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<tr><td rowspan="2"> UNESA</td><td rowspan="2">Universitas Negeri Surabaya
Faculty of Engineering,
Electrical Engineering Undergraduate Study Program</td><td>Document Code</td></tr>
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SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
New Generation Network	2020102417		**T=2**	**P=0**	**ECTS=3.18**	5	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Pradini Puspitaningayu, Ph.D.	Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T.	Dr. Lusia Rakhmawati, S.T., M.T.

Learning model	Case Studies

Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	Program Objectives (PO)	
	PO - 1	Able to apply basic knowledge of New Generation Network to gain a thorough understanding of engineering principles
	PO - 2	Able to communicate effectively both verbally and in writing regarding New Generation Network topics
	PO - 3	Able to apply New Generation Network topic methods and skills needed to solve problems in the engineering field
	PO - 4	Able to work in cross-disciplinary and cultural arts teams
	PO - 5	Able to understand the need for lifelong learning in the field of New Generation Network which is related to relevant current issues

PLO-PO Matrix

P.O
PO-1
PO-2
PO-3
PO-4
PO-5

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
PO-1																
PO-2																
PO-3																
PO-4																
PO-5																

Short Course Description	Students can discuss the concept of radio wave spectrum, identify networks from technical and financial aspects, differentiate telecommunications network standards, determine the basic concepts of 5G, explain Cognitive Radio, Massive centralized RAN, Vehicular Communication, explain IoT and Mobile telecommunications, categorize network architecture, mobility management , RAN, classifies D2D, Big data, and explores the latest and future developments in telecommunications networks using the case method in lectures.

References	**Main :**	
	1. Next Generation Networks, . 2008. Jingming Li Salina, Pascal Salina, John Wiley & Sons 2. 5G Mobile Communications Concepts and Technologies, 2019, Saad Z. Asif, CRC Press, Taylor&Francis Group	

	Supporters:	
	1. New Directions in Wireless Communications Systems from Mobile to 5G, 2018, Athanasios G. 2. Kanatas, Konstantina S. Nikita, Panagiotos Mathiopoulos, CRC Press Taylor&Francis Group	

Supporting lecturer	Dr. Nurhayati, S.T., M.T. Pradini Puspitaningayu, S.T., M.T., Ph.D.

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	1.Students are able to understand & explain the concept of computer networks, 2.Students are able to understand & explain the influence of networks in everyday life, 3.Students are able to understand & explain the characteristics of network architecture, 4.Students are able to understand & explain network classification based on scale,	1.Accuracy in explaining Computer Network Concepts 2.Accuracy in explaining trends in the development of computer networks and the Internet 3.Accuracy in explaining Network Architecture 4.Accuracy in explaining the classification of computer networks based on scale and types of computer network topology	**Form of Assessment** : Participatory Activities	presentation, discussion			0%
2	1.Students are able to understand & explain the concept of computer networks, 2.Students are able to understand & explain the influence of networks in everyday life, 3.Students are able to understand & explain the characteristics of network architecture, 4.Students are able to understand & explain network classification based on scale,	1.Accuracy in explaining Computer Network Concepts 2.Accuracy in explaining trends in the development of computer networks and the Internet 3.Accuracy in explaining Network Architecture 4.Accuracy in explaining the classification of computer networks based on scale and types of computer network topology	**Form of Assessment** : Participatory Activities	presentation, discussion			5%

| 3 | 1. Students are able to understand, explain and differentiate the meaning and function of the Protocol, 2. Students are able to understand, explain and differentiate the functions of each OSI and TCP/IP Layer, 3. Students are able to understand, explain and differentiate between the Reference Protocol and the Model Protocol, 4. Students are able to understand, explain and differentiate between the OSI Protocol and the TCP/IP Protocol, 5. Students are able to understand, explain and differentiate the Encapsulation and Decapsulation Processes at each layer | 1. Accuracy in explaining the Communication Layer Concept 2. Accuracy in explaining Protocol Characteristics and Functions 3. Accuracy in distinguishing between the OSI Reference model and the TCP/IP Protocol. Accuracy in explaining the encapsulation and decapsulation processes at each layer. | **Form of Assessment** : Participatory Activities | presentation, discussion 100 | | | 0% |

| 4 | 1.Students are able to understand, explain and differentiate the meaning and function of the Protocol, 2.Students are able to understand, explain and differentiate the functions of each OSI and TCP/IP Layer, 3.Students are able to understand, explain and differentiate between the Reference Protocol and the Model Protocol, 4.Students are able to understand, explain and differentiate between the OSI Protocol and the TCP/IP Protocol, 5.Students are able to understand, explain and differentiate the Encapsulation and Decapsulation Processes at each layer | 1.Accuracy in explaining the Communication Layer Concept 2.Accuracy in explaining Protocol Characteristics and Functions 3.Accuracy in distinguishing between the OSI Reference model and the TCP/IP Protocol. Accuracy in explaining the encapsulation and decapsulation processes at each layer. | **Form of Assessment** : Participatory Activities | presentation, discussion 100 | | | 5% |

5	1.Students are able to understand, explain and differentiate the meaning and function of the Protocol, 2.Students are able to understand, explain and differentiate the functions of each OSI and TCP/IP Layer, 3.Students are able to understand, explain and differentiate between the Reference Protocol and the Model Protocol, 4.Students are able to understand, explain and differentiate between the OSI Protocol and the TCP/IP Protocol, 5.Students are able to understand, explain and differentiate the Encapsulation and Decapsulation Processes at each layer	1.Accuracy in explaining the Communication Layer Concept 2.Accuracy in explaining Protocol Characteristics and Functions 3.Accuracy in distinguishing between the OSI Reference model and the TCP/IP Protocol. Accuracy in explaining the encapsulation and decapsulation processes at each layer.	**Form of Assessment** : Participatory Activities	presentation, discussion 100			5%
6	1.Students are able to understand, explain and differentiate Data Coding Functions, 2.Students are able to understand, explain and differentiate between types of data coding, 3.Students are able to understand, explain and differentiate Serial and Parallel Transmission Modes, 4.Students are able to understand, explain and differentiate Synchronization Techniques and types of Synchronization Techniques	1.Accuracy in explaining the Physical Layer Concept 2.Accuracy in explaining and Differentiating Data Coding 3.Accuracy in explaining and distinguishing between types of synchronization	**Form of Assessment** : Participatory Activities	Class discussions, groups discussing directly and looking for related material.			5%

7	1. Students are able to understand, explain and differentiate Data Coding Functions, 2. Students are able to understand, explain and differentiate between types of data coding, 3. Students are able to understand, explain and differentiate Serial and Parallel Transmission Modes, 4. Students are able to understand, explain and differentiate Synchronization Techniques and types of Synchronization Techniques	1. Accuracy in explaining the Physical Layer Concept 2. Accuracy in explaining and Differentiating Data Coding 3. Accuracy in explaining and distinguishing between types of synchronization	**Form of Assessment** : Participatory Activities	Class discussions, groups discussing directly and looking for related material.			2%
8		Able to answer UTS questions correctly.	**Form of Assessment** : Test	Test/quiz			20%
9	1. Students are able to understand, explain and differentiate the concept of the Data Link Layer, 2. Students are able to understand, explain and differentiate Multiple Access Techniques, 3. Students are able to understand, explain and differentiate between types of IEEE standard protocols, 4. Students are able to understand, explain and differentiate Error Control and Flow Control Methods, 5. Students are able to understand, explain and differentiate between types of Error Control and Flow Control methods		**Form of Assessment** : Participatory Activities	Presentations, class discussions, group discussions directly and looking for related material.			2%

10	1. Students are able to understand, explain and differentiate the concept of the Data Link Layer, 2. Students are able to understand, explain and differentiate Multiple Access Techniques, 3. Students are able to understand, explain and differentiate between types of IEEE standard protocols, 4. Students are able to understand, explain and differentiate Error Control and Flow Control Methods, 5. Students are able to understand, explain and differentiate between types of Error Control and Flow Control methods		**Form of Assessment** : Participatory Activities	Presentations, class discussions, group discussions directly and looking for related material.			5%

| 11 | 1.Students are able to understand, explain and differentiate the concept of the Data Link Layer, 2.Students are able to understand, explain and differentiate Multiple Access Techniques, 3.Students are able to understand, explain and differentiate between types of IEEE standard protocols, 4.Students are able to understand, explain and differentiate Error Control and Flow Control Methods, 5.Students are able to understand, explain and differentiate between types of Error Control and Flow Control methods | | **Form of Assessment** : Participatory Activities | Presentations, class discussions, group discussions directly and looking for related material. | | | 3% |

| 12 | 1. Students are able to understand, explain and differentiate the concept of network layers, 2. Students are able to understand, explain and differentiate Addressing Systems in Computer Networks, 3. Students are able to understand, explain and differentiate the concept of IP Address Subnetting, 4. Students are able to understand, explain and differentiate the CIDR and VLSM Subnetting Concepts, 5. Students are able to understand, explain and differentiate Simple Computer Networks using the Subnetting Concept | 1. Accuracy in explaining the Network Layer Concept 2. Accuracy in explaining and differentiating addressing systems in computer networks 3. Accuracy in explaining IP Address Subnetting 4. Accuracy in explaining and differentiating CIDR and VLSM subnetting concepts | **Form of Assessment** : Participatory Activities | Group discussions, presentations | | | 3% |

| 13 | 1. Students are able to understand, explain and differentiate the concept of network layers, 2. Students are able to understand, explain and differentiate Addressing Systems in Computer Networks, 3. Students are able to understand, explain and differentiate the concept of IP Address Subnetting, 4. Students are able to understand, explain and differentiate the CIDR and VLSM Subnetting Concepts, 5. Students are able to understand, explain and differentiate Simple Computer Networks using the Subnetting Concept | 1. Accuracy in explaining the Network Layer Concept 2. Accuracy in explaining and differentiating addressing systems in computer networks 3. Accuracy in explaining IP Address Subnetting 4. Accuracy in explaining and differentiating CIDR and VLSM subnetting concepts | **Form of Assessment** : Participatory Activities | Group discussions, presentations | | | 5% |

14	1. Students are able to understand, explain and differentiate the concept of network layers, 2. Students are able to understand, explain and differentiate Addressing Systems in Computer Networks, 3. Students are able to understand, explain and differentiate the concept of IP Address Subnetting, 4. Students are able to understand, explain and differentiate the CIDR and VLSM Subnetting Concepts, 5. Students are able to understand, explain and differentiate Simple Computer Networks using the Subnetting Concept	1. Accuracy in explaining the Network Layer Concept 2. Accuracy in explaining and differentiating addressing systems in computer networks 3. Accuracy in explaining IP Address Subnetting 4. Accuracy in explaining and differentiating CIDR and VLSM subnetting concepts	**Form of Assessment** : Participatory Activities	Group discussions, presentations			5%
15	Students are able to explain the new generation network resume material		**Form of Assessment** : Participatory Activities	group discussion			5%
16	Final exams		**Form of Assessment** : Test	test/quiz			30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	50%
2.	Test	50%
		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.