	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Bachelor of Science Education Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Electricity and Magnetism	8420103068		T=3	P=0	ECTS=4.77	5	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Prof. Dr. Erman, M.Pd.

Learning model	**Case Studies**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-5	Demonstrate scientific, critical, and innovative attitudes in integrated science learning, laboratory activities, and professional-related tasks
	PLO-11	Design and conduct research about learning of integrated science, and acquire, analyze, and interpret the research data
	Program Objectives (PO)	
	PO - 1	1 Able to show a responsible attitude, demonstrate a scientific, critical and innovative attitude independently during the lecture process.
	PO - 2	2 Able to master the basic concepts of static electricity, dynamic electricity and magnetism and their application to solve problems in everyday life.
	PO - 3	3 Able to demonstrate independent, quality and measurable performance and make decisions in making project products appropriately and can work individually or in a team.
	PLO-PO Matrix	

P.O	PLO-5	PLO-11
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	This course discusses static electricity, dynamic electricity, magnetism, electromagnetic induction, alternating current electricity, and an introduction to electromagnetic waves. Lectures are carried out with modeling, presentations, discussions and practicums.
References	**Main :**

1.

1. Sharpe, Pamela. J. 2003. How to prepare for the TOEFL. Barron's Educational Series. NY

2. *Phillips, Deborah. 2004.* Longman Preparation Course for the TOEFL Test: The Paper Test (Student Book with Answer Key and CD-ROM). Pearson Education. NY

3. _____. 2012. Official Guide to the TOEFL Test With CD-ROM, 4th Edition (Official Guide to the Toefl Ibt). McGraw-Hill. USA.

4 . *Phillips, Deborah. 2001.* Longman Introductory Course for the TOEFL Test: iBT, 2nd ed. Pearson Education. NY

5. Worcester, Adam, et al. 2008 **. Building Skill for the TOEFL iBT** : Beginning. Compass Publishing.

6. Cullen, Pauline, et al. 2014. The Official Cambridge Guide to IELTS Students Book With Answers with DVD-ROM. Oxford University Press.

7. Parthare, Emma; Parthare, Gary; May, Peter. 2013. Headway Academic Skills IELTS Study Skills Edition: Level 1 Students Book.Oxford University Press.

8. Lougheed, Lin. 2007. Longman Preparation Series for the TOEIC Test: Listening and Reading, 5th Edition. Pearson Education. NY

9. **Buku yang disusun oleh Tim Mata Kuliah Bahasa Inggris**

Supporters:	

Supporting lecturer	Dr. Mohammad Budiyanto, S.Pd., M.Pd. Tutut Nurita, S.Pd., M.Pd. Laily Rosdiana, S.Pd., M.Pd. Aris Rudi Purnomo, S.Si., M.Pd., M.Sc. Muhamad Arif Mahdiannur, S.Pd., M.Pd. Dr. Syarif Prasetyo, S.Si., M.Si. Fasih Bintang Ilhami, S.Kep., M.T., Ph.D. Dr. Sapti Puspitarini, S.Si., M.Si.

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	Utilizing science and technology to explore data and information about electricity and magnetism and their use in everyday life.	1.Explain the properties of electricity and magnetism. 2.Mention examples of electrical and magnetic objects in everyday life. 3.Answer questions related to electricity and magnetism.	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities, Tests	Contextual Learning Approach, Lectures and Practicum 3 X 50		**Material:** Electrical and magnetic properties **References:**	5%
2	Analyze the symptoms of static electricity (Coulomb's law, electric field, electric potential, electric potential energy, and capacitors)	· Define electric charge · Define Coulomb's law · Analyze electric field strength	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** Electric charge Coulomb's law Electric field strength **References:**	5%

3	Analyze the symptoms of static electricity (Coulomb's law, electric field, electric potential, electric potential energy, and capacitors)	· Describe the concept of Gauss's law. · Calculating electric potential · Determining the capacitance of a capacitor	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** Gauss's Law of Electric Potential Capacitance of Capacitors **References:**	5%
4	Analyze the symptoms of static electricity (Coulomb's law, electric field, electric potential, electric potential energy, and capacitors)	Determining the capacitance of a capacitor circuit Analyzing the symptoms of static electricity, electric fields, electric potential and energy	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the explanation is wrong **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** capacitor capacitance Symptoms of static electricity **Reference:**	5%
5	Analyzing dynamic electrical phenomena and their application by utilizing science and technology.	Carrying out dynamic electrical investigations Analyzing unidirectional electrical circuits (series, parallel, mixed, Wheatstone bridge)	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** Dynamic electricity Unidirectional electric circuits **References:**	10%
6	Analyzing dynamic electrical phenomena and their application by utilizing science and technology. Analyze the phenomena of magnetism, magnetic induction, and electromagnetic induction and their applications by utilizing science and technology	· Analyze dynamic electrical phenomena and their application by utilizing science and technology.	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** Kirchoff's Laws **Bibliography:**	10%
7	Analyze the phenomena of magnetism, magnetic induction, and electromagnetic induction and their applications by utilizing science and technology	1. Conduct investigations into magnetic induction and electromagnetic induction 2. Analyze the phenomena of magnetism, magnetic induction, and electromagnetic induction 3. Producing products that utilize the phenomena of magnetic induction or electromagnetic induction	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** Magnetic and electromagnetic induction Magnetic symptoms **Literature:**	10%

