	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***	:	Otomasi Sistem Kendali Pembangkit / *Power Plant Control System Automation*
2	**Course Code**	:	EE235311
3	**Kredit / *Credits***	:	3 SKS
4	**Semester / *Semester***	:	3

Deskripsi Mata Kuliah / *Course Description*

MK ini membahas tentang prinsip kerja peralatan kendali dan monitoring pada pembangkit. Adapun detail materi meliputi: peralatan kendali tegangan pada pembangkit, peralatan kendali frekuensi pada pembangkit, prinsip kerja