INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Sarjana (S1) Teknik Elektro

INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FACULTY OF INTELLIGENT ELECTRICAL & INFORMATICS TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING
Bachelor Degree Program in Electrical Engineering

1	**Nama Mata Kuliah / *Course Name***	:	Lab. Teknik Elektro 1 / *Electrical Engineering Lab 1*
2	**Kode Mata Kuliah / *Course Code***	:	EE234308
3	**Kredit / *Credits***	:	3 SKS
4	**Semester / *Semester***	:	3

Deskripsi Mata Kuliah / *Course Description*

Mata kuliah ini merupakan mata kuliah laboratorium pertama bagi mahasiswa EE. Pada mata kuliah ini mahasiswa diperkenalkan dengan keselamatan kerja di laboratorium dan penggunaan peralatan pengukuran dasar seperti voltmeter, ampere-meter, power-meter, dan osiloskop. Percobaan laboratorium yang harus dilakukan pada mata kuliah ini adalah pengukuran satuan dasar listrik, hukum dasar rangkaian listrik, dan sistem digital. / *This course is first laboratory session for EE students. In this course students are introduced to laboratory safety and use of basic measurement equipment such as voltmeter, ampere-meter, power-meter, and osciloscope. Laboratory experiments must be performed in this course are basic electric unit measurement, basic electric circuits laws, and digital system.*

Capaian Pembelajaran Lulusan (CPL) Yang Dibebankan Mata Kuliah / *Program Learning Outcomes Charged to The Course*

1. *Mastering the concepts and principles of design procedure in power systems, control systems, multimedia telecommunications, or electronics.*
2. *Being able to utilize analytical and engineering design tools based on appropriate information and computation technology to perform engineering activities in power systems, control systems, multimedia telecommunications, or electronics.*
3. *Being able to take responsibility for the achievement of group work and supervise and evaluate the work completion assigned to the worker under his/her responsibility.*
4. *Internalizing values, norms and academic ethics*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mampu memahami konsep dasar teknik elektro dari pengalaman langsung di laboratorium / *Able to understand the concept of basic electrical engineering from hands-on experience in laboratory session*
2. Mampu membaca diagram skematik kelistrikan dasar dan melakukan pengkabelan diagram rangkaian kelistrikan dasar serta mampu menginterpretasikan dan menganalisis data dari percobaan / *Able to read basic electric schematic diagram and perform wiring of basic electric circuit diagram and able to interprete and analyse data from experiment*
3. Mampu mempraktikkan prosedur operasi standar dan tindakan keselamatan saat bekerja di laboratorium dan mampu menggunakan peralatan pengukuran listrik standar di laboratorium / *Able to practice standard operation procedure and safety measure while working in laboratory and able to use standard electric measurement equipment in laboratory*

Pokok Bahasan / Contents

Praktikum Pengukuran Listrik */ Basic electric measurement lab*

1. Pengukuran tegangan AC dan DC / *Measurement of AC and DC voltage*
2. Pengukuran resistansi, induktansi, dan kapasitansi / *Measurement of electrical resistance, inductance, and capacitance*
3. Pengukuran daya listrik */ Measurement of electric power*
4. Penggunaan osiloskop */ Measurement using oscilloscope*

Praktikum Rangkaian Listrik / *Electric circuit lab*

1. Hukum Ohm, Hukum Kirchoff, Resistor Seri dan Paralel, Analisis Mesh dan Node / *Ohm's law, Kirchoff's law, Series and Parallel Resistors, Mesh and Node analysis.*
2. Teorema Superposisi, Thevenin/Norton, Transfer Daya / *Superposition theorem Thevenin/Norton theorem, Power Transfer*
3. Analisis Rangkaian RC dan RL */ RL and RC circuit analysis*
4. Analisis Rangkaian RLC dan Transformator / *RLC and transformer circuit analysis*

Praktikum Sistem Digital / *Digital Systems Practicum*

1. Modul 1. Gerbang Logika Dasar / *Module 1. Basic Logic Gates*:

   Percobaan 1. Level Tegangan High/Low NOT IC 74LS04 74HCT04 menggunakan potensiometer / *Experiment 1: High/Low Voltage Level NOT IC 74LS04 74HCT04 using a potentiometer.*

   Percobaan 2. Gerbang Logika AND, NOR, XOR / *Experiment 2: AND, NOR, XOR logic gates*

2. Modul 2. Rangkaian Digital Kombinasional / *Module 2. Combinational Digital Circuit :*

   Percobaan 1. Decoder menggunakan IC gerbang logika AND NOT dan langsung dari IC DECODER 74LS138 / *Experiment 1: Decoder using AND NOT logic gate IC and directly from DECODER IC 74LS138.*

   Percobaan 2. Encoder menggunakan IC ENCODER 74LS148 / *Experiment 2: Encoder using ENCODER IC 74LS148.*

3. Modul 3. Rangkaian Digital Kombinasional / *Module 3. Combinational Digital Circuit*

   Percobaan 1. Multiplexer menggunakan IC MULTIPLEXER 74LS153 / *Experiment 1: Multiplexer using MULTIPLEXER IC 74LS153*

   Percobaan 2. Demultiplexer menggunakan IC gerbang logika AND NOT dan langsung dari IC DEMULTIPLEXER 74LS139 / *Experiment 2: Demultiplexer using AND NOT logic gate IC and directly from DEMULTIPLEXER IC 74LS139.*

4. Modul 4. Rangkaian Digital Sekuensial / *Module 4. Sequential Digital Circuits*

   Percobaan 1. D Flip Flop untuk pembagi frekuensi / *Experiment 1: D Flip Flop for frequency divider*

   Percobaan 2. Counter dengan output Decoder to 7Segment / *Experiment 2: Counter with Decoder to 7Segment output*

Prasyarat / Pre-requisite

Rangkaian Listrik / *Electric Circuits*, Sistem Digital / *Digital Systems*

Pustaka / Reference

Lembar Kerja Percobaan / *Experiment Worksheet*