



**Universitas Negeri Surabaya**  
**Faculty of Engineering**  
**, Electrical Engineering Education Undergraduate Study Program**

Document Code

## SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																																																		
Data communication	8320102049		T=2	P=0	ECTS=3.18	5	April 26, 2023																																																																		
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																																																			
	Dr. Hapsari Peni		Dr. Lusia Rakhmawati			Dr. Nur Kholis, S.T., M.T.																																																																			
Learning model	Case Studies																																																																								
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																																								
	PLO-8	Have extensive knowledge in the fields of general knowledge, social and humanities (General).																																																																							
	PLO-10	Have a responsible character and be committed to professional ethics (General/SSC4.6).																																																																							
	Program Objectives (PO)																																																																								
	PO - 1	Working together and having social sensitivity and concern for society and the environment in the field of data communications																																																																							
	PO - 2	CPL-KU1 Have extensive knowledge in the fields of general knowledge, social and humanities																																																																							
	PLO-PO Matrix																																																																								
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PO Matrix at the end of each learning stage (Sub-PO)																																																																									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> <tr> <td>PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-2</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>						P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																	PO-2																
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Short Course Description	This course discusses communication system models including analog and digital data transmission, various transmission media, data coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / IP, PSTN telecommunications networks, wireless LAN ,WAN. This course is presented in theoretical form																																																																								
References	Main :																																																																								
	1. Wiliam S . Data and Computer Communication.2010, Pearson 2. Dony A, Rum A. Komunikasi data.2008, Andi																																																																								
	Supporters:																																																																								
Supporting lecturer	Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T. Dr. Raden Roro Hapsari Peni Agustin Tjahyaningtijas, S.Si., M.T. Dr. Lusia Rakhmawati, 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	Students are able to explain communication system models	<ol style="list-style-type: none"> <li>Students are able to understand Analog and Digital transmission models</li> <li>Students are able to understand transmission problems</li> <li>Students are able to calculate canal capacity</li> </ol>	<b>Form of Assessment</b> : Participatory Activities	Discussion, questions and answers, PPT 2 X 50		<b>Material:</b> Meeting material 1 <b>Reader:</b> <i>William S. Data and Computer Communication. 2010, Pearson</i>	5%
2	Students are able to explain communication system models	<ol style="list-style-type: none"> <li>Students are able to understand Analog and Digital transmission models</li> <li>Students are able to understand transmission problems</li> <li>Students are able to calculate canal capacity</li> </ol>	<b>Criteria:</b> Evaluation Rubric  <b>Form of Assessment</b> : Participatory Activities	Discussion, question and answer, PPT - Method: Case Method Learning  Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 2 X 50 questions	Discussion, question and answer, PPT - Method: Case Method Learning  Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 2 X 50 questions	<b>Material:</b> Meeting material 2 <b>Reader:</b> <i>William S. Data and Computer Communication. 2010, Pearson</i>	0%

				<p>answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 2 X 50 questions</p>			
3	Students are able to understand transmission media	Students are able to understand cable transmission media. Students are able to understand wireless transmission media	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.The assessment criteria are carried out by looking at aspects:</li> <li>2.1. Participation: carried out by observing student activities (weight 2)</li> <li>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</li> <li>4.3. UAS: carried out every semester to measure all indicators (weight 3)</li> <li>5.4. Task: carried out on each indicator (weight 3)</li> <li>6.Student Final Grade:</li> <li>7.Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>Discussion, Question and Answer, PPT Discussion, question and answer, PPT - Method: Case Method Learning</p> <p>Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	<p><b>Material:</b> Meeting material 3 <b>Reader:</b> <i>William S. Data and Computer Communication. 2010, Pearson</i></p>	5%	

				<p>provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented Provide suggestions and input on case examples presented Students Collect discussion results according to the agreed time limit. Present and respond to 4 X 50 questions</p>		
4	Students are able to understand transmission media	Students are able to understand cable transmission media. Students are able to understand wireless transmission media	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.The assessment criteria are carried out by looking at aspects:</li> <li>2.1. Participation: carried out by observing student activities (weight 2)</li> <li>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</li> <li>4.3. UAS: carried out every semester to measure all indicators (weight 3)</li> <li>5.4. Task: carried out on each indicator (weight 3)</li> <li>6.Student Final Grade:</li> <li>7.Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>Discussion, Question and Answer, PPT Discussion, question and answer, PPT - Method: Case Method Learning</p> <p>Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>		5%

				Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 2 X 50 questions		
5	Students are able to understand data coding techniques	Students are able to know and understand various codes Students are able to understand digital data coding of digital signals Students are able to understand digital data coding of Analog signals Students are able to understand Analog data coding of digital signals Students are able to understand Analog data coding of Analog signals	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>The assessment criteria are carried out by looking at aspects: <ol style="list-style-type: none"> <li>Participation: carried out by observing student activities (weight 2)</li> <li>UTS: carried out with an assessment during the middle of the semester (weight 2)</li> <li>UAS: carried out every semester to measure all indicators (weight 3)</li> <li>Task: carried out on each indicator (weight 3)</li> </ol> </li> <li>Student Final Grade:</li> <li>Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>Discussion Questions and Answers PPT Discussion, questions and answers, PPT - Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions.</p>	<p>Discussion, question and answer, PPT - Method: Case Method Learning</p> <p>Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	0%

