	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
Laser Engineering	8320102184		T=2	P=0	ECTS=3.18	5	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Nur Kholis, S.T., M.T.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

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

Short Course Description	Application of photonic technology in the design and manufacture of integrated photonic devices for optical signal processing in high speed telecommunications systems.
References	**Main :**

1. Bahtiar. 2008. Rekayasa Optik : Diktat Kuliah. Fisika Universitas Padjadjaran.
2. O. Svelto. 1998. Principle of Lasers : fourth Edition. New York: Plenum Press.
3. B.E.A. Saleh and M.C. Teich. 1991.Fundamentals of Photonics. John Wiley & Sons Inc., NY.
4. JD Joannopoulos RD Meade JN Winn. 1995. Photonic Crystals : Molding the Flow of Light. Princeton University Press.
5. K. Sakoda. 2001.Optical Properties of Photonic Crystals. Springer Verlag Berlin.

Supporters:	
Supporting lecturer	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	Laser working principles and Laser Physics	Explain the working principle of the formation of laser light	**Criteria:** Assignments are rated excellent, good, and fair	Lectures and discussions 2 X 50			0%

2	Explain the types of lasers	Explain the types of lasers (solid laser, liquid laser and gas laser)	**Criteria:** Very good, good, and enough	Lectures and discussions 2 X 50			0%
3	Shows the differences in laser light beam patterns (Gauss, Hermite-Gauss, Laguerre-Gaus, and Bessel beams) and their consequences	Can show differences in laser light beam patterns (Gauss, Hermite-Gauss, Laguerre-Gaus, and Bessel beams) and their consequences	**Criteria:** Very good, good, and enough	Lectures and discussions 2 X 50			0%
4	Comparing the working principles of metal and dielectric waveguides and connecting a laser light source with a planar waveguide (coupling technique)	Can compare the working principles of metal and dielectric waveguides and connect a laser light source with a planar waveguide (coupling technique)	**Criteria:** Very good, good, and enough	Lectures and discussions 2 X 50			0%
5	Comparing the working principles of metal and dielectric waveguides and connecting a laser light source with a planar waveguide (coupling technique)	Can compare the working principles of metal and dielectric waveguides and connect a laser light source with a planar waveguide (coupling technique)	**Criteria:** Very good, good, and enough	Lectures and discussions 2 X 50			0%
6	Distinguish between two types of optical fiber design and their consequences, and evaluate the losses in optical signal transmission due to intrinsic and extrinsic factors of the optical fiber	Can differentiate between two types of optical fiber designs and their consequences, and evaluate optical signal transmission losses due to intrinsic and extrinsic factors of optical fibers	**Criteria:** Very good, good, and enough	Lectures and discussions 2 X 50			0%
7	Distinguish between two types of optical fiber design and their consequences, and evaluate the losses in optical signal transmission due to intrinsic and extrinsic factors of the optical fiber	Can differentiate between two types of optical fiber designs and their consequences, and evaluate optical signal transmission losses due to intrinsic and extrinsic factors of optical fibers	**Criteria:** Very good, good, and enough	Lectures and discussions 2 X 50			0%
8	UTS	Meetings 1 to 7	**Criteria:** According to UTS results	Meetings 1 to 7 2 X 50			0%
9	Comparing the advantages and disadvantages of each type of switching system, discussing the concept of photonic crystals and comparing it with the concept of crystals in semiconductors, and discussing several applications of photonic crystals for integrated optical devices and comparing them with conventional devices (ordinary planar waveguides)	Comparing the advantages and disadvantages of each type of switching system, discussing the concept of photonic crystals and comparing it with the concept of crystals in semiconductors, and discussing several applications of photonic crystals for integrated optical devices and comparing them with conventional devices (ordinary planar waveguides)	**Criteria:** Discussion results	Discussion 2 X 50			0%

10	Comparing the advantages and disadvantages of each type of switching system, discussing the concept of photonic crystals and comparing it with the concept of crystals in semiconductors, and discussing several applications of photonic crystals for integrated optical devices and comparing them with conventional devices (ordinary planar waveguides)	Comparing the advantages and disadvantages of each type of switching system, discussing the concept of photonic crystals and comparing it with the concept of crystals in semiconductors, and discussing several applications of photonic crystals for integrated optical devices and comparing them with conventional devices (ordinary planar waveguides)	**Criteria:** Discussion results	Discussion 2 X 50			0%
11	Comparing the advantages and disadvantages of each type of switching system, discussing the concept of photonic crystals and comparing it with the concept of crystals in semiconductors, and discussing several applications of photonic crystals for integrated optical devices and comparing them with conventional devices (ordinary planar waveguides)	Comparing the advantages and disadvantages of each type of switching system, discussing the concept of photonic crystals and comparing it with the concept of crystals in semiconductors, and discussing several applications of photonic crystals for integrated optical devices and comparing them with conventional devices (ordinary planar waveguides)	**Criteria:** Discussion results	Discussion 2 X 50			0%
12	Analyze the photonic devices in the paper for further performance improvement, analyze the photonic devices in the paper for further performance improvement, and analyze the photonic devices in the paper for further performance improvement	Can analyze the photonic devices in the paper for further performance improvement, analyze the photonic devices in the paper for further performance improvement, and analyze the photonic devices in the paper for further performance improvement	**Criteria:** Presentation results and individual reports	Presentation 2 X 50			0%
13	Analyze the photonic devices in the paper for further performance improvement, analyze the photonic devices in the paper for further performance improvement, and analyze the photonic devices in the paper for further performance improvement	Can analyze the photonic devices in the paper for further performance improvement, analyze the photonic devices in the paper for further performance improvement, and analyze the photonic devices in the paper for further performance improvement	**Criteria:** Presentation results and individual reports	Presentation 2 X 50			0%

14	Analyze the photonic devices in the paper for further performance improvement, analyze the photonic devices in the paper for further performance improvement, and analyze the photonic devices in the paper for further performance improvement	Can analyze the photonic devices in the paper for further performance improvement, analyze the photonic devices in the paper for further performance improvement, and analyze the photonic devices in the paper for further performance improvement	**Criteria:** Presentation results and individual reports	Presentation 2 X 50			0%
15	Analyze the photonic devices in the paper for further performance improvements	Can analyze photonic devices in the paper for further performance improvement	**Criteria:** Results of individual presentations and reports	Individual presentation 2 X 50			0%
16	Explain the application of modern optics or the use of photons for processing optical signals in integrated devices, such as electron engineering in electronic devices	Can explain the application of modern optics or the use of photons for processing optical signals in integrated devices, such as electron engineering in electronic devices	**Criteria:** UAS	UAS 2 X 50 test			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

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.