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|  | **UNIVERSITAS NEGERI PADANG****ENGINEERING FACULTY** **ELECTRONIC DEPARTMENT****INFORMATIC EDUCATION STUDY PROGRAM** | **Document Code** |
| **LEARNING STUDY PLAN (SLP)** |
| **Course** | **Code** | **Course Field** | **Credit Points (s)** | **Semester** | **Date of creation** |
| **Electrical Physics** | TIK 1.61.1302 | Compulsory Courses of the Study Program | 2 CP (theory) | 1 |  July 2017 |
| **Authorized** | **Lecturers** | **Course Coordinator** | **Head of Study Program** |
| **Dra. Nelda Azhar, M.Pd** |  | **Ahmaddul Hadi, S.Pd,M.Kom****NIP. 197612092005011003** |
| **Learning Outcomes** | **Learning Outcomes (LO)** |
| LO – S1 | Devote to God Almighty, Pancasila minded, and aware of the interest of the nation. |
| LO – S9  | Have responsibility, confidence, emotionally mature, ethics, and lifelong learner principle. |
| LO – PP5 | Mastering basic science concepts in the field of Informatics Engineering |
| LO – KU5 | Able to make decisions appropriately in the context of problem solving in their field of expertise, based on the results of information and data analysis. |
| LO – KK5  | Ability to apply basic science knowledge in the field of Informatics Engineering |
| **Course Outcomes (CO)** |
| CO1 | Able to explain electrical principles |
| CO2 | Able to explain the concepts and features of the form of an electrical circuit |
| CO3 | Able to solve problems of the electrical circuit based on the basic law of electricity |
| CO4 | Able to explain the concepts of magnetism |
| CO5 | Able to apply physics theory in practical learning in the field |
| **Course Description** | This course discusses Coulomb's law, electric fields, electrical potential, electric currents and resistance, Ohm's Law, Kirchoof's Law, Magnetic Fields, Biot Savart, Induction GGL, Transformers and Lorentz Force. |
| **Course Materials** | 1. Electric Motion (GGL), electric current and electrical resistance2. The forms of the electrical circuit3. Basic law of electricity4. Magnetic field5. Induced electromotive force6.Magnetic force (Lorentz force) |
| **References** | **Main :** |  |
| 1. Nelda Azhar, Dra., M.Pd (2019). **Fisika Teknik Listrik.** Padang: UNP Press
2. Sears, FW., Zemansky, MW., Soerdarjana. (1985). **Fisika Untuk Universitas 2**: Listrik Magnet,Bandung : Binacipta.
3. Sutrisno, Tan Ik Gie. (1983) **Fisika Dasar, Listrik, Magnet dan Termofisika.** Bandung : ITB.
4. Tipler, A, Paul Bambang Soegjiono, Dr. (1996). **Fisika untuk Sains dan Teknik.** Jakarta : Erlangga.
5. Usmeldi, Drs., M.Pd (2003) **Modul dan Pentujuk Pratikum Fisika Terapan.** Laboratorium Fisika Teknik UNP.
 |
| **Additional :** |  |
| 1. Halliday, D., Resnick, R, Silaban. P.(1990) **Fisika2.** Jakarta: Erlangga.
