Electronics

Module Name :	Electronics
Module Level :	Undergraduate
Code :	32253014
Sub-heading, if applicable :	
Classes, if applicable :	
Semester :	3rd
Module coordinator :	Prof. Dr. Agus Setyo Budi, M.Sc
Lecturer(s) :	Prof. Dr. Agus Setyo Budi, M.Sc Dewi Muliyati, S.Pd., M.Si, M.Sc
Language :	Indonesian
Classification within the curriculum :	Compulsory course
Type of Teaching	Contact hours per week during the semester: Class Size
Lecture (Expository, discussion, exercise)	200 minutes: 40
Workload	Total workload of this course 181,3 hours (6 ECTS) per semester which consist of 53,4 hours (1.76ECTS) classroom activity, 64 hours (2,12 ECTS) structured task, and 64 hours (2,12 ECTS) per semester.
Credit points :	6 ECTS
Prerequisite course(s) :	-
Course Outcomes :	After taking this course the student have ability to : CLO1. Understand the basic concepts of electrical circuits and describe the associated magnitudes. CLO2. Understand the elements of an electrical circuit and describe the properties of each element of an electrical circuit. CLO3. Understand the concept of resistive circuits and apply them to series-parallel relationships.

	CLO4. Analyze resistive circuits. CLO5. Understand the concept of circuit theorem and analyze electrical circuits using the circuit theorem. CLO6. Understand the basic concepts of capacitors and inductors and analyze capacitor and inductor circuits. CLO7. Understand alternating current and apply it to analyzing alternating current circuits. CLO8. Understand the concept of semiconductors. CLO9. Understand the basic concepts of diodes in electrical circuits and analyze diode circuits. CLO10. Understand the basic concepts of transistors and analyze transistor circuits transistors. CLO11. Understand the basic concepts of Op-Amplifiers and analyze the circuits of Op-Amplifier circuit.
Content :	1. Basic Concepts and Elements of Electrical Circuits ● System of Units ● Electric Charge and Current ● Voltage ● Power and Energy ● Active and passive elements ● Independent current and voltage sources ● Voltmeter and ammeter ● Source dependent current and voltage 2. Circuit Analysis Resistive ● Kirchoff's Law ● Voltage divider circuit ● Current divider circuit ● Node Analysis ● Mesh Analysis 3. Circuit Theorem ● Superposition Theorem ● Source Transformation ● Thevenin Theorem ● Norton's equivalent circuit ● Maximum power transfereaknesses of Classical Physics 4. RL and RC circuits ● Series and parallel capacitor circuits ● Series and parallel inductor circuits ● First order circuit ● Complete response first-order circuit ● Differential operator

	● Second-order circuit ● Complete Response Second-order circuit 5. Alternating Current ● Sinusoidal Sources ● Fasors ● Series and parallel impedance ● Mesh and Node Equations ● Thevenin and Norton equivalent circuits ● Superposition principle ● Phasor diagram ● Complete response of RL and RC 6. Semiconductors ● Conductors ● Semiconductors ● Intrinsic semiconductor ● Extrinsic semiconductor ● P-n junction ● Potential barrier 7. Diodes ● Ideal diode ● Second and third approximation ● Diode load line ● Half-wave rectifier circuit ● Transfomator ● Full wave rectifier circuit ● Bridge-rectifier circuit ● The Choke-Input Filter ● The Capacitor-Input Filter ● Peak Inverse Voltage and Surge Current 8. Basic principles of Transistors Bipolar ● Transistors without leads ● Rewarded transistor ● Current in the transistor ● Curves at base and collector ● Transistor approximation ● Load line and working point of the transistor ● Saturation and cut-off ● Transistor as a switch 9. Transistor circuit Retrieved ● Emitter Bias ● LED Diver ● Voltage Divider Bias

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Load line and working point on VDB
Two-Supply Emitter Bias

10. Op-Amplifier

Differential Amplifier
Common Mode Gain
Integrated circuit
Op-Amp basics
Ideal Op-Amp
Inverting Amplifier
Noninverting Amplifier

11. Amplifier Basics

Base-Based Amplifier
Emitter-Biased Amplifier
Small Signal Operation
AC Resistance of the Emitter Diode
Two Models of Transistors

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<tr><td>Study/exam achievements:</td><td>Examination are conducted as unit test, as following
<table>
<tr><th>No</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>Individual Assignment</td><td>Written test</td><td>20%</td></tr>
<tr><td>2</td><td>Class activity</td><td>Discussion</td><td>10%</td></tr>
<tr><td>3</td><td>Quiz</td><td>Written test</td><td>10%</td></tr>
<tr><td>4</td><td>Midterm Test</td><td>Written test</td><td>30%</td></tr>
<tr><td>5</td><td>Final Test</td><td>Written test</td><td>30%</td></tr>
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<tr><td>Media :</td><td>Laptop/Computer, Epsilon (Study Program E-Learning), University LMS, Projector, Video Conference Software: Zoom Meeting, Multisim</td></tr>
<tr><td>Literatures :</td><td>

Alexander, Charles K. & Sadiku, Mathew N.O., 2013, Fundamental of Electric Ciscuits, 5th Edition, New York: McGraw-Hill.
Dorf, Richard C. & Svoboda, James A., 2014, Introduction to Electric Circuits, 9th Edition, United States: Wiley.
Schultz, Mitchel E., 2011, Grob’s Basic Electronics, 11th Edition, New York: McGra-Hill.
Malvino, Albert Paul & Bates, David J., 2016, Electronic Principles, 8th Edition, New York: McGraw-Hill.

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