				<p>Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 4 X 50 questions.</p>		
6	Students are able to understand data coding techniques	Students are able to know and understand various codes Students are able to understand digital data coding of digital signals Students are able to understand digital data coding of Analog signals Students are able to understand Analog data coding of digital signals Students are able to understand Analog data coding of Analog signals	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.The assessment criteria are carried out by looking at aspects:</li> <li>2.1. Participation: carried out by observing student activities (weight 2)</li> <li>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</li> <li>4.3. UAS: carried out every semester to measure all indicators (weight 3)</li> <li>5.4. Task: carried out on each indicator (weight 3)</li> <li>6.Student Final Grade:</li> <li>7.Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	Discussion Questions and Answers PPT 4 X 50	Discussion, Q&A, PPT	0%

7	Students are able to understand digital data communication	Students are able to understand Asynchronous transmission Students are able to understand Synchronous transmission Students are able to understand Parallel transmission Students are able to understand Serial transmission Students are able to understand Duplex communication Students are able to understand data communication standards	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.The assessment criteria are carried out by looking at aspects:</li> <li>2.1. Participation: carried out by observing student activities (weight 2)</li> <li>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</li> <li>4.3. UAS: carried out every semester to measure all indicators (weight 3)</li> <li>5.4. Task: carried out on each indicator (weight 3)</li> <li>6.Student Final Grade:</li> <li>7.Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	Presentation Discussion and Questions and Answers 4 X 50	Presentations, Discussions and Questions and Answers		0%
8	UTS	Students are able to understand asynchronous transmission	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.The assessment criteria are carried out by looking at aspects:</li> <li>2.1. Participation: carried out by observing student activities (weight 2)</li> <li>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</li> <li>4.3. UAS: carried out every semester to measure all indicators (weight 3)</li> <li>5.4. Task: carried out on each indicator (weight 3)</li> <li>6.Student Final Grade:</li> <li>7.Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</li> </ol>	4 X 50			0%

