

<b>Mata Kuliah Course</b>	Nama MK <i>Name</i>	: :	Rangkaian Listrik Lanjut <i>Advanced Electric Circuits</i>
	Kode MK <i>Code</i>	: :	EE184301
	Kredit <i>Credits</i>	: :	3 sks
	Semester <i>Semester</i>	: :	III (Wajib) <i>III (Compulsory)</i>
	Beban Belajar <i>Workload</i>	: :	Kuliah : 3 x 50 = 150 menit/minggu Latihan/tugas : 3 x 60 = 180 menit/minggu Belajar mandiri : 3 x 60 = 180 menit/minggu <i>Lectures : 3 x 50 = 150 min/week</i> <i>Exercises/Assignments : 3 x 60 = 180 min/week</i> <i>Self learning : 3 x 60 = 180 min/week</i>
	Tingkatan <i>Module Level</i>	: :	Sarjana (S1) <i>Undergraduate</i>
	Penanggung Jawab <i>PIC</i>	: :	Fajar Budiman, ST, M.Eng
	Pengajar <i>Lecturer</i>	: :	Dr.Ir. Djoko Purwanto, M.Eng Dr. Ir. Hendra Kusuma, M.Eng. Dr. Ir. Totok Mujiono, Ml.Kom. Dr. I Made Yulistya Negara, ST, M.Sc Vita Lystianingrum B P, ST, M.Sc, PhD Dr. Dimas Fajar Uman Putra, ST, MT Fajar Budiman, ST, M.Eng
	Bahasa <i>Language</i>	: :	Bahasa Indonesia dan Bahasa Inggris <i>Bahasa Indonesia and English</i>
	Persyaratan dan Peraturan <i>Requirement and Regulation</i>	: :	Setiap mahasiswa harus menghadiri setidaknya 75% dari jumlah perkuliahan untuk dapat mengikuti ujian <i>A student must have attended at least 75% of the lectures to sit in the exams</i>

### Deskripsi Mata Kuliah

#### Description of Course

Mata kuliah Rangkaian Listrik II membahas tentang Arus, Tegangan dan Daya Listrik pada daerah Frekuensi (AC), Fungsi Sinusoida, Konsep Phasor, Analisis 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 gandeng magnetic, Trafo Linier dan Ideal, dan Trafo Auto Ideal.

*Advanced Electrical Circuits is intended for use in a classroom course that deals with currents, Voltages and Power at Frequency domain, a Sinusoidal function, Phasor Concept, Steady State Sinusoidal Analysis, Thevenin and Norton Theorems, Temporary AC Power and Average AC Power, Maximum Power Transfer Theorems, Power Factor, Complex Power, Power Factor*

*Correction, 3 phase AC Circuit, 3 Phase Power Measurement. Electrical System 3 Balanced and Unbalanced Phases. 3 phase Phase Power Measurement, magnetic coupling circuit, Linear and Ideal Transformer, as well as Ideal Auto transformer.*

### **CPL Prodi yang Dibebankan**

#### **Learning Outcomes**

(CPL-01) Mampu menerapkan ilmu pengetahuan alam dan matematika pada bidang teknik elektro

*(PLO-1) Capable to apply knowledge of natural sciences and mathematics to solve electrical engineering problem*

(CPL-09) Mampu belajar mandiri untuk menumbuhkan kemampuan belajar sepanjang hayat

*(PLO-9) Capable to learn independently to foster lifelong learning abilities*

### **Capaian Pembelajaran Mata Kuliah**

#### **Course Learning Outcomes**

(CPMK-01) Mahasiswa mampu memahami teori, konsep dan prinsip rekayasa rangkaian listrik, arus, tegangan dan daya listrik AC 1 fasa dengan menggunakan konsep Phasor serta mahasiswa mampu memahami rangkaian 3 fasa, dan rangkaian gandeng magnetik.

*(CLO-01) Students should be able to understand the theory, concepts and principles of electrical circuit engineering, current, voltage and AC power single phase using the Phasor concept. They also should be able to understand 3 phase circuits, as well as magnetic coupling circuits.*

(CPMK-02) Mampu mendeskripsikan penyelesaian permasalahan rekayasa rangkaian listrik pada domain frekuensi dengan analisis phasor pada sistem tenaga listrik, sistem pengaturan, telekomunikasi multimedia, atau elektronika.

*(CLO-02) Students should Able to describe the problem solving of electrical circuit engineering in frequency domain with phasor analysis on electric power system, control system, multimedia telecommunication, or electronics,*

(CPMK-03) Mampu menganalisis dan merancang rangkaian pasif AC pada sistem tenaga listrik, sistem pengaturan, telekomunikasi multimedia, atau elektronika dengan menggunakan konsep phasor.

*(CLO-03) Students should be able to analyze and design passive AC circuits on electric power system, control system, multimedia telecommunication, or electronics by using phasor concepts.*

(CPMK-04) Menunjukkan sikap bertanggungjawab atas pekerjaan di bidang keahlian analisis rangkaian AC secara mandiri khususnya dalam menganalisis dan menyelesaikan permasalahan rangkaian di domain frekuensi.

*(CLO-04) Students should show a responsible attitude towards the work in the field of AC circuit analysis independently especially in analyzing and solving circuit problems in the frequency domain.*

### **Topik/Pokok Bahasan**

#### **Main Subjects**

1. Fungsi Sinusoida,  
*Sinusoidal Functions,*
2. Konsep Phasor,  
*Phasor Concepts,*

3. Analisis Steady State AC,  
*AC Steady state analysis*
4. Analisis Daya Listrik AC,  
*AC Power analysis*
5. Rangkaian listrik 3 Fasa,  
*3 Phase AC Circuits*
6. Rangkaian gandeng magnetic (transformator)  
*Mutual Inductance Circuits*

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### **Pembelajaran dan ujian**

#### ***Study and examination***

- Latihan di kelas  
*In-class exercises*
- Tugas 1, 2, 3  
*Assignment 1, 2, 3*
- Ujian tengah semester  
*Mid-term examination*
- Ujian akhir semester  
*Final examination*

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### **Pustaka**

#### ***Reference(s)***

- [1] Alexander Charles K., Sadiku Matthew O. N., Fundamentals of Electric Circuit, Fifth edition, McGraw-Hill, New York, 2013.
- [2] Hyatt, William H., Kemmerly Jack E, Engineering circuit analysis, McGraw-Hill, New York, 1983.
- [3] Irwin, J. David, Nelms, R. Mark, Basic engineering circuit analysis, 11th edition, John Wiley & Sons, USA, 2015

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### **Prasyarat**

#### ***Prerequisite(s)***

EW184003 Rangkaian Listrik  
*EW184003 Electric Circuits*

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