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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date
Data communication	2020102064	Compulsory Study Program Subjects	T=2 P=0 ECTS=3.18	4	April 10, 2023

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model: Case Studies

Program Learning Outcomes (PLO)

PLO study program that is charged to the course

Program Objectives (PO)

PO - 1	Able to explain both verbally and in writing the concept of Data Communication, transmission media, analyzing interfacing techniques, multiplexing, implementing data link control processes, applying switching techniques for everyday problems, presenting the OSI Model, as well as TCP/IP protocols starting from sending data at the layer physical form of analog and digital data, analog and digital modulation, and their implementation
PO - 2	Able to convey ideas and innovation results both orally and regarding transmission media, analyze interfacing techniques, multiplexing, apply data link control processes, apply switching techniques to everyday problems, present the OSI Model, as well as TCP/IP protocols starting from sending data at the layer physical form of analog and digital data, analog and digital modulation, and their implementation
PO - 3	Able to be responsible for professional ethics and be responsible for solving problems based on the concept of data communication

PLO-PO Matrix

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

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																

Short Course Description: This course gives students the ability to explain the concept of Data Communication, transmission media, analyze interfacing techniques, multiplexing, apply data link control processes, apply switching techniques to everyday problems, present the OSI Model, and the TCP/IP protocol starting from transmission. data on the physical layer in the form of analog and digital data, analog and digital modulation, and its implementation on the local area network using case method learning

References

Main :

1. W. Stallings. 2007. Data Communication and Computer. 2nd edition. McGraw Hill
2. B. Forouzan. 2001. Data Communication and Networking. 2nd edition. McGraw Hill

Supporters:

1. Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.

Supporting lecturer: Muhamad Syariffuddien Zuhrie, S.Pd., M.T.
Dr. Nurhayati, S.T., M.T.
Dr. Lilik Anifah, S.T., M.T.
Dr. Farid Baskoro, S.T., M.T.

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. Able to explain both verbally and in writing the concept of Data Communication correctly. 2. Able to convey ideas and innovation results both verbally and on Data Communication correctly.	1. Able to explain both verbally and in writing the concept of Data Communication correctly. 2. Able to convey ideas and innovation results both verbally and on Data Communication correctly.	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentation, group discussion and reflection 3 X 50		**Material:** Meeting material 1 **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill* **Material:** Introduction of Data Communication **Bibliography:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	1%
2	1. Able to explain both verbally and in writing the concept of Data Communication correctly. 2. Able to convey ideas and innovation results both verbally and on Data Communication correctly.	1. Able to explain both verbally and in writing the concept of Data Communication correctly. 2. Able to convey ideas and innovation results both verbally and on Data Communication correctly.	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentation, group discussion and reflection 3 X 50		**Material:** Meeting material 1 **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill* **Material:** Data Communication Concepts **Reference:** *B. Forouzan. 2001. Data Communication and Networking. 2nd edition. McGraw Hill*	4%
3	1. Able to explain orally and in writing transmission media correctly. 2. Able to convey ideas and innovation results both verbally and via transmission media correctly.	1. Describe the meaning and use of protocols 2. Describe the importance of protocol architecture standardization 3. Describe and reconstruct the architecture of the OSI and TCP/IP models	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Protocol architecture, OSI and TCP/IP, protocol standardization, internet-based applications, 3 X 50 multimedia		**Material:** Meeting material 3 **Reader:** *B. Forouzan. 2001. Data Communication and Networking. 2nd edition. McGraw Hill* **Material:** Protocol architecture, OSI and TCP/IP, protocol standardization, internet-based applications, multimedia **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	2%
4	1. Able to explain orally and in writing transmission media correctly. 2. Able to convey ideas and innovation results both verbally and via transmission media correctly.	1. Describe the meaning and use of protocols 2. Describe the importance of protocol architecture standardization 3. Describe and reconstruct the architecture of the OSI and TCP/IP models	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Protocol architecture, OSI and TCP/IP, protocol standardization, internet-based applications, 3 X 50 multimedia		**Material:** Protocol architecture, OSI and TCP/IP, protocol standardization, internet-based applications, multimedia **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	4%
5	1. Able to explain orally and in writing analyze interfacing techniques correctly. 2. Able to convey ideas and innovation results both verbally and analyzing interfacing techniques correctly.	1. Explain data coding techniques and digital signals 2. Explain the techniques for coding digital data and analog signals 3. Explain analog data coding techniques and digital signals 4. Explain coding techniques and analog data and signals	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentation, group discussion and reflection 3 X 50		**Material:** Interfacing techniques **References:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	4%