9	Students are able to understand digital data communication	<p>1. Students are able to understand asynchronous transmission, Students are able to understand data communication standards</p> <p>2. Students are able to understand synchronous transmission</p> <p>3. Students are able to understand parallel transmission,</p> <p>4. Students are able to understand serial transmission</p> <p>5. Students are able to understand Duplex communication</p>	<p><b>Criteria:</b></p> <p>1. The assessment criteria are carried out by looking at aspects:</p> <p>2.1. Participation: carried out by observing student activities (weight 2)</p> <p>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</p> <p>4.3. UAS: carried out every semester to measure all indicators (weight 3)</p> <p>5.4. Task: carried out on each indicator (weight 3)</p> <p>6. Student Final Grade:</p> <p>7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>Presentation Discussion and Questions and Answers</p> <p>Step 1: Preparation of Case Examples Basic Questions</p> <p>The lecturer asks: what are the public problems that arise, their causes and impacts?</p> <p>Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex)</p> <p>Lecturer determines collection procedures and time</p> <p>Lecturer makes agreement on deadline for collection, Gives students time to form groups</p> <p>Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion</p> <p>Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members</p> <p>. Students. Discussing examples of cases that will be taken. Collecting and processing supporting data.</p> <p>Analyzing cases and their solutions.</p> <p>Preparing presentations.</p> <p>Step 4: Group Presentation.</p> <p>Lecturer examines the presentation, provides opportunities for questions and answers.</p> <p>Provides time. students to reflect and revise cases presented.</p> <p>Provide suggestions and input on case examples presented.</p> <p>Students collect discussion results according to the agreed time limit.</p> <p>Present and respond to 4 X 50 questions</p>	<p>Step 1: Preparation of Case Examples Basic Questions</p> <p>The lecturer asks: what are the public problems that arise, their causes and impacts?</p> <p>Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex)</p> <p>Lecturer determines collection procedures and time</p> <p>Lecturer makes agreement on deadline for collection, Gives students time to form groups</p> <p>Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion</p> <p>Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members</p> <p>. Students. Discussing examples of cases that will be taken. Collecting and processing supporting data.</p> <p>Analyzing cases and their solutions.</p> <p>Preparing presentations.</p> <p>Step 4: Group Presentation.</p> <p>Lecturer examines the presentation, provides opportunities for questions and answers.</p> <p>Provides time. students to reflect and revise cases presented.</p> <p>Provide suggestions and input on case examples presented.</p> <p>Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	60%
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10	Students are able to understand digital data communication	<p>1. Students are able to understand asynchronous transmission, Students are able to understand data communication standards</p> <p>2. Students are able to understand synchronous transmission</p> <p>3. Students are able to understand parallel transmission,</p> <p>4. Students are able to understand serial transmission</p> <p>5. Students are able to understand Duplex communication</p>	<p><b>Criteria:</b></p> <p>1. The assessment criteria are carried out by looking at aspects:</p> <p>2.1. Participation: carried out by observing student activities (weight 2)</p> <p>3.2. UTS: carried out with an assessment during the middle of the semester (weight 2)</p> <p>4.3. UAS: carried out every semester to measure all indicators (weight 3)</p> <p>5.4. Task: carried out on each indicator (weight 3)</p> <p>6. Student Final Grade:</p> <p>7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10</p>	<p>Presentation Discussion and Questions and Answers</p> <p>Step 1: Preparation of Case Examples Basic Questions</p> <p>The lecturer asks: what are the public problems that arise, their causes and impacts?</p> <p>Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex)</p> <p>Lecturer determines collection procedures and time</p> <p>Lecturer makes agreement on deadline for collection, Gives students time to form groups</p> <p>Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion</p> <p>Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members</p> <p>. Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation.</p> <p>Lecturer examines the presentation, provides opportunities for questions and answers.</p> <p>Provides time. students to reflect and revise cases presented.</p> <p>Provide suggestions and input on case examples presented.</p> <p>Students collect discussion results according to the agreed time limit. Present and respond to 4 X 50 questions</p>	<p>Step 1: Preparation of Case Examples Basic Questions</p> <p>The lecturer asks: what are the public problems that arise, their causes and impacts?</p> <p>Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex)</p> <p>Lecturer determines collection procedures and time</p> <p>Lecturer makes agreement on deadline for collection, Gives students time to form groups</p> <p>Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion</p> <p>Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members</p> <p>. Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation.</p> <p>Lecturer examines the presentation, provides opportunities for questions and answers.</p> <p>Provides time. students to reflect and revise cases presented.</p> <p>Provide suggestions and input on case examples presented.</p> <p>Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	60%
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11	Students understand the types of switching and multiplexing	<p>1. Students understand the types of switching</p> <p>2. Students understand the types of multiplexing</p>	<p><b>Criteria:</b> Criteria: Analytical Rubric Form: Non Test</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>Presentation Discussion and Questions and Answers</p> <p>Step 1: Preparation of Case Examples Basic Questions</p> <p>The lecturer asks: what are the public problems that arise, their causes and impacts?</p> <p>Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex)</p> <p>Lecturer determines collection procedures and time</p> <p>Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion</p> <p>Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation.</p> <p>Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	<p>Presentation Discussion and Questions and Answers</p> <p>Step 1: Preparation of Case Examples Basic Questions</p> <p>The lecturer asks: what are the public problems that arise, their causes and impacts?</p> <p>Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex)</p> <p>Lecturer determines collection procedures and time</p> <p>Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion</p> <p>Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation.</p> <p>Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>		60%
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12	Students understand about Spread Spectrum, Frequency Hopping Spread Spectrum, and Direct Sequence Spread Spectrum	<p>1. Students understand about Spread Spectrum</p> <p>2. Students understand how Frequency Hopping Spread Spectrum works</p> <p>3. Students understand how Direct Sequence Spread Spectrum works</p>	<p><b>Criteria:</b> Criteria: Holistic Rubric Form: Non Test</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>- Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	<p>- Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>		70%
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13	Students are able to understand the types of transmission media, the advantages and disadvantages of guided (wired) transmission media and the advantages and disadvantages of guided (wireless) media.	<ol style="list-style-type: none"> <li>Students are able to understand the types of transmission media</li> <li>Students are able to understand the advantages and disadvantages of guided (wired) transmission media</li> <li>Students understand the advantages and disadvantages of unguided (wireless) media</li> </ol>	<b>Form of Assessment :</b> Participatory Activities	- Method: Case Method Learning  Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions	- Method: Case Method Learning  Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions		70%
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14	Students understand how Multiple Access works and the types of multiple access	<p>1. Students understand about Multiple Access</p> <p>2. Students understand how each type of multiple access works</p>	<p><b>Criteria:</b> Criteria: Analytical Rubric Form: Non Test</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>- Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	<p>- Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>		80%
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15	Students understand the function of the data link layer, error detection and error correction	<p>1. Students understand the function of the data link layer</p> <p>2. Students understand error detection and error correction</p>	<p><b>Criteria:</b> Criteria: Analytical Rubric Form: Non Test</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>- Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>	<p>- Method: Case Method Learning</p> <p>Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the public problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer</p> <p>Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups,</p> <p>Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations.</p> <p>Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions</p>		90%
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16	Complete the Final Semester Exam	Evaluation Rubric	<b>Criteria:</b> Evaluation Rubric	Written Test 2 x 50		<b>Material:</b> Meeting material 1-15 <b>Reader:</b> <i>William S. Data and Computer Communication. 2010, Pearson</i>	5%
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**Evaluation Percentage Recap: Case Study**

No	Evaluation	Percentage
1.	Participatory Activities	445%
		100%

**Notes**

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.