

Course Code	TKIT163106
Course Name	Distributed System
Course Instructors	Lukito, Selo
Course Type	Required
Course Classification	Engineering Topics
Credit / Contact Hour per Week	3 / 150 minutes per Week
Course Description	Computer networks as distributed systems infrastructure, techniques and support in the management of distributed systems, and software and application components. Topics to be discussed: communication primitives, computer networks, web objects, security, transactions, replication, fault tolerance, mobile and ubiquitous systems, and distributed file systems. Some related issues such as distributed computing platform, interoperability, and examples of distributed computing architectures are also discussed.
Prerequisites Courses	-
<b>Covered Student Outcome</b>	<b>Fundamental Engineering Knowledge Development of Engineering Solution (b) Modern Tools Utilization (e)</b>

**Learning Outcome**

		Study Program Student Outcome
No	Learning Outcome	SO (a) – SO (k)
1.	Students are able to explain about the notion of distributed computer system, its characteristics, and functions. Students can also provide examples of distributed systems in daily life.	Fundamental Engineering Knowledge
2.	Students are able to identify and explain distributed system primitives, components, and their mechanisms	Fundamental Engineering Knowledge
3.	Students are able to design a simple working implementation of distributed system in real world applications.	Development of Engineering Solution
4.	Student able to utilize tools for distributed system development.	Modern Tools Utilization

Topic	<ul style="list-style-type: none"> <li>1. Introduction to distributed systems <ul style="list-style-type: none"> <li>o Characteristics</li> <li>o Utilization</li> <li>o Examples</li> <li>o Trend and direction of development</li> </ul> </li> <li>2. Computer network <ul style="list-style-type: none"> <li>• Variety of computer networks</li> <li>• Technology in computer networks</li> <li>• Protocols in computer networks</li> <li>• Addressing, switching, and routing mechanisms and operations</li> <li>• Wireless network and ad-hoc network</li> <li>• P2P and JXTA networks</li> </ul> </li> <li>3. Primitive communication in distributed systems <ul style="list-style-type: none"> <li>• Communication models</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>• The client-server model</li> <li>• Inter-process communication (IPC)</li> <li>• Remote procedure call (RPC)</li> <li>• Remote method invocation (RMI)</li> </ul> <p>4. Distributed Components and Objects</p> <ul style="list-style-type: none"> <li>o Distributed Objects</li> <li>o Case study: CORBA</li> <li>o From Object to Component</li> </ul> <p>5. Web Services</p> <ul style="list-style-type: none"> <li>o Introduction</li> <li>o Service description</li> <li>o XML technology</li> </ul> <p>6. Security</p> <ul style="list-style-type: none"> <li>o Introduction</li> <li>o Cryptography</li> <li>o Digital Signatute</li> <li>o Public key</li> </ul> <p>7. Replication</p> <ul style="list-style-type: none"> <li>o Modeling and replication architecture</li> <li>o Coordination and ordering of messages</li> <li>o Fault tolerance</li> <li>o Replication techniques</li> </ul> <p>8. Transaction and concurrency</p> <ul style="list-style-type: none"> <li>o Transactions in a distributed system</li> <li>o Problems related to concurrency</li> <li>o Serial equivalence</li> <li>o Locking</li> </ul> <p>9. Fault Tolerance</p> <ul style="list-style-type: none"> <li>o Introduction</li> <li>o Resilience</li> <li>o Recovery</li> </ul> <p>10. Distributed File Systems</p> <ul style="list-style-type: none"> <li>o Introduction</li> <li>o File service architecture</li> <li>o Case Study</li> </ul> <p>11. Mobile Ubiquitos</p> <ul style="list-style-type: none"> <li>o Introduction</li> <li>o Interoperation</li> <li>o Sensing and context awareness</li> </ul> <p>12. Cloud Technology</p> <ul style="list-style-type: none"> <li>o Fundamentals</li> <li>o Architecture</li> <li>o Technology</li> </ul>
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<b>Direct Aseement</b>		
	<b>Direct Aseement Plan</b>	<b>Measured Learning Outcome</b>
	Mid Exam	LO1,LO2, LO4
	Final Exam	LO1,LO2,LO4
	Engineering Design Assignment	LO3, LO4

Indirect Assesment	Questionnaire and direct communication
References	<ol style="list-style-type: none"><li>1. Coulouris, G., Dollimore, J., dan Kindberg, T. Distributed Systems: Concepts and Design. 5rd edition. Addison-Wesley, 2011.</li><li>2. Editors by Borko Furht ·Armando Escalante, Handbook of Cloud Computing , Springer</li><li>3. Andrew S Tanenbaum, Distributed Systems; Principle and Paradigms, 2005</li><li>4. Some sources from the Internet.</li></ol>