



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 : Pengaman Sistem Tenaga Listrik / <i>Power System Protection</i>
2	Kode Mata Kuliah / Course Code : EE234723
3	Kredit / Credits : 3 SKS
4	Semester / Semester : 0

Deskripsi Mata Kuliah / Course Description

Mata kuliah ini merupakan mata kuliah pilihan yang ditawarkan kepada mahasiswa bidang studi Teknik Sistem Tenaga. Secara umum, capaian pembelajaran pada topik Pengaman Tenaga Listrik meliputi pendefinisian gangguan, persyaratan system proteksi, pemilihan peralatan proteksi dan pendukungnya. / *This course is an elective course offered to students in the field of Power Systems Engineering. In general, the learning outcomes for this course include defining power system disturbances, understanding protection system requirements, and selecting protection equipment and supporting systems.*

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

CPL 1 Mampu menunjukkan sikap dan karakter yang mencerminkan: ketakwaan kepada Tuhan Yang Maha Esa, etika dan integritas, berbudi pekerti luhur, peka dan peduli terhadap masalah sosial dan lingkungan, menghargai perbedaan budaya dan kemajemukan, menjunjung tinggi penegakan hukum mendahulukan kepentingan bangsa dan masyarakat luas, melalui kreatifitas dan inovasi, eksekusi, kepemimpinan yang kuat, sinergi, dan potensi lain yang dimiliki untuk mencapai hasil yang maksimal / *Being able to demonstrate attitudes and characteristics that reflect: devotion to the One Almighty God, ethics and integrity, noble virtues, sensitivity and care towards social and environmental issues, appreciation of cultural diversity and inclusivity, upholding the rule of law with a priority on the interests of the nation and the wider community, through*

creativity and innovation, excellence, strong leadership, synergy, and other potentials possessed to achieve maximum results.

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 9 Mampu berkomunikasi secara efektif baik dalam bentuk tulisan maupun lisan / *Able to effective communication, both in written and oral forms.*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mampu memahami tujuan pengaman tenaga listrik dan mampu menentukan jenis gangguan-gangguan sistem tenaga listrik, persyaratan rele pengaman, peralatan transformator, fungsi dan elemen sistem pengaman, macam-macam rele pengaman dan sistem pengamanannya / *Able to understand the objectives of electrical power protection and determine the types of disturbances in the power system, protection relay requirements, transformer equipment, protection system functions, various types of protective relays, and their protection schemes.*
2. Mampu menjelaskan jenis dan cara kerja peralatan pengaman pada sistem tenaga listrik / *Able to explain the types and operation of protection equipment in electrical power systems.*
3. Mampu mendesain sistem Pengaman Sistem Tenaga Listrik / *Able to design Electrical Power System Protection.*
4. Mampu menentukan setting rele pengaman serta koordinasinya dalam sistem tenaga listrik/ *Able to determine protection relay settings and coordination within the power system.*
5. Mampu mendesain grounding system dan menentukan system proteksinya / *Able to design a grounding system and determine its protection scheme.*

Pokok Bahasan / Contents

1. Penjelasan umum tujuan pengaman tenaga listrik / *General Explanation of the Objectives of Electrical Power Protection*
2. Jenis-jenis gangguan sistem tenaga listrik, persyaratan rele pengaman, peralatan transformator, fungsi dan elemen sistem pengaman, macam-macam rele pengaman dan sistem pengamanannya / *Types of Electrical Power System Disturbances, Protective Relay Requirements, Transformer Equipment, Protective System Functions and Elements, Types of Protective Relays, and Their Protection Systems*
3. Jenis dan cara kerja peralatan pengaman pada sistem tenaga listrik / *Types and Operation of Protective Devices in Electrical Power Systems*
4. Desain sistem Pengaman Sistem Tenaga Listrik / *Design of Electrical Power System Protection*
5. Perhitungan setting rele pengaman serta koordinasinya dalam sistem tenaga listrik / *Calculation of Protective Relay Settings and Their Coordination in Electrical Power Systems*

6. Macam-macam sistem pengetanahan serta koordinasinya dengan sistem pengaman
/ Types of Grounding Systems and Their Coordination with Protection Systems

Prasyarat / Pre-requisite

Analisis Sistem Tenaga / *Power System Analysis*

Pustaka / Reference

1. M. Titarenko & I.Noskov, Protective Relaying in Electric Power System,
2. Siemens Power Engineering Guide · Transmission and Distribution · 4th Edition
3. Sunil S. Rao, Switchgear and Protection,
4. Turan Gonen, Modern Power System Analysis,
5. T.S. Hutaaruk, Gelombang Berjalan dan Proteksi Surja
6. Pritindra Chowdhuri, Electromagnetic Transient in Power System