Spanning Tree, Maximal Independent Set	Chalk-Board
6	Distributed consensus with link failures	Chalk-Board
7	Distributed consensus with process failures	Chalk-Board
	UNIT - 2	
1	Asynchronous system model – I/O Automata	Chalk-Board
2	Asynchronous system model – Complexity Measures, Indistinguishable executions, Randomization	Chalk-Board
3	Asynchronous shared memory model	Chalk-Board
4	Mutual exclusion	Chalk-Board
5	Resource allocation	Chalk-Board
6	Consensus	Chalk-Board
7	Atomic objects	Chalk-Board
	UNIT - 3	
1	Asynchronous network model	Chalk-Board
2	Basic asynchronous network algorithms – Leader Election in a Ring, Leader Election in an Arbitrary Network	Chalk-Board
3	Basic asynchronous network algorithms – Spanning Tree Construction	Chalk-Board
4	Basic asynchronous network algorithms – BFS and Shortest Path	Chalk-Board
5	Basic asynchronous network algorithms – Minimum Spanning Tree	Chalk-Board
6	Synchronizers – Local Synchronizer	Chalk-Board
7	Synchronizers – Safe Synchronizer	Chalk-Board
	UNIT - 4	
1	Shared memory versus networks	Chalk-Board
2	Logical time	Chalk-Board
3	Global snapshots and stable properties	Chalk-Board
4	Network resource allocation – Mutual exclusion	Chalk-Board

5	Network resource allocation – General Resource Allocation	Chalk-Board
6	Partially synchronous system models – MMT Automata, General Timed Automata	Chalk-Board
7	Partially synchronous system models – Mutual Exclusion	Chalk-Board
	UNIT - 5	
1	Fault Tolerance in distributed systems – Robust Algorithms	Chalk-Board
2	Fault Tolerance in distributed systems – Stabilizing Algorithms	Chalk-Board
3	Fault Tolerance in asynchronous systems – Initially dead cases, Deterministically Acheivable Cases	Chalk-Board
4	Fault Tolerance in asynchronous systems – Probabilistic Consesnsus Algorithms Fault Tolerance in synchronous systems – Synchronous Decision Protocols	Chalk-Board
5	Fault Tolerance in synchronous systems – Authenticating Protocols, Clock Synchronization	Chalk-Board
6	Failure detection	Chalk-Board
7	Stabilization	Chalk-Board
	TOTAL	**35**

COURSE ASSESSMENT METHODOLOGY

Sl. No	Mode of Assessment	Week/Date	Duration	Marks
1	Assessment -1	5th week	1 hour	20
2	Assessment - 2	11th week	1 hour	20
3	Assignment	10th week		10
4	End Semester Examination	November last week	3 hours	50
			Total	100

ESSENTIAL READINGS (Textbooks, Reference books, Websites, Journals, etc.)

Text Books

1. Nancy A Lynch, “Distributed Algorithms”, Morgan Kaufman Publishers 1996
2. Gerard Tel, “Introduction to Distributed Algorithms”, Cambridge University Press, 2 nd edition, 2000

Course Exit Survey
Student feedback form will be collected at the end of the course through MIS

Course Policy
Attendance- Students having 75% to 100% attendance are eligible for writing the End semester Examination. Students having attendance between 65% & 75% with valid reasons can write the end semester exam after attending extra classes. Students havingless than 65% have to redo the course. Student should not absent for the assessment. If the reason for absence is genuine, the student can reappear for reassessment.

FOR SENATE'S CONSIDERATION

Course Faculty	CC Chairperson	HOD