	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
ENGINEERING PHYSICS II	2020102393	Compulsory Study Program Subjects	T=2 P=0 ECTS=3.18	2	July 18, 2024

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	Understand and apply basic and advanced physics concepts in mechanics and electromagnetism
PO - 2	Understand and apply the laws of physics to electrical and magnetic systems
PO - 3	Understand and apply wave theory, including electromagnetic and optical waves

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: The Engineering Physics II course is an advanced course that discusses an in-depth understanding of the principles of physics applied in the world of electrical engineering. Discussions include two-dimensional motion, gradients, divergence, curl, line, surface and volume integrals, Gauss and Stokes theorems, electric and magnetic fields, resistance currents, electric voltage, alternating current, induced magnetic fields, Maxwell's equations, electromagnetic waves, and the propagation properties of light.

References

Main :

1. Halliday, Resnic, Jearl Walker ; 'Fundamental of Physics'. John Wiley and Sons, 10th ed, New York, 2014
2. Douglas C. Giancoli, 'Physics for Scientists and Engineers , Pearson Education, 4th ed, London, 2014
3. Paul M. Fishbane, Stephen G Gasiorowics, Stephen T.Thornton, 'Physics for Scientists and Engineering with Modern Physics, Parson Educaion Inernasional, 3rd ed,2005

Supporters:

	1. Tipler, PA, 'Physics for Scientists and Engineers ',6th ed, W.H. Freeman and Co, New York, 2008 2. B. Sears, F.W. dan M.W.Zemansky (disadur oleh Ir. Soedarjana dan Drs. Amir Achmad). Fisika untuk Universitas 1. bandung: Penerbit ITM, 1984.
Supporting lecturer	Dr. Tri Rijanto, M.Pd., M.T. Prof. Dr. Joko, M.Pd., M.T. Dr. Puput Wanarti Rusimamto, S.T., M.T. Roswina Dianawati, S.Pd., M.Ed.

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	Understand and solve two-dimensional motion problems	Understanding of concepts and applications	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Advanced vectors **References:** *Halliday, Resnic, Jearl Walker ; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
2	Understand gradients, divergence, and curl	Understanding of theory and application in cases	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Gradients, Divergence, and Curl **References:** *Halliday, Resnic, Jearl Walker ; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
3	Understand line, surface and volume integrals	Understanding and solving integrals in various coordinates	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Integral **Bibliography:** *Halliday, Resnic, Jearl Walker ; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
4	Understand Gauss and Stokes' theorem	Understanding of concepts and their applications in physics	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Gauss and Stokes **Bibliography:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
5	Understand electric force and Coulomb's Law	Case analysis and application of Coulomb's Law	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Coulomb's Law **Bibliography:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%

6	Understand electric fields and electric field flux	Understanding the concept and application of Gauss's Law	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Gauss's Law **Bibliography:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
7	Understand magnetic fields and Ampere's Law	Analysis and application of Ampere's and Biot-Savart's Laws	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Ampere's Law and Biot-Savart **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
8	Midterm Exam (UTS)	Comprehensive evaluation of Meeting 1-7 material	**Criteria:** Rubrics and scoring **Form of Assessment** : Test	Written exam 2x50 minutes		**Material:** Material for weeks 1-7 **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	20%
9	Understanding Resistance Current and Electric Voltage	Understanding of concepts and practical application	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** DC Circuits **References:** *Halliday, Resnic, Jearl Walker ; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
10	Understanding Alternating Current	Case analysis and theoretical understanding	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** AC circuits **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
11	Understand induced magnetic fields and Maxwell's Equations	Understanding of concepts and applications	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Maxwell's Equations **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%

12	Understand the process of the birth of electromagnetic waves	Analysis and application of Maxwell's Equations	**Criteria:** Rubrics and scoring	Lecture and Case study discussion 2x50 minutes		**Material:** Maxwell's Equations **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
13	Explain the spectrum of electromagnetic waves and transmission paths	Theoretical understanding and practical application	**Criteria:** Rubrics and scoring	Lecture and Case study discussion 2x50 minutes		**Material:** Wave spectrum **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
14	Understand the nature of light propagation and interference	Analysis of light phenomena and application of theory	**Criteria:** Rubrics and scoring **Form of Assessment** : Participatory Activities	Lecture and Case study discussion 2x50 minutes		**Material:** Light phenomena **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
15	Understand diffraction, grating, spectrum, and polarization	Understanding of concepts and their application in experiments	**Criteria:** Rubrics and scoring **Form of Assessment** : Portfolio Assessment	Lecture and Case study discussion 2x50 minutes		**Material:** Diffraction, grating, spectrum, and polarization **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	5%
16	Final Semester Examination (UAS)	Comprehensive evaluation of all semester material	**Criteria:** Rubrics and scoring **Form of Assessment** : Test	Written Exam 2x50 minutes		**Material:** All material from Engineering Physics II **References:** *Halliday, Resnic, Jearl Walker; 'Fundamentals of Physics'. John Wiley and Sons, 10th ed, New York, 2014*	20%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	55%
2.	Portfolio Assessment	5%
3.	Test	40%
		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.