



**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**

<b>1</b>	<b>Nama Mata Kuliah / Course Name</b> : Pengukuran Besaran Listrik / <i>Electrical Measurements</i>
<b>2</b>	<b>Kode Mata Kuliah / Course Code</b> : EE234304
<b>3</b>	<b>Kredit / Credits</b> : 2 SKS
<b>4</b>	<b>Semester / Semester</b> : 3

#### **Deskripsi Mata Kuliah / Course Description**

Mata kuliah ini membahas mengenai teori pengukuran, cara kerja dan penggunaan alat ukur analog, alat ukur digital, dan osiloskop. Mata kuliah ini juga membahas mengenai pengukuran besaran-besaran listrik meliputi tegangan, arus, impedansi, daya, dan energi.  
*/ This course covers the theory of measurement, the operation, and use of analog measuring instruments, digital measuring instruments, and oscilloscopes. It also addresses the measurement of electrical quantities, including voltage, current, impedance, power, and energy.*

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

- CPL 2 Mampu mengkaji dan memanfaatkan ilmu pengetahuan dan teknologi dalam rangka mengaplikasikannya pada bidang teknik elektro, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir atau bentuk kegiatan pembelajaran lain yang luarannya setara dengan tugas akhir melalui pemikiran logis, kritis, sistematis dan inovatif / *Able to examine and utilize knowledge and technology for the purpose of applying them in the field of electrical engineering, and making informed decisions based on individual work as well as group work in the form of final reports or other learning activities whose outcomes are equivalent to final projects, through logical, critical, systematic, and innovative thinking.*
- CPL 3 Mampu mengelola pembelajaran diri sendiri, dan mengembangkan diri sebagai pribadi pembelajar sepanjang hayat untuk bersaing di tingkat nasional, maupun

internasional, dalam rangka berkontribusi nyata untuk menyelesaikan masalah dengan mengimplementasikan teknologi informasi dan komunikasi dan memperhatikan prinsip keberlanjutan serta memahami kewirausahaan berbasis teknologi / *Able to manage one's own learning and continually self-develop as a lifelong learner to compete at the national and international levels, with the goal of making a tangible contribution to problem-solving by implementing information and communication technology and considering sustainability principles, as well as understanding technology-based entrepreneurship.*

#### **Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes**

1. Memahami dan mampu mengaplikasikan teori terkait pengukuran besaran listrik. / *Understand and be able to apply theories related to the measurement of electrical quantities.*
2. Memahami dan mampu mengaplikasikan materi terkait alat ukur analog, alat ukur digital, dan osiloskop. / *Understand and be able to apply materials related to analog measuring instruments, digital measuring instruments, and oscilloscopes.*
3. Memahami dan mampu mengaplikasikan materi terkait pengukuran tegangan, arus, dan impedansi. / *Understand and be able to apply materials related to the measurement of voltage, current, and impedance.*
4. Memahami dan mampu mengaplikasikan materi terkait pengukuran daya dan energi. / *Understand and be able to apply materials related to the measurement of power and energy.*

#### **Pokok Bahasan / Contents**

1. Pendahuluan dan teori pengukuran (Metode pengukuran dan alat ukur serta sensitivitas, akurasi, presisi, dan range alat ukur; Error dalam pengukuran). / *Introduction and Measurement Theory (Measurement methods and instruments, sensitivity, accuracy, precision, and measurement range of instruments; Errors in measurements).*
2. Cara kerja dan penggunaan alat ukur analog, alat ukur digital, osiloskop. / *Operation and Use of Analog and Digital Instruments*
3. Pengukuran tegangan: meter analog, meter digital, osiloskop, transformator tegangan (PT). / *Voltage Measurement: Analog meters, digital meters, oscilloscope, voltage transformers (PT).*
4. Pengukuran arus: meter analog, sensor hall effect, transformator arus (CT), clamp. / *Current Measurement: Analog meters, Hall effect sensors, current transformers (CT), clamps.*
5. Pengukuran impedansi: metode Volt Amper, metode jembatan, LCR meter, tahanan isolasi. / *Impedance Measurement: Volt-Ampere method, bridge method, LCR meter, insulation resistance measurement*
6. Pengukuran daya: daya satu fasa, daya tiga fasa, kualitas daya. / *Power Measurement: Single-phase power measurement, three-phase power measurement, power quality measurement.*
7. Pengukuran energi. / *Energy Measurement.*

#### **Prasyarat / Pre-requisite**

Rangkaian Listrik / *Electric Circuits*

**Pustaka / Reference**

1. Instrumentation and Measurement in Electrical Engineering by Roman Malaric.
2. Electrical and Electronics Measurements and Instrumentation by Prithwiraj Purkait, Budhaditya Biswas, Santanu Das, Chiranjib Koley.