2. Hayt,WH., Kemmerly,JE.Silaban, P (1985).**Rangkaian Listrik 1.** Jakarta : Erlangga
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| **Media**  | **Software:** | **Hardware :** |
| MS Office  | LCD & Projector |
| **Lecturer** | **Dra. Nelda Azhar, M.Pd** |
| **Recommended prerequisites** | - |
| **Week** | **Sub-Learning Outcomes** | **Assessment Indicators** | **Assessment Criteria** | **Learning Method, Students’ Learning Experience****[Time Allocation]** | **Learning Material****[Topic from Reference]** | **Score (%)** |
| **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** |
| 1-2 | Electric Motion (GGL), Electric Current and Conductor Resistance | 1. Accuracy explains about the electromotive force (GGL2. Accuracy in explaining electric currents;3. Provision describes the resistance of the conductor. | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 2x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 2 x (2x70 Minutes) | Electric Motion, electric current, GGL sources, resistivity and conductivity, and the effect of temperature on resistance.[1,2,3,4,5,6,7] | **5 %** |
| 3 | Various Prisoners | 1. The decree explains the various types of detainees | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 1x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 1 x (2x70 Minutes) | Explain the meaning of prisoners, the function of prisoners, types of prisoners, color code of prisoners and read the value of prisoners[1,2,3,4,5,6,7] | **5 %** |
| 4-5 | Detention Network | 1. The accuracy in distinguishing the various types of resistance circuits2. Accuracy in calculating the value of replacement resistance | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 2x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 2 x (2x70 Minutes) | Explain the meaning of various chains, hold different series series in simple series, calculate total prisoners in series, calculate total prisoners in parallel, calculate total prisoners in mixed series, transform triangles into stars and stars to segments[1,2,3,4,5,6,7] | **15 %** |
| 6 | Ohm's Law | 1. Accuracy in explaining the definition of ohms law2. The accuracy of the total current and voltage | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 1x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 1 x (2x70 Minutes) | Explains the law of ohms, calculates current in simple circuits, and calculates voltage in simple circuits[1,2,3,4,5,6,7] | **15 %** |
| 7 | Kirchoff's Law I | 1. Accuracy in explaining the meaning of Kirchoff I's law2. Accurately calculate the current for each branch | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 1x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 1 x (2x70 Minutes) | Explaining the current kirchoff law, calculating the branch current in a series parallel circuit[1,2,3,4,5,6,7] | **15 %** |
| 8-9 | Kirchoff's Law II | 1. Accuracy in explaining the meaning of Kirchoff II's law2. Ketetapatan calculates the current for each Loop | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 2x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 2 x (2x70 Minutes) | Explain the kirchoff voltage law, calculate the current and voltage in a 2 loop circuit, and calculate the current and voltage in a 3 loop circuit[1,2,3,4,5,6,7] | **20 %** |
| 10 | **UTS / Mid Test**  |  |
| 11-12 | Magnetic field | 1. Accuracy explains the meaning of the magnetic field2. Accuracy describes the permeability of magnets and magnetic materials3. Accuracy in calculating the magnetic field strength | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 2x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 2 x (2x70 Minutes) | Describe the shape and properties of magnets, calculate the force between two magnetic poles. Explain the meaning of magnetic flux. Distinguishing magnetic field strength and magnetic induction. Explain the meaning of magnetic permeability, and distinguish magnetic materials based on permeability. Describes the Oersted experiment. Uses the Biot-Savart law to determine the magnetic field around a long straight wire, called soleneides, tororides.[1,2,3,4,5,6,7] | **10** |
| 13-14 | Induced Electric Motion | 1. Accuracy describes the principle of induction2. Accuracy in calculating the number of turns. Voltage and current of the transformer | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 2x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 2 x (2x70 Minutes) | Explain the occurrence of induced current based on Faraday's law of induction, explain Lenz's law, explain the principle of electric generators and the working principle of a transformer, calculate the secondary voltage and efficiency of a transformer[1,2,3,4,5,6,7] | **10 %** |
| 15 | Magnetic Force | 1. Accuracy explains the meaning of magnetic force2. The accuracy of calculating the amount of induction in Lorentz force | **Form:**1. Quiz
2. Assignment
 | 1. Presentation
2. Online
3. Practice

TM : 1x ( 2 x 100 Minutes)1. Structured Assignments

BM+BT : 1 x (2x70 Minutes) | Describe the emergence of the magnetic force (Lorentz force). Using the Lorentz force to determine the magnetic force in a moving electric charge, and on an electrically current conductor, explains the working principle of an electric motor, and calculates the moment of force in an electric motor.[1,2,3,4,5,6,7] | **5%** |
| 16 | **Final Test** |  |