	INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS) **FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS** **DEPARTEMEN TEKNIK ELEKTRO** **Program Studi Magister (S2) Teknik Elektro**

1	**Nama Mata Kuliah / *Course Name***	:	Teknologi Arus Searah Tegangan Tinggi / *High-Voltage Direct Current Transmission Technology*
2	**Course Code**	:	EE235314
3	**Kredit / *Credits***	:	2 SKS
4	**Semester / *Semester***	:	Pilihan

Deskripsi Mata Kuliah / *Course Description*

Mata kuliah ini mempelajari konsep dasar HVDC dan pemanfaatannya dalam transmisi tenaga listrik. Dijelaskan pula tentang macam-macam rangkaian konverter yang digunakan dalam sistem, pemanfaatan Grid HVDC hingga proteksi terhadap gangguan

This course studies the basic concepts of HVDC and its use in electric power transmission. It also explains the various types of converter circuits used in the system, the use of HVDC Grids and protection against disturbances.

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

1. (CPL-02) Mampu mengembangkan dan memecahkan permasalahan ipteks dalam bidang keilmuannya melalui riset dengan pendekatan inter atau multidisiplin hingga menghasilkan karya inovatif dan teruji, serta mendapat pengakuan nasional dan internasional.

   (PLO-02) Able to develop and solve science and technology problems in their scientific fields through research with an inter or multidisciplinary approach to produce innovative and tested work, and receive national and international recognition.

2. (CPL-04) Mampu menguasai konsep, prinsip keilmuan secara komprehensif, prinsip rekayasa, dan pengetahuan faktual tentang Teknologi Informasi untuk mengembangkan prosedur dan strategi yang diperlukan pada analisis dan perancangan sistem terkait bidang Teknik Elektro.

   (PLO-04) Able to master concepts, scientific principles comprehensively, engineering principles, and factual knowledge about Information Technology to develop procedures and strategies required in the analysis and design of systems related to the field of Electrical Engineering.

Capaian Pembelajaran Mata Kuliah / *Course Learning Outcomes*
1. Memahami konsep HVDC dalam transmisi tenaga listrik / *Understanding the concept of HVDC in electric power transmission.* 2. Memahami konverter HVDC /*Understanding HVDC converters.* 3. Memahami grid HVDC /*Understanding the HVDC grid.* 4. Memahami sistem proteksi pada HVDC /*Understanding the protection system in HVDC*.
Pokok Bahasan / *Contents*
1. Dasar HVDC dan pemanfaatan HVDC dalam transmisi tenaga listrik /*Basics of HVDC and the use of HVDC in electric power transmission* 2. Tipe-tipe rangkaian konverter HVDC /*Types of HVDC converter circuits* 3. Konverter VSC satu fasa dan tiga fasa /*Single phase and three phase VSC converters* 4. Konverter multi fasa VSC HVDC /*VSC HVDC multi phase converter* 5. Half-bridge dan Full-bridge MMC converter /*Half-bridge and Full-bridge MMC converters* 6. Transmisi Grid HVDC /*HVDC Grid Transmission* 7. HVDC Circuit Breaker /*HVDC Circuit Breaker* 8. Sistem Proteksi HVDC /*HVDC Protection System*
Prasyarat / *Pre-requisite*
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Pustaka / *Reference*
Utama / *Primary*: 1. Dragan Jovcic, "High Voltage Direct Current Transmission, Converter, Systems, and DC Grids", 2nd Ed., Wiley, 2019. Pendukung / *Supporting*: 2. Dirk Van Hertem, "HVDC Grids, for Offshore and Supergrid of the Future", IEEE-WIley, 2016 3. Chan-Ki Kim, "HVDC Transmission Power Conversion Applications in Power Systems", IEEE-Wiley, 2009 4. Enrique Acha, "VSC-FACTS-HVDC Analysis