



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 : <i>/ Course Name</i>	Rangkaian Listrik 2 / <i>Electric Circuits 2</i>
2	Kode Mata Kuliah : <i>/ Course Code</i>	EE234202
3	Kredit / Credits	: 3 SKS
4	Semester / Semester	: 2

Deskripsi Mata Kuliah / Course Description

Mata kuliah Rangkaian Listrik II membahas tentang Arus, Tegangan dan Daya Listrik AC, Fungsi Sinusoida, Konsep Phasor, Analisa Steady State Sinusoida, Teorema Thevenin dan Norton, Daya AC sesaat dan Daya AC Rata-rata, Perpindahan daya maksimum, Faktor Daya, Daya Kompleks, Koreksi Faktor Daya, Rangkaian AC 3 Fasa, Pengukuran Daya 3 Fasa. Sistem Listrik 3 Fasa seimbang dan tak seimbang, pengukuran Daya Listrik 3 Fasa, rangkaian induktansi gandeng, trafo Linier dan Ideal, dan trafo auto ideal. / *The course 'Electric Circuits II' covers topics related to AC electrical currents, voltage, and power, sinusoidal functions, phasor concepts, steady-state sinusoidal analysis, Thevenin and Norton theorems, instantaneous and average AC power, maximum power transfer, power factor, complex power, power factor correction, three-phase AC circuits, three-phase power measurement, balanced and unbalanced three-phase electrical systems, measurement of three-phase electrical power, coupled inductance circuits, linear and ideal transformers, and auto-transformers.*

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. Mampu menjelaskan fungsi sinusoida sebagai tegangan sumber eksitasi rangkaian listrik dan konsep fasor sebagai alat bantu menyelesaikan persamaan differensial / *Able to explain the sinusoidal function as the excitation voltage source in electrical circuits and the concept of phasors as a tool for solving differential equations.*
2. Mampu menganalisis rangkaian listrik dengan menggunakan Fasor untuk menentukan tanggapan Steady state, dengan berbagai metoda analisa rangkaian / *Capable of analyzing electrical circuits using phasors to determine the steady-state response through various circuit analysis methods.*
3. Mampu menganalisis daya listrik AC, yaitu daya kompleks, daya semu, dan daya nyata serta factor daya / *Able to analyze AC power, including complex power, apparent power, real power, and power factor.*
4. Mampu menerapkan power factor corrector untuk meningkatkan faktor daya rangkaian / *Capable of applying a power factor corrector to improve the power factor of a circuit.*
5. Mampu menjelaskan prinsip kerja dan menganalisis rangkaian listrik 3 fasa / *Able to explain the principles and analyze three-phase electrical circuits.*
6. Mampu menjelaskan dan menganalisis daya listrik 3 fasa pada sistem seimbang dan tak seimbang / *Able to explain and analyze three-phase electrical power in both balanced and unbalanced systems.*
7. Mampu menjelaskan prinsip kerja dan menganalisis rangkaian induktansi gandeng khususnya pada transformator baik ideal maupun tidak / *Able to explain the working principles and analyze coupled inductance circuits, especially in transformers, whether ideal or not.*
8. Mampu menganalisis tanggapan frekuensi pada rangkaian filter pasif dan aktif / *Capable of analyzing the frequency response of passive and active filter circuits.*

Pokok Bahasan / Contents

1. Fungsi Sinusoida / *Sinusoidal Functions.*
2. Konsep Fasor / *Phasor Concept.*
3. Analisa Steady State / *Steady-State Analysis.*

4. Analisis Daya Listrik AC / *AC Power Analysis*.
5. Rangkaian listrik 3 Fasa / *Three-Phase Electrical Circuits*.
6. Rangkaian gandeng magnetik (transformator) / *Coupled Magnetic Circuits (Transformers)*.
7. Tanggapan Frekuensi / *Frequency Response Analysis*.

Prasyarat / Pre-requisite

Pustaka / Reference

1. Charles Alexander, Matthew Sadiku, *Fundamentals of Electric Circuits*, 7th Ed., McGraw-Hill Education, New York, 2021,
2. William H. Hayt, Jr., Jack E. Kemmerly, Jamie D. Phillips, Steven M. Durbin, 9th Ed., *Engineering Circuit Analysis*, 2019,
3. J. David Irwin, R. Mark Nelms, *Basic Engineering Circuit Analysis*, 11th Ed. John Wiley & Sons, USA, 2015.