



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 : Peralatan Tegangan Tinggi / <i>High Voltage Equipments</i>
2	Kode Mata Kuliah / Course Code : EE234725
3	Kredit / Credits : 3 SKS
4	Semester / Semester : 0

Deskripsi Mata Kuliah / Course Description

Mata kuliah ini mengajarkan konsep Gardu Induk Tegangan Tinggi, jenis dan fungsi peralatan kerja di dalamnya, serta mendesain gardu induk / *This course teaches the concept of High Voltage Substation, the types and functions of equipment inside it, and how to design substations.*

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, ekselensi, 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 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 dasar Gardu Induk, busbar dan jenis-jenisnya / *Able to explain the basic concept of Substations, Busbars, and their types.*
2. Mampu menjelaskan konsep trafo daya / *Able to explain the concept of power transformers.*
3. Mampu menjelaskan jenis dan fungsi kerja peralatan utama dan pendukung pada gardu induk / *Able to explain the types and functions of primary and auxiliary equipment in substations.*
4. Mampu membuat gambar desain sederhana gardu induk / *Able to create a simple design drawing of a substation.*

Pokok Bahasan / Contents

1. Gardu Induk / *Substation*
2. Jenis-jenis Bus bar / *Types of Busbars*
3. Trafo Daya / *Power Transformer*
4. Circuit Breaker
5. SF6 dan GIS / *SF6 and GIS (Gas-Insulated Switchgear)*
6. Disconnecter
7. Trafo Pengukuran : CT, VT, PT / *Measurement Transformers: Current Transformers (CT), Voltage Transformers (VT), and Potential Transformers (PT)*
8. Arester / *Surge Arrester*
9. Serandang dan Pentanahan GI / *Grounding and Bonding in a Substation*
10. Kapasitor, Reaktor dan Kompensasi Daya Reaktif / *Capacitor, Reactor, and Reactive Power Compensation*
11. Kabel Daya, Isolator dan Bushing / *Power Cables, Insulators, and Bushings*

Prasyarat / Pre-requisite

Analisis Sistem Tenaga / *Power System Analysis*

Pustaka / Reference

1. Martin J. Heatcote, "The J&P Transformer Book", 13th Ed, Elsevier, 2007
2. John D. McDonald, "Electric Power Substations Engineering", 3rd Ed., CRC Press, 2012
3. BHEL, "Handbook of Switchgears", Mc-Graw Hill, 2007
4. PLN, "Buku Pedoman Pemeliharaan PLN", 2016
5. ABB, "ABB Switchgear Manual", 10th Ed., 2001

6. Terry Krieg, "Substations", Cigre, Springer, 2019