	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**
Electromagnetic Field	8320102263	Compulsory Study Program Subjects	**T=0**	**P=0**	**ECTS=0**	2	January 2, 2024

AUTHORIZATION	**SP Developer**	**Course Cluster Coordinator**	**Study Program Coordinator**
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Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-5	Able to align the electrical and electronics engineering training curriculum in vocational education that is relevant to the demands of global industrial development (Education).
	PLO-9	Able to communicate in Indonesian and English well orally and in writing (General).
	PLO-10	Have a responsible character and be committed to professional ethics (General/SSC4.6).
	PLO-11	Have extensive knowledge in the fields of mathematics, science and electrical engineering so that you can solve complex problems typical of electrical engineering and electronics engineering skills programs by following the rules of scientific writing (SSC2.2).
	Program Objectives (PO)	
	PO - 1	Mastering the concept of basic electromagnetic field theory which includes electrostatic field theory, fixed and time-changing electromagnets, as well as the basic laws that support it.
	PO - 2	Mastering the concept of static magnetic fields, the concept of dynamic electromagnetic fields, Maxwell's equations and their applications
	PO - 3	Able to analyze electrostatic field problems, fixed and time-changing electromagnets, and use related basic laws
	PO - 4	Able to analyze the problems of static magnetic fields and dynamic electromagnetic fields and able to analyze the propagation of flat waves simultaneously in various media
	PO - 5	Able to analyze electrostatic field problems, fixed electromagnets and changes over time
	PLO-PO Matrix	

P.O	PLO-5	PLO-9	PLO-10	PLO-11
PO-1				
PO-2				
PO-3				
PO-4				
PO-5				

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																
PO-4																
PO-5																

Short Course Description	Electromagnetic Fields discusses an in-depth understanding of the theory and application of electromagnetism, including static and dynamic aspects of electromagnetic fields. The main focus of this course is on the basic principles of electromagnetic fields, including their effects on conductors, dielectrics, and capacitance, as well as on static and dynamic magnetic fields. This course also examines changes in electromagnetic fields over time and their applications in various electronic components and electrical machines, including semiconductors and capacitors.
References	**Main :**
	1. Edminister, J. A., & Nahvi, M. (2014). Schaum's Outline of Electromagnetics. McGraw-Hill Education. 2. Salam, M. A. (2014). Electromagnetic field theories for engineering. Springer Science & Business Media.
	Supporters:
Supporting lecturer	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	Able to understand basic electromagnetic concepts, vector definitions, and vector operations						0%
2	Able to understand the meaning of Coulomb's law and the concept of electric field intensity						0%
3	Able to understand the concepts of electric flux density, Gauss's law, and divergence						0%
4	Able to understand the concepts of energy and work, electric potential and potential difference						0%
5	Able to understand the nature of conductors, the concept of dielectricity, and the meaning of capacitance						0%
6	Able to understand the source of magnetic fields, Biot-Savart's law, and Ampere's law						0%
7	Able to understand the concepts of permeability, hysteresis, force on moving charges in a magnetic field, and inductance						0%

8							0%
9	Able to understand Maxwell's equations, as well as the concept of changing field applications						0%
10	Able to understand the concept of plane waves, wave equations, and propagation in various media						0%
11							0%
12							0%
13							0%
14							0%
15							0%
16							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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.