



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	<b>Nama Mata Kuliah / Course Name</b> : Kontrol Penggerak Elektrik / <i>Control of Electric Drives</i>
2	<b>Kode Mata Kuliah / Course Code</b> : EE234734
3	<b>Kredit / Credits</b> : 2 SKS
4	<b>Semester / Semester</b> : 0

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

Mata kuliah ini mempelajari konsep sistem kontrol penggerak elektrik . Saat ini penggerak di dunia industri mayoritas berbasis sistem elektrik, sehingga semua sinyal yang diproses dalam kontroler dilakukan secara elektrik. Dalam mata kuliah ini hal yang dipelajari yaitu: modelling dan sistem kontrol Motor DC dan AC, inverter serta simulasinya. / *This course covers the concept of electric drive control systems. Nowadays, most industrial drives are based on electric systems, and all signals processed in the controller are performed electrically. In this course, you will learn about modeling and control systems for DC and AC motors, inverters, and their simulations.*

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

- CPL 5 Mampu mendesain komponen, sistem, dan proses yang logis dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi / *Able to design components, systems, and processes that are logical and realistic in accordance with specified specifications, while considering safety, social, cultural, environmental, and economic aspects.*
- CPL 6 Mampu mengkaji dan memanfaatkan matematika, ilmu pengetahuan alam dan teknologi serta mengidentifikasi, memformulasikan dan menyelesaikan permasalahan di bidang teknik elektro / *Able to evaluate and utilize mathematics, natural sciences, and technology, as well as identify, formulate, and solve problems in the field of electrical engineering.*

CPL 7 Mampu mengetahui dan mengaplikasi metode, keahlian sesuai perkembangan terkini di bidang ilmu pengetahuan dan teknologi untuk menyelesaikan permasalahan teknik elektro dengan mengedepankan nilai-nilai universal / *Able to understanding and applying the latest methods and skills in the field of science and technology to solve electrical engineering problems while emphasizing universal values.*

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

1. Mampu menjelaskan dinamika sistem motor berbeban, cara kerja motor dc, motor induksi, metode kontrol tegangan AC motor induksi, prinsip kerja motor sinkron. / *Able to explain the dynamics of loaded motor systems, the operation of DC motors, induction motors, methods of controlling AC voltage in induction motors, and the principles of synchronous motor operation.*
2. Mampu merancang rectifier control, chopper control, kontrol loop tertutup untuk dc drives, speed control dan multiquadrant control, kontrol menggunakan inverter sumber tegangan, kontrol menggunakan inverter sumber arus, self control untuk motor sinkron. / *Able to design rectifier control, chopper control, closed-loop control for DC drives, speed control, multiquadrant control, control using voltage source inverters, control using current source inverters, and self-control for synchronous motors.*
3. Mampu merancang rectifier control, chopper control, kontrol loop tertutup untuk dc drives, speed control dan multiquadrant control, kontrol menggunakan inverter sumber tegangan, kontrol menggunakan inverter sumber arus, self control untuk motor sinkron menggunakan MATLAB, mikrokontroler. / *Able to design rectifier control, chopper control, closed-loop control for DC drives, speed control, multiquadrant control, control using voltage source inverters, control using current source inverters, and self-control for synchronous motors using MATLAB and microcontrollers.*

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

1. Pengenalan Penggerak Elektrik / Introduction to Electric Drives
2. Review Mesin Listrik / Review Electric Machine
3. DC Motor sebagai penggerak / DC Motor as Drives
4. Pemodelan dan Kontrol Motor DC / DC Motor Modelling and Control
5. Stepping Motor / Stepping Motor
6. Simulasi Sistem Kontrol Motor DC / Simulation of DC Motor Control System
7. Brushless DC Motor / Brushless DC Motor
8. Motor AC Sinkron / AC Synchronous Motor
9. PMSM vs BLDC Kontrol dan aplikasinya / PMSM vs BLDC Control and Applications
10. Motor AC Asinkron / Asynchronous AC Motor
11. Pemodelan dan Kontrol Motor AC / Modelling and Control of AC Motor
12. Inverter atau Variable Speed Drives / Inverter or Variable Speed Drives
13. Simulasi Sistem Kontrol Motor AC dengan Matlab (Simulation of AC Motor Control System using Matlab)

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

Dasar Sistem Kontrol / *Fundamentals of Control Systems*

**Pustaka / Reference**

1. DUBEY, Gopal K : Power Semiconductor Controlled Drives, Prentice Hall, Inc., 1989
2. Subrahmanyam, Vedam : Electric Drives Concepts & Applications, McGraw-Hill, 1996