



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 / Course Name : Elektronika Industri dan Robotika / Industrial Electronics and Robotics
2	Kode Mata Kuliah / Course Code : EE234552
3	Kredit / Credits : 3 SKS
4	Semester / Semester : 5

Deskripsi Mata Kuliah / Course Description

Pada mata kuliah ini, mahasiswa akan mempelajari konsep sistem SCADA di industri beserta komponen – komponen penyusunnya yang meliputi sistem instrumentasi, pengontrol dan strategi kontrol, sistem penggerak serta jaringan komunikasi data elektronik di industri. Mahasiswa mempelajari sistem robotika di industri yang meliputi pengenalan dan aplikasi robot industri, kinematika robot, perencanaan gerak robot, pemrograman robot industri, kontrol robot, dan robot industri dalam CIM (Computer Integrated Manufacture). / *In this course, students will learn the concept of SCADA systems in industry along with their components, which include instrumentation systems, controllers, control strategies, drive systems, and electronic data communication networks in industry. Students will also study industrial robotics systems, covering the introduction and applications of industrial robots, robot kinematics, robot motion planning, industrial robot programming, robot control, and industrial robots in Computer Integrated Manufacturing (CIM).*

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

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.

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.*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mampu menjelaskan konsep Supervisory Control and Data Acquisition (SCADA) / *Able to explain the concept of Supervisory Control and Data Acquisition (SCADA).*
2. Mampu menerapkan sistem elektronika instrumentasi di industri / *Capable of applying electronic instrumentation systems in the industry.*
3. Mampu menerapkan sistem penggerak motor di Industri / *Capable of applying motor drive systems in the industry.*
4. Mampu menerapkan Programmable Logic Controller (PLC) / *Capable of applying Programmable Logic Controllers (PLC).*
5. Mampu menjelaskan aplikasi robot di industri / *Able to explain the applications of robots in the industry.*
6. Mampu menjelaskan kinematika robot industri / *Able to explain the kinematics of industrial robots.*
7. Mampu menjelaskan perencanaan gerak robot industri dan pemrograman robot industri / *Able to explain motion planning for industrial robots and programming industrial robots.*
8. Mampu menjelaskan kontrol robot dan implementasi robot industri dalam CIM (Computer Integrated Manufacture) / *Able to explain robot control and the implementation of industrial robots in Computer Integrated Manufacturing (CIM).*

Pokok Bahasan / Contents

1. Pengenalan sistem SCADA dan komponen penyusunnya (Transmitter, Distributed Control System (DCS), Programmable logic controller (PLC), Remote Terminal Unit (RTU), Human Machine Interface (HMI) dan Aktuator) / *Introduction to SCADA systems and their components (Transmitter, Distributed Control System (DCS), Programmable Logic Controller (PLC), Remote Terminal Unit (RTU), Human-Machine Interface (HMI), and Actuators)*
2. Review metode pengukuran besaran fisis dan listrik di Industri / *Review of measurement methods for physical and electrical quantities in industry*

3. Review prinsip kerja motor induksi dan BLDC / *Review of the working principles of induction motors and BLDC (Brushless DC) motors*
4. Variable Speed Drive (VSD) / *Variable Speed Drives (VSD)*
5. Programmable Logic Controller (PLC) / *Programmable Logic Controllers (PLC)*
6. Pengenalan dan aplikasi robot di industri / *Introduction to and applications of robots in industry*
7. Kinematika robot industri / *Kinematics of industrial robots*
8. Perencanaan gerak robot industri dan pemrograman robot industri / *Motion planning for industrial robots and robot programming*
9. Kontrol robot industri dan implementasi robot industri dalam CIM (Computer Integrated Manufacture) / *Control of industrial robots and the implementation of industrial robots in CIM (Computer Integrated Manufacturing)*

Prasyarat / Pre-requisite

Akuisisi data dan pengolahan sinyal / *Data Acquisition and Signal Processing*
Sensor dan Aktuator / *Sensors and Actuators*

Pustaka / Reference

1. Timothy J. Maloney (2011). *Modern Industrial Electronics, 4/E*, Prentice-Hall, Inc.
2. Bartelt, T. L. (2011). *Industrial automated systems: instrumentation and motion control*. Clifton Park, NY: Delmar.
3. Bruno Siciliano, dkk, *Robotics: Modeling, Planning and Control*, Springer-Verlag Limited, 2009.
4. Appin Knowledge Solution, *Robotics*, Infinity Science Press, 2007.
5. Lung-Wen Tsai, *Robot Analysis*, John Wiley and Sons, Inc., 1999.