	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***	:	Kualitas Daya dan Mitigasi pada STL / *Power Quality and Mitigation in STL*
2	**Course Code**	:	EE235113
3	**Kredit / *Credits***	:	2 SKS
4	**Semester / *Semester***	:	1

Deskripsi Mata Kuliah / *Course Description*

Mata kuliah ini membahas tentang fenomena dan mitigasi, serta simulasi kualitas daya listrik pada sistem distribusi tenaga listrik, dengan bahasan meliputi: Istilah dan Definisi Kualitas Daya Listrik, Standard, Distorsi Tegangan,Kompensasi Daya Reaktif, Ketakseimbangan, Harmonisa dan Dampak Distributed Generation terhadap Kualitas Daya. Setelah memahami konsep kualitas daya dan mitigasinya, mahasiswa mempelajari implementasi mitigasi menggunakan sistem pasif dan aktif berbasis konverter elektronika daya.

This course discusses the phenomenon and mitigation, as well as simulation of electrical power quality in the electrical power distribution system, with discussions covering: Terms and Definitions of Electrical Power Quality, Standards, Voltage Distortion, Reactive Power Compensation, Imbalance, Harmonics and the Impact of Distributed Generation on Power Quality. After understanding the concept of power quality and its mitigation, students learn the implementation of mitigation using passive and active systems based on power electronic converters.

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-03) 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 memperhatikan prinsip keberlanjutan.

(PLO-03) Able to manage self-learning, and develop oneself as a lifelong learner to compete at national and international levels, in order to make a real contribution to solving problems while paying attention to the principle of sustainability.

3. (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. Mahasiswa memahami konsep fenomena kualitas daya listrik pada sistem distribusi tenaga listrik. / *Students understand the concept of power quality phenomena in power distribution systems.*
2. Mahasiswa mampu memodelkan sistem distribusi untuk simulasi dan mitigasi kualitas daya listrik / *Students are able to model distribution systems for simulation and mitigation of electric power quality.*
3. Mahasiswa mampu menggunakan software untuk melakukan simulasi fenomena kualitas daya pada sistem distribusi / *Students are able to use software to simulate power quality phenomena in distribution systems.*
4. Mampu merancang dan mensimulasikan sistem pengkondisian daya menggunakan software untuk mitigasi gangguan kualitas daya. / *Able to design and simulate power conditioning systems using software to mitigate power quality disturbances.*

Pokok Bahasan / *Contents*

1. Pengertian fenomena kualitas daya listrik, permasalahan akibat penurunan kualitas daya / *Understanding the phenomenon of electrical power quality, problems due to decreased power quality*
2. Istilah dan definisi dalam kualitas daya. / *Terms and definitions in power quality.*
3. Standar kualitas daya / *Power quality standards*
4. Distorsi tegangan. / *Voltage distortion.*
5. Daya reaktif dan kompensasi daya reaktif / *Reactive power and reactive power compensation*
6. Ketakseimbangan tegangan / *Voltage imbalance*
7. Harmonisa / *Harmonics*
8. Dampak DG terhadap kualitas daya / *Impact of DG on power quality*
9. Perbaikan kualitas daya menggunakan peralatan pasif / *Power quality improvement using passive equipment*
10. Perbaikan kualitas daya menggunakan sistem elektronika daya / *Power quality improvement using power electronics systems*

Prasyarat / *Pre-requisite*
Analisa Sistem Tenaga / *Power System Analysis*
Pustaka / *Reference*
Utama / *Primary*: 1. ”Electrical Power Systems Quality”, McGraw Hill, 1996, Roger C. Dugan, Mark F.McGranagan, H. Wayne Beaty, 2. “Power Electronic Handbook”, Academic Press, 2007, Muhammad H. Rashid Pendukung / *Supporting*: 3. ”Power Quality in Electrical Systems”, Alexander Kusko, Sc.D., P.E. Marc T.Thompson, Ph.D. 4. ‘’Power Quality Primer’’, McGraw-Hill, 1996, Barry W. Kennedy 5. ‘’’Electric Power Quality’’ Surajit Chattopadhyay • Madhuchhanda Mitra, Samarjit Sengupta