8	Midterm exam	1. Analyzing electric field strength 2. Calculate electric potential 3. Determine the capacitance of the capacitor 4. Analyze unidirectional electrical circuits (series, parallel, mixed, Wheatstone bridge) 5. Apply Khirchoff's laws to analyze complex circuits. 6. Analyze the phenomena of magnetism, magnetic induction, and electromagnetic induction	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 3. 1: the description is wrong **Form of Assessment** : Test	paper and pencil test (Midterm Exam) 3 X 50		**Material:** electric field strength, electric potential, capacitors, electric circuits, Khirchoff's law, magnetism and electromagnetic induction **References:**	0%
9	Analyze resistance, inductors, and/or capacitors in alternating current circuits	1. Formulate transient induction in RC and RL circuits 2. Define resistance, capacitance and effective values of current and voltage. 3. Determine the current and voltage in the C, L, RC, RL, series RLC and parallel RLC circuits in AC circuits	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** RC and RL circuits **Library:**	10%
10	Analyze resistance, inductors, and/or capacitors in alternating current circuits	1. Formulate transient induction in RC and RL circuits 2. Define resistance, capacitance and effective values of current and voltage. 3. Determine the current and voltage in the C, L, RC, RL, series RLC and parallel RLC circuits in AC circuits	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities	Contextual Learning Approach, lecture, practicum 3 X 50		**Material:** Resistance and capacitance **References:**	10%
11	Analyze resistance, inductors, and/or capacitors in alternating current circuits	1. Formulate transient induction in RC and RL circuits 2. Define resistance, capacitance and effective values of current and voltage. 3. Determine the current and voltage in the C, L, RC, RL, series RLC and parallel RLC circuits in AC circuits	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect **Form of Assessment** : Participatory Activities		Contextual Learning Approach, 3 X 50 lectures	**Material:** Resistance and capacitance **References:**	5%

12	Have creativity and innovation in developing media about electricity and magnetism	Determine the current and voltage in the C, L, RC, RL, series RLC and parallel RLC circuits in AC circuits	**Criteria:** 1.Mark 2.Rubric 3.A 4.1. The product matches the concept 5.2. Suitability of the method/procedure used with the real product 6.3. Product operations can be used according to the concept 7.4. Innovation in the circuit and placement of measuring instruments 8.5. Aesthetics and selling value 9.A- 10.All components are done, there is 1 part missing 11.B 12.All components are done, there are 2 parts missing 13.B 14.All components are done, there are 3 parts missing 15.B- 16.All components are done, there are 4 parts missing 17.C 18.All components are done, but everything is still lacking **Form of Assessment** : Participatory Activities	lectures and practicum 3 X 50		**Material:** Current and voltage in AC circuits **References:**	5%
13	Communicate the results of research or scientific work related to electricity and magnetism.	Develop and use interesting learning media to make it easier to learn and teach about electricity and magnetism	**Criteria:** Assessment Form: Non-Test Assessment Criteria: Using a rubric **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	lectures and percentages 3 X 50		**Material:** Symptoms of magnetism **Reference:**	10%

14	Designing KIT product designs/learning media for electric motors and electrical installations in miniature houses (series, parallel, socket)	Develop and use interesting learning media to make it easier to learn and teach about electricity and magnetism	**Criteria:** 1. Mark 2. Rubric 3. A 4. 1. The product matches the concept 5. 2. Suitability of the method/procedure used with the real product 6. 3. Product operations can be used according to the concept 7. 4. Innovation in the circuit and placement of measuring instruments 8. 5. Aesthetics and selling value 9. A- 10. All components are done, there is 1 part missing 11. B 12. All components are done, there are 2 parts missing 13. B 14. All components are done, there are 3 parts missing 15. B- 16. All components are done, there are 4 parts missing 17. C 18. All components are done, but everything is still lacking **Form of Assessment** : Project Results Assessment / Product Assessment		3x50' workshop lecture	**Material:** Learning media Electricity and magnetism **References:**	5%

15	Produces KIT products/learning media for electric motors and electrical installations in miniature homes (series, parallel, socket circuits).	1. Analyzing electric field strength 2. Calculate electric potential 3. Determine the capacitance of the capacitor 4. Determine the capacitance of a capacitor circuit 5. Analyze the symptoms of static electricity, electric fields, electric potential and energy 6. Analyze unidirectional electrical circuits (series, parallel, mixed, Wheatstone bridge) 7. Apply Khirchoff's laws to analyze complex circuits 8. Analyze the phenomena of magnetism, magnetic induction, and electromagnetic induction 9. Determine the current and voltage in the C, L, RC, RL, series RLC and parallel RLC circuits in AC circuits	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong **Form of Assessment** : Practice / Performance	presentation 3 X 50		**Material:** scientific papers on electricity and magnetism **References:**	5%
16	-	Accuracy in answering the questions provided	**Criteria:** Based on Assessment Guidelines **Form of Assessment** : Test	Final Semester Exam 3x50'		**Material:** Electric circuits and electromagnetic induction **References:**	0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	82.5%
2.	Project Results Assessment / Product Assessment	10%
3.	Practice / Performance	5%
4.	Test	2.5%
		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** 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.