



**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
Broadband Optical Network	2020102418		T=2	P=0	ECTS=3.18	5	July 18, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Dr.Farid Baskoro		Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T			Dr. Lusia Rakhmawati, S.T., M.T.	

Learning model	Case Studies
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Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																		
	Program Objectives (PO)																																																		
	PO - 1	students are able to understand and explain the concept of telecommunications, telecommunications systems, virtual private networks; fiber optic communications and fabrication; signal weakening in optical fiber; digital and analog links; optical amplifiers and optical networks																																																	
	PLO-PO Matrix																																																		
	<table border="1" style="margin-left: 40px;"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> </table>		P.O	PO-1																																															
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PO-1																																																			
PO Matrix at the end of each learning stage (Sub-PO)																																																			
<table border="1" style="margin-left: 40px;"> <tr> <td rowspan="2">P.O</td> <td colspan="16">Week</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td> </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> </table>		P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																
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PO-1																																																			

Short Course Description	Our courses provide in-depth knowledge in Optical Wireless Communications systems, covering optical wireless communications trends and usage applications. This course discusses indoor and outdoor channel models, modulation techniques, free space communications and visible light communications.
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References	Main :	
		<ol style="list-style-type: none"> Broadband Telecommunications Handbook 2nd edition 2002 Keiser, G., Optical Fiber Communication, 4nd Ed., McGraw-Hill Inc., 2008. Stamatiou V. Kartalopoulos "Free space optical Networks for Ultra Broadband services" John Wiley & Sons, 2011. Z. Ghassemlooy, W.Popoola, S. Rajbhandari "Optical Wireless Communications- Systems and channel modelling with MATLAB" CRC press, Taylor & Francis, 2019
	Supporters:	<ol style="list-style-type: none"> Ergen, Mustafa Mobile Broadband Including WiMAX and LTE, Springer 2009

Supporting lecturer	Dr. Farid Baskoro, S.T., M.T.
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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 understand and explain telecommunications concepts, telecommunications systems	Students are able to understand and explain telecommunications concepts, telecommunications systems	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain telecommunications concepts, telecommunications systems. Reference: <i>Broadband Telecommunications Handbook 2nd edition 2002</i>	5%
2	Students are able to understand and explain telecommunications concepts, telecommunications systems	Students are able to understand and explain telecommunications concepts, telecommunications systems	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain telecommunications concepts, telecommunications systems. Reference: <i>Broadband Telecommunications Handbook 2nd edition 2002</i>	5%
3	Students are able to understand and explain the concept of virtual private networks	Students are able to understand and explain the concept of virtual private networks	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain the concept of virtual private networks. Reference: <i>Broadband Telecommunications Handbook 2nd edition 2002</i>	3%
4	Students are able to understand and explain the concept of virtual private networks	Students are able to understand and explain the concept of virtual private networks	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain the concept of virtual private networks. Reference: <i>Broadband Telecommunications Handbook 2nd edition 2002</i>	3%
5	Students are able to understand and explain the concept of communication and fiber optic fabrication	Students are able to understand and explain the concept of communication and fiber optic fabrication	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain the concept of optical fiber communication and fabrication. Reference: <i>Keiser, G., Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i>	3%
6	Students are able to understand and explain the concept of communication and fiber optic fabrication	Students are able to understand and explain the concept of communication and fiber optic fabrication	Criteria: according to the assessment rubric Form of Assessment : Portfolio Assessment	case study 2x50		Material: students are able to understand and explain the concept of optical fiber communication and fabrication. Reference: <i>Keiser, G., Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i>	4%

7	Students are able to understand and explain signal attenuation in optical fibers	Students are able to understand and explain signal attenuation in optical fibers	<p>Criteria: according to the assessment rubric</p> <p>Form of Assessment : Portfolio Assessment</p>	case study 2x50		<p>Material: students are able to understand and explain the concept of optical fiber communication and fabrication.</p> <p>Reference: Keiser, G., <i>Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i></p> <hr/> <p>Material: students are able to understand and explain signal attenuation in optical fibers.</p> <p>Reference: Keiser, G., <i>Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i></p>	4%
8	UTS		<p>Form of Assessment : Test</p>	case studies			20%
9	Students are able to understand and explain digital and analog links in fiber optics and WDM concepts	Students are able to understand and explain digital and analog links in fiber optics and WDM concepts	<p>Criteria: according to the assessment rubric</p> <p>Form of Assessment : Portfolio Assessment</p>	case study 2x50		<p>Material: students are able to understand and explain digital and analog links in fiber optics and the WDM concept.</p> <p>Reference: Stamatioas V. Kartalopoulos "Free space optical Networks for Ultra Broadband services" John Wiley & Sons, 2011.</p>	4%
10	Students are able to understand and explain digital and analog links in fiber optics and WDM concepts	Students are able to understand and explain digital and analog links in fiber optics and WDM concepts	<p>Criteria: according to the assessment rubric</p> <p>Form of Assessment : Portfolio Assessment</p>	case study 2x50		<p>Material: students are able to understand and explain digital and analog links in fiber optics and the WDM concept.</p> <p>Reference: Stamatioas V. Kartalopoulos "Free space optical Networks for Ultra Broadband services" John Wiley & Sons, 2011.</p>	4%
11	Students are able to understand and explain optical amplifiers and optical networks	students are able to understand and explain students are able to understand and explain optical amplifiers and optical networks	<p>Criteria: according to the assessment rubric</p> <p>Form of Assessment : Portfolio Assessment</p>	case study 2x50		<p>Material: students are able to understand and explain digital and analog links in fiber optics and the WDM concept.</p> <p>Reference: Stamatioas V. Kartalopoulos "Free space optical Networks for Ultra Broadband services" John Wiley & Sons, 2011.</p> <hr/> <p>Material: students are able to understand and explain optical amplifiers and optical networks.</p> <p>References: Keiser, G., <i>Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i></p>	4%

12	Students are able to understand and explain optical amplifiers and optical networks	students are able to understand and explain students are able to understand and explain optical amplifiers and optical networks	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain digital and analog links in fiber optics and the WDM concept. Reference: <i>Stamatias V. Kartalopoulos "Free space optical Networks for Ultra Broadband services" John Wiley & Sons, 2011.</i> <hr/> Material: students are able to understand and explain optical amplifiers and optical networks. References: <i>Keiser, G., Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i>	4%
13	Students are able to understand and explain optical amplifiers and optical networks	students are able to understand and explain students are able to understand and explain optical amplifiers and optical networks	Criteria: according to the assessment rubric Form of Assessment : Participatory Activities, Portfolio Assessment	case study 2x50		Material: students are able to understand and explain digital and analog links in fiber optics and the WDM concept. Reference: <i>Stamatias V. Kartalopoulos "Free space optical Networks for Ultra Broadband services" John Wiley & Sons, 2011.</i> <hr/> Material: students are able to understand and explain optical amplifiers and optical networks. References: <i>Keiser, G., Optical Fiber Communication, 4th Ed., McGraw-Hill Inc., 2008.</i>	4%
14	Projects		Form of Assessment : Project Results Assessment / Product Assessment				5%
15	Projects		Form of Assessment : Project Results Assessment / Product Assessment				5%
16	UAS		Form of Assessment : Test				23%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	13.5%
2.	Project Results Assessment / Product Assessment	10%
3.	Portfolio Assessment	33.5%
4.	Test	43%
		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.