Course Handout

Semester: VII **Academic Year:** 2019-20

Course Code: CS4211 **Course Title:** Parallel and Distributed Computing

LTPC: 3024/3104 **Programme:** Bachelor of Technology

Course-in-charge: Dr. Prashant Srivastava

1. Course Description

- This course introduces the basic concepts of parallel and distributed computing to the students of undergraduate level.

2. Course Content

- Basic Concepts of Parallel Computing
- Hardware issues in Parallel Computing
- Software issues in Parallel Computing
- Parallel Algorithm Design
- Computer Clusters for Scalable Parallel Computing
- Basic Concepts of Distributed Computing
- Communication in Distributed Computing
- Distributed Shared Memory
- Synchronization
- Security in Distributed Systems
- Processes and Processors in Distributed Systems
- Emerging Trends in Distributed Computing
- GRIDS, P2P, and the future Internet

3. Course Outcomes: After the completion of the course the student will be able to:

CO1	Understand the fundamentals of parallel and distributed Computing
CO2	Understand hardware and software issues in parallel computing
CO3	Learn to design parallel algorithms
CO4	Understand the concepts of communication, shared memory and synchronization in distributed systems
CO5	Understand the concept of security, processes and processors in distributed computing
CO6	Learn to develop applications of parallel and distributed computing

4. Course Outcomes Mapping with Programme Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	H	H	M	M	H	L	L	L	L	L	H	H	H	H	H
CO2	H	H	M	M	H	L	L	L	L	L	H	H	H	H	H
CO3	H	H	H	H	H	L	L	M	L	L	L	M	H	H	H
CO4	H	H	H	H	H	L	L	M	L	L	L	M	H	H	H
CO5	H	H	H	H	H	L	L	M	L	L	L	M	H	H	H
CO6	H	H	H	H	H	M	M	M	H	H	H	H	H	H	H

Note: H- High**, M**- Moderate**, L**- Low and **NA**- Not Applicable

5. Session Plan

Sl. No.	Topics	No. of Lectures	Course Outcome
1	Basic Concepts of Parallel Computing	2	CO1
2	Hardware issues in Parallel Computing	3	CO1, CO2
3	Software issues in Parallel Computing	3	CO1, CO2
4	Parallel Algorithm Design	4	CO3
5	Computer Clusters for Scalable Parallel Computing	4	CO3
6	Communication in Distributed Computing	4	CO1, CO4
7	Distributed Shared Memory	3	CO1, CO4
8	Synchronization	4	CO1, CO4
9	Security in Distributed Systems	3	CO5
10	Processes and Processors in Distributed Systems	4	CO5
11	Emerging Trends in Distributed Computing	3	CO6
12	GRIDS, P2P, and the future Internet	3	CO6
Total		**40**	

6. Evaluation Scheme

Mid Semester – I	Pen-Paper	1 Hour	20%	Closed Book
Mid Semester – II	Pen-Paper	1 Hour	20%	Closed Book
Comprehensive Exam	Pen-Paper	2 Hours	30%	Closed Book
Attendance	-	-	10%	-
Project	Offline	-	20%	-

7. Course Outcomes Mapping with Evaluation Components

Course Outcomes	Mid-Sem I	Mid-Sem II	Comprehensive Exam	Project
CO1	H	L	H	H
CO2	H	L	H	H
CO3	L	H	H	H
CO4	L	H	H	H
CO5	L	L	H	H
CO6	L	L	H	H

H- High**, M**- Moderate**, L**- Low and **NA**- Not applicable

8. Project

Students will be required to make a project based on the concepts studied in theory classes. The project will be of 20% marks. The detailed evaluation of the project will be done as follows:

- Project work 12% marks
- Presentation 5% marks
- Project report 3% marks

Students will have to give a presentation of their project which would be of 10 minutes showing the work done in the project and the output achieved. The dates of final presentation will be announced by Course-in-charge. However, the final presentation is expected to take place one week before comprehensive examination.

9. Attendance Policy

As per Attendance policy of the University.

10. Make up Policy

Students who are likely to miss a component of evaluation on a genuine reason may be given a make-up of that component by the Course In-Charge. The students are required to approach Course In-Charge immediately for the same before the conduct of the evaluation component. It is the responsibility of the student to approach the Course In-Charge. The Course In-Charge will not allow makeup, if student approaches 7 days after the examination.

11. Plagiarism

Instances of plagiarism will be dealt with in accordance with the rules set by the University in this connection.

12. Grading Policy

Marks obtained in all the components of evaluation shall be summed up and the final marks shall be converted in the letter grades, namely, A, B, C, D, E and NC. The grading is relative and normally it is centered around the average of a class. Mid-semester grading will be announced on completion of about 50% of the evaluation components.

13. Pedagogy

MS-PowerPoint Presentations, Videos and Animation of few lectures, as well as Open Course Ware websites will be used as teaching methodologies.

14. Text Books

TB1. Sunita Mahajan, Seema Shah, Distributed Computing, 2nd Edition 2013, Oxford University Press

TB2. Grama A., Kumar V., Gupta A., & Karypis G, Introduction to parallel computing. Pearson,2003

TB3. Kai Hwang, Geoffrey C Fox, Jack J Dongarra, Distributed and Cloud Computing from Parallel Processing to the Internet of Things, Elsevier

14. Reference Books

RB1. C Lin, L Snyder. Principles of Parallel Programming. USA: Addison-Wesley Pub Co., 2008.

RB2. George Coulouris, Distributed Systems: Concepts & Design, Addison Wesley Pvt. Ltd.

RB3. Tanenbaum, Distributed Systems, Prentice Hall of India.

RB4. William Buchanan, Distributed Systems & Networks, Tata McGraw Hill

15. Consultation Hour

By prior appointment fixed via email: write to: Prashant.Srivastava@niituniversity.in