College of Computer Science and Information Systems | **Department of Computer Science**

Course Code : 456CSS-3 | **Parallel and Distributed Systems**

Contact Hour : 3(0) | **Prerequisite : 329CSS-3**

Coordinator -

2. Course Description

Introduction to parallel systems; Processes and processors; Parallel architectures (multi-computer, multi-processor); Performance of Parallel, Distributed and Pipelined Computing systems (speedup, efficiency, etc.); Characterization of distributed systems; System models; Inter-process communication; Remote invocation; Distributed operating system; and Distributed file systems.

3. Course Learning Outcomes

SL	By the end of this course, students should be able to:	Linkages to POs
1.	Define the basic concepts and terminologies of parallel and distributed systems.	a(W)
2.	Explain various parallel and distributed computing paradigms.	a(W),j(S)
3.	Evaluate the performance and different issues of parallel, distributed and pipelined computing.	a(S),b(W),j(W)
4.	Analyze the algorithms of parallel and distributed systems.	b(W),j(S)
5.	Apply the knowledge and methods of parallel and distributed systems in programming using java.	i(S),j(W)

4. Learning Resources

Text	Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Introduction to Parallel Computing, Second Edition, Addison Wesley
Text	George Coulouris, Jean Dollimore, Tim Kindberg and Gordon Blair, Distributed Systems Concepts and Design, fifth edition, Addison Wesley
Reference	William Stallings, Computer Organization and Architecture: Designing for Performance, Eighth Edition, Pearson Prentice Hall, Pearson Education, Inc. Upper Saddle River, New Jersey.
Reference	Peter Pacheco, An Introduction to Parallel Programming, 2011, Morgan Kaufmann
Reference	Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems: Principles and Paradigms, second edition, Prentice Hall.

5. Course Content : The list below provides a summary of the material that will be covered during the course

Week	Topics	References Book / Others Source	Special Event	Tutorial Activities	Lab Activities
1.	Introduction to parallel system	Ch. 01 [1]			
2.	Parallel system architecture	Ch. 02 [1]	Quiz 01	Chapter-17 [Reference 1] Exercise 17.2, 17.9	Thread programming
3.	Parallel system architecture	Ch. 02 [1]	Assignment 1	Chapter-17 [Reference 1] Exercise 17.11 (a, b)	Thread programming
4.	Performance of Parallel systems (speedup, efficiency, etc.)	Ch. 05 [1]		Chapter-17 [Reference 1] Exercise 17.12	Thread programming

5.	Performance of Parallel systems (speedup, efficiency, etc.)	Ch. 05 [1]	Midterm1 Exam	Chapter-17 [Reference 1] Exercise Amdahlâ€™s Law	Thread Priority programming
6.	Introduction to distributed systems	Ch. 01 [2]		Chapter-1[2] Exercise:1.1,1.6,1.11	Thread Synchronization programming
7.	Distributed system models	Ch. 02 [2]		Chapter-2[2] Exercise: 2.3 and inside the chapter	Java-based TCP communication
8.	Inter-process communication	Ch. 04 [2]	Quiz 02	Chapter-3[2] Exercise:3.1, 3.7, and inside the chapter	Java-based TCP communication
9.	Inter-process communication	Ch. 04 [2]	Midterm2 Exam	Chapter-5[2] Exercise:5.22, and inside the chapter	Java-based TCP communication
10.	Remote invocation	Ch. 05 [2]			Java RMI
11.	Remote invocation	Ch. 05 [2]			Java RMI
12.	Distributed Operating system	Ch. 07 [2]			Java RMI
13.	Distributed File systems	Ch. 10 [2]			Java RMI
14.	Theory Revision		Lab Final Examination		

6. Evaluation Scheme: The following list is the contribution of course components to the final grade for the course.

Component	Weight (%)
Quiz 1 and Quiz 2	5%
Assignment 1	5%
Mid Term 1	15%
Mid Term 2	15%
Lab Performance	10%
Final Lab Exam	10%
Final Examination	40%
Total	100