	Universitas Negeri Surabaya Faculty of Engineering, Undergraduate Study Program in Informatics Engineering	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Parallel and Distributed Computing	5520203035		T=3	P=0	ECTS=4.77	5	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Aditya Prapanca, S.T., M.Kom.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	This course helps understand the basic principles and key characteristics of Parallel and Distributed Computing. Students will learn the concepts of RPC, XMPP, distributed algorithms such as Leader Election, Distributed Sorting, and Shared Memory and Object. Students also get to know the basics of distributed programming using Twisted and Node.js. This course helps understand the basic principles and key characteristics of Parallel and Distributed Computing. Students will learn the concepts of RPC, XMPP, distributed algorithms such as Leader Election, Distributed Sorting, and Shared Memory and Object. Students also get to know the basics of distributed programming using Twisted and Node.js.
References	**Main :**

1. Kshemkalyani, Ajay D., & Singhal Mukesh. 2011. Distributed Computing: Principles, Algorithms, and Systems. United Kingdom: Cambridge University Press.
2. Varela, Carlos A., & Agha, Gul. 2013. Programming Distributed Computing Systems: A Foundational Approach. United States: The MIT Press.
3. Pacheco, Peter. 2011. An Introduction to Parallel Programming. United States: Morgan Kaufmann.

Supporters:

Supporting lecturer	I Made Suartana, S.Kom., M.Kom.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students can understand the principles and characteristics of distributed systems	- Detailing the definition of a distributed system - Detailing the principles of distributed system objectives - Mentioning the types of distributed systems - Describing in detail the types of architecture - Explaining the concept of self-management in distributed systems		Scientific approach, discussion, question and answer, and problem-based learning 3 X 50			0%

2	Students can understand the principles and characteristics of parallel computing	- Details the definition of parallel computing - Details the principles of parallel computing goals		Scientific approach, discussion, question and answer, and problem-based learning 3 X 50			0%
3	Students are able to explain the working principles of parallel computing devices	- Tells about modifications of von Neumann structures - Tells about parallel computing hardware - Tells about parallel computing software	**Form of Assessment** : Participatory Activities	Scientific approach, presentation, question and answer, discussion and discovery learning 3 X 50			25%
4	Students are able to explain the working principles of parallel computing devices	- Tells about modifications of von Neumann structures - Tells about parallel computing hardware - Tells about parallel computing software		Scientific approach, presentation, question and answer, discussion and discovery learning 3 X 50			0%
5	Students can demonstrate the basics of implementing parallel computing on distributed memory	- Explain the concept of MPI - Create simple programs with MPI		Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			0%
6	Students can demonstrate the basics of implementing parallel computing on distributed memory	- Explain the concept of MPI - Create simple programs with MPI		Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			0%
7	Students can demonstrate the basics of implementing parallel computing on shared memory	- Explain the concept of Pthreads - Create simple programs with Pthreads	**Form of Assessment** : Participatory Activities	Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			25%
8	UTS			3 X 50			0%
9	Students can demonstrate the basics of implementing parallel computing on shared memory	- Explain the concept of Pthreads - Create simple programs with Pthreads		Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			0%
10	Students are able to describe the process components in a distributed system	- Detailing the concept of threads in distributed systems - Detailing the concept of virtualization in distributed systems - Explaining the concept of servers in distributed systems - Demonstrating the application of the process concept - Demonstrating the application of the thread concept - Demonstrating the concept of implementing virtualization		Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			0%
11							0%

12	Students are able to explain the components of communication in a distributed system	- Detailing the concept of RPC in distributed systems - Detailing the concept of Message-OrientedCommunication in distributed systems - Demonstrating the application of the RPC concept - Demonstrating the application of the Message-Oriented concept		Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			0%
13	Students are able to explain the components of synchronization in a distributed system	- Tells about the concept of clock synchronization in a distributed system - Tells about the concept of logical clock in a distributed system - Tells about the election algorithm - Demonstrates the application of the clock synchronization algorithm - Demonstrates the application of the traditional election algorithm	**Form of Assessment** : Participatory Activities	Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			25%
14	Students are able to explain the components of synchronization in a distributed system	- Tells about the concept of clock synchronization in a distributed system - Tells about the concept of logical clock in a distributed system - Tells about the election algorithm - Demonstrates the application of the clock synchronization algorithm - Demonstrates the application of the traditional election algorithm	**Form of Assessment** : Project Results Assessment / Product Assessment	Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			25%
15	Students are able to describe object-based distributed systems	- Tells about object-based distributed system architecture - Tells about object-based distributed system communication		Scientific approach, discussion, question and answer, and 3 X 50 project-based learning			0%
16	UAS			3 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	75%
2.	Project Results Assessment / Product Assessment	25%
		100%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.

11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.