6	1. Able to explain orally and in writing analyze interfacing techniques correctly. 2. Able to convey ideas and innovation results both verbally and analyzing interfacing techniques correctly.	1. Explain data coding techniques and digital signals 2. Explain the techniques for coding digital data and analog signals 3. Explain analog data coding techniques and digital signals 4. Explain coding techniques and analog data and signals	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentation, group discussion and reflection 3 X 50		**Material:** Interfacing techniques **References:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	4%
7	Students are able to understand the types of errors and error detection mechanisms	1. Explain the types of errors in data communication 2. Explain error detection methods (parity check, CRC, polynomial) 3. Explains the error correction method with block coding	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Presentation, group discussion and reflection 3 X 50		**Material:** Types of errors and error detection mechanisms in data communications. **Reference:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	2%
8	UTS	UTS	**Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Written Test 3 X 50		**Material:** Meeting material 1-7 **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill* **Material:** Midterm Exam **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	20%
9	Students are able to understand how to control congestion/slowdowns in data networks.	1. · Explain the effects of congestion on data networks. 2. Explain how to control traffic jams. 3. Explain network data traffic management. 4. Explains congestion control in packet data network connections. 5. Explain congestion control in frame relay 6. Explaining ATM traffic management Understanding ATM traffic management - GFR	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Congestion/slowdown control in data networks in data communications **Reference:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	0%
10	Students are able to understand cellular wireless networks	1. Explain analog network systems. 2. Explain the CDMA network system. 3. Explain the 3G, 4G, 5G network system	**Criteria:** 1. Activeness and accuracy of answers 2. Evaluation Rubric **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Meeting material 10 **References:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.* **Material:** Cellular wireless networks **Reference:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	8%

11	Students are able to understand the description of a local area network	1. Explain the background of local area networks. 2. Explain topologies and transmission media. 3. Explain the LAN protocol architecture. 4. Explain bridges 5. Explaining layer 2 and layer 3 switches	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Local area networks **Reference:** *B. Forouzan. 2001. Data Communication and Networking. 2nd edition. McGraw Hill*	8%
12	Students are able to understand Internet Protocol	1. Explain the basic functions of the protocol. 2. Explain the principles of internet networking 3. Explain the operation of internet protocols. 4. Explaining IPv6 5. Explain virtual network privacy and IP security	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Internet Protocol **Bibliography:** *Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, Mc-Graw Hill, 2012.*	5%
13	Students are able to understand internet network operations	1. Explain multicasting. 2. Explain routing protocols 3. Explain the integrated service architecture. 4. Explain differentiated service and level service agreement 5. Explain IP performance metrics	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Internet network operations **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	0%
14	Students are able to understand Transport Protocols	1. Explain the transport mechanism of the protocol. 2. Explain TCP 3. Explain TCP congestion control. 4. Explaining UDP	**Criteria:** Answering questions. Providing responses to lectures. Asking questions **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Meeting material 14 **Bibliography:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill* **Material:** Transport Protocols **Bibliography:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	0%
15	Students are able to understand electronic mail, internet applications - internet directory services and the world wide web	1. Explain electronic mail – SMTP and MIME. 2. Explain internet directory service - DSN. 3. Explaining web access - HTTP	**Criteria:** Activeness and accuracy of answers **Form of Assessment** : Participatory Activities	Presentations, group discussions and reflections. 3 X 50		**Material:** Electronic mail, internet applications - internet directory services and the world wide web **Bibliography:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	8%
16	UAS	UAS	**Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Written test 3 X 50		**Material:** Meeting material 1-15 **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill* **Material:** Final Semester Exam **Reader:** *W. Stallings. 2007. Data Communication and Computers. 2nd edition. McGraw Hill*	30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	72%
2.	Project Results Assessment / Product Assessment	28%
		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.