



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 1 / <i>Electric Circuits 1</i>
2	Kode Mata Kuliah : <i>/ Course Code</i>	EE234103
3	Kredit / Credits	: 3 SKS
4	Semester / Semester	: 1

Deskripsi Mata Kuliah / Course Description

Mata kuliah Rangkaian Listrik membahas tentang Konsep dasar rangkaian dan analisisnya, Hukum dasar rangkaian yang meliputi Hukum Ohm dan Kirchhoff, Metoda analisis node dan mesh, Teori rangkaian yang meliputi teorema superposisi, rangkaian ekuivalen thevenin dan Norton, serta transfer daya maksimum. Topik pembahasan berikutnya adalah prinsip kerja Kapasitor dan induktor, Rangkaian dengan resistor atau induktor (orde satu), serta Rangkaian dengan resistor, kapasitor dan induktor (orde dua) baik seri maupun paralel. / *The course 'Electric Circuits' covers the basic concepts of circuits and their analysis, fundamental circuit laws, including Ohm's Law and Kirchhoff's Laws, analysis methods like node and mesh analysis, circuit theory including superposition theorem, Thevenin and Norton equivalent circuits, and maximum power transfer. Subsequent topics include the operation principles of capacitors and inductors, circuits with resistors or inductors (first order), and circuits with resistors, capacitors, and inductors (second order) in both series and parallel configurations.*

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.

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mampu menjelaskan konsep dasar elemen rangkaian listrik (resistor, sumber arus, sumber tegangan, sumber tergantung, dan sumber bebas) serta istilah pada rangkaian listrik (node, branch, loop, dan mesh). / *The ability to explain the basic concepts of electrical circuit elements (resistor, current source, voltage source, dependent source, and independent source), as well as circuit terminology (node, branch, loop, and mesh).*
2. Mampu menjelaskan hukum dasar yang berlaku pada rangkaian listrik seperti Hukum Ohm dan Hukum Kirchoff. / *The ability to explain the fundamental laws applicable to electrical circuits, such as Ohm's Law and Kirchhoff's Laws.*
3. Mampu menganalisis rangkaian listrik dengan menggunakan analisis Node dan Mesh. / *The ability to analyze electrical circuits using Node and Mesh analysis.*
4. Mampu memahami dan menganalisis teori rangkaian seperti teori superposisi, transformasi sumber, rangkaian ekuivalen Thevenin, rangkaian ekuivalen Norton, serta transfer daya maksimum. / *The ability to understand and analyze circuit theory concepts, including superposition, source transformation, Thevenin's equivalent circuit, Norton's equivalent circuit, and maximum power transfer.*
5. Mampu memahami dan menganalisis Operational amplifier / *The ability to understand and analyze operational amplifiers.*
6. Mampu menjelaskan konsep dasar kapasitor dan inductor. / *The ability to explain the basic concepts of capacitors and inductors.*
7. Mampu memahami dan menganalisis konsep rangkaian orde satu: rangkaian tanpa sumber R-L dan R-C, dan tanggapan lengkap rangkaian R-L dan R-C. / *The ability to understand and analyze first-order circuits: circuits without sources R-L and R-C, and complete response of R-L and R-C circuits.*
8. Mampu memahami dan menganalisis konsep rangkaian orde dua: rangkaian tanpa sumber R-L-C seri, dan paralel, dan tanggapan lengkap rangkaian R-L-C seri, dan paralel / *The ability to understand and analyze second-order circuits: R-L-C series and parallel circuits without sources, and complete response of R-L-C series and parallel circuits.*

Pokok Bahasan / Contents

1. Konsep dasar rangkaian listrik / *Basic Electrical Circuit Concepts*
2. Hukum dasar rangkaian listrik / *Basic Laws of Electrical Circuits*
3. Metoda analisa rangkaian (analisa Node dan Mesh) / *Methods of Circuit Analysis (Node and Mesh Analysis)*
4. Teorema rangkaian / *Circuit Theorems*
5. Operasional Amplifier / *Operational Amplifiers*
6. Kapasitor dan induktor / *Capacitors and Inductors*
7. Rangkaian orde satu (RL & RC) / *First-Order Circuits (RL & RC)*
8. Rangkaian orde dua (RLC) / *Second-Order Circuits (RLC)*

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. Robert L. Boylestad, Introductory Circuit Analysis, 13th Ed. Pearson Education Limited, 2016.