POLITEKNIK ELEKTRONIKA NEGERI SURABAYA (PENS)
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Diploma Tiga (D3) Teknik Elektro Industri

POLITEKNIK ELEKTRONIKA NEGERI SURABAYA (PENS)
DEPARTMENT OF ELECTRICAL ENGINEERING
3-Year Diploma Program in Industrial Electrical Engineering

1	**Nama Mata Kuliah / *Course Name***	:	Praktik Mesin Listrik 2 / *Electric Machinery Lab. Work 2*
2	**Kode Mata Kuliah / *Course Code***	:	EI034107
3	**Kredit / *Credits***	:	1 SKS
4	**Semester / *Semester***	:	4

Deskripsi Mata Kuliah / *Course Description*

Mata kuliah Praktik Mesin Listrik 2 dirancang untuk memberikan pemahaman praktis dan mendalam kepada mahasiswa tentang berbagai jenis mesin listrik AC. Mahasiswa akan mempelajari cara memahami, mengidentifikasi, menyebut, menunjukkan, membuktikan, membuat skema, merangkai, mengoperasikan, mengamati, menghitung, menganalisis, dan melaporkan percobaan pada motor induksi. Selain itu, mahasiswa akan dilatih untuk melakukan hal yang sama pada motor AC sinkron, di mana mereka akan memahami prinsip kerja, komponen, dan cara pengoperasian motor sinkron. Mata kuliah ini juga mencakup percobaan pada generator AC sinkron, memberikan pengalaman langsung dalam memahami operasi, perakitan, dan analisis generator sinkron. Dengan pendekatan praktis ini, mahasiswa akan memperoleh keterampilan yang dibutuhkan untuk mengoperasikan dan menganalisis kinerja mesin-mesin listrik ini, serta menyusun laporan yang komprehensif tentang hasil percobaan mereka /

The Electric Machinery Lab. Work 2 course is designed to provide students with practical and in-depth understanding of various types of AC electrical machines. Students will learn to understand, identify, name, demonstrate, verify, create schematics, assemble, operate, observe, calculate, analyze, and report experiments on induction motors. Additionally, students will be trained to perform the same tasks on AC synchronous motors, where they will understand the working principles, components, and operation of synchronous motors. This course also includes experiments on AC synchronous generators, providing hands-on experience in understanding the operation, assembly, and analysis of synchronous generators. With this practical approach, students will acquire the necessary skills to operate and analyze the performance of these electrical machines, and to compile comprehensive reports on their experimental results.

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

S8	Mampu menginternalisasi nilai, norma, dan etika akademik / *Able to internalize academic values, norms and ethics*
KU2	Mampu menunjukkan kinerja mandiri, bermutu, dan terukur / *Able to demonstrate independent, quality and measurable performance*
KU3	Mampu memecahkan masalah pekerjaan dengan sifat dan konteks yang sesuai dengan bidang keahlian perapannya didasarkan pada pemikiran logis, inovatif, dan bertanggung jawab atas hasilnya secara mandiri / *Able to solve work problems with the nature and context appropriate to the field of expertise based on logical, innovative thinking, and being responsible for the results independently*
KK1	Mampu menerapkan matematika, sains, teknologi kelistrikan dan penggunaan teknologi informasi dengan beragam metode yang sesuai atau sudah baku untuk menyelesaikan pelayanan utilitas ketenagalistrikan dan utilitas industri yang mempertimbangkan faktor ekonomis, standar regulasi, K2-K3 dan lingkungan hidup / *Able to apply mathematics, science, electrical technology and the use of information technology with various appropriate or standard methods to complete electricity utility services and industrial utilities that take into account economic factors, regulatory standards, K2-K3 and the environment*
P1	Menguasai konsep teori tentang kelistrikan, elektronika, sistem pengaturan, efsiensi energi, statistik dan probabilitas untuk mengkalkulasi serta pengoperasian dan perawatan sistem utilitas ketenagalistrikan dan utilitas industry / *Master the theoretical concepts of electricity, electronics, regulatory systems, energy efficiency, statistics and probability to calculate and operate and maintain electricity utility systems and industrial utilities*

Capaian Pembelajaran Mata Kuliah / *Course Learning Outcomes*

CPMK-1	Mahasiswa dapat memahami, mengidentifikasi, menyebut, menunjukkan, membuktikan, membuat skema, merangkai, mengoperasikan, mengamati, menghitung, menganalisis dan melaporkan percobaan motor induksi / *Students can understand, identify, name, demonstrate, verify, create schematics, assemble, operate, observe, calculate, analyze, and report experiments on induction motors*
CPMK-2	Mahasiswa dapat memahami, mengidentifikasi, menyebut, menunjukkan, membuktikan, membuat skema, merangkai, mengoperasikan, mengamati, menghitung, menganalisis dan melaporkan percobaan motor AC sinkron/ *Students can understand, identify, name, demonstrate, verify, create schematics, assemble, operate, observe, calculate, analyze, and report experiments on AC synchronous motor*
CPMK-3	Mahasiswa dapat memahami, mengidentifikasi, menyebut, menunjukkan, membuktikan, membuat skema, merangkai, mengoperasikan, mengamati, menghitung, menganalisis dan melaporkan percobaan generator AC sinkron / *Students can understand, identify, name, demonstrate, verify, create schematics, assemble, operate, observe, calculate, analyze, and report experiments on AC synchronous generator*

Pokok Bahasan / *Contents*

1. Medan Listrik dan Medan Magnet: Identifikasi, penjelasan, perhitungan, pembuatan diagram, dan penjelasan tentang medan listrik dan medan magnet / *Electric and Magnetic Fields: Identification, explanation, calculation, diagram creation, and explanation of electric and magnetic fields*
2. Motor Induksi Satu Fasa dan Tiga Fasa: Identifikasi, penjelasan, perhitungan, pembuatan diagram, dan penjelasan prinsip kerja motor induksi satu fasa dan tiga fasa / *Single-Phase and Three-Phase Induction Motors: Identification, explanation, calculation, diagram creation, and explanation of the working principles of single-phase and three-phase induction motors*
3. Motor AC Sinkron: Identifikasi, penjelasan, perhitungan, pembuatan diagram, dan penjelasan prinsip kerja motor AC sinkron / *AC Synchronous Motors: Identification, explanation, calculation, diagram creation, and explanation of the working principles of AC synchronous motors*
4. Generator AC Sinkron: Identifikasi, penjelasan, perhitungan, pembuatan diagram, dan penjelasan prinsip kerja generator AC sinkron / *AC Synchronous Generators: Identification, explanation, calculation, diagram creation, and explanation of the working principles of AC synchronous generators*
5. Penggunaan Motor Induksi Satu Fasa dan Tiga Fasa: Identifikasi, penjelasan, perhitungan, pembuatan diagram, dan penggunaan motor induksi satu fasa dan tiga fasa / *Usage of Single-Phase and Three-Phase Induction Motors: Identification, explanation, calculation, diagram creation, and usage of single-phase and three-phase induction motors*
6. Penggunaan Motor AC Sinkron dan Generator AC Sinkron: Identifikasi, penjelasan, perhitungan, pembuatan diagram, dan penggunaan motor AC sinkron dan generator AC sinkron / *Usage of AC Synchronous Motors and AC Synchronous Generators: Identification, explanation, calculation, diagram creation, and usage of AC synchronous motors and AC synchronous generators*

Prasyarat / *Pre-requisite*

1. Rangkaian Listrik 1 / *Fundamental of Electrical Circuits*
2. Rangkaian Listrik 2 / *Electrical Circuits*
3. Elektromagnetik / *Electromagnetics*
4. Bahan dan Komponen Listrik / *Electrical Materials and Components*

Pustaka / *Reference*

1. B. L. Theraja, A. K. Theraja," A Textbook of Electrical Technology in SI Units. Volume I_ Basic Electrical Engineering . vol 1", S Chand & Co Ltd., 1999.
2. B. L. Theraja, A. K. Theraja," A Textbook of Electrical Technology: AC and DC Machines. Pt. 2", S Chand & Co Ltd., 2006.
3. S. P. Bali," Electrical Technology Electrical Fundamentals, Vol 1, Pearson Education, 2013.
4. S. P. Bali," Electrical Technology Machines and Measurements, Vol 2, Pearson Education, 2013.

5. John O. Bird,” Bird's Electrical circuit theory and technology”, 7th Ed., Routledge Taylor and francis Group, 2022.
6. D P Kothari, I J Nagrath,” Electric Machines”, 4th Ed., Tata McGraw-Hill Higher Education, 2010.
7. Jacek F. Gieras,”Electrical Machines Fundamentals of Electromechanical Energy Conversion”, CRC Press, Taylor and Francis Group, 2017
8. Leander W. Matsch_ J. Derald Morgan,”Electromagnetic and Electromechanical Machines”, Harper & Row (1986)
9. Ned Mohan,” Electric-machines and drives”, 2012.
10. P. C. Sen,”Principles of Electric Machines and Power Electronics”, 3rd Ed., Wiley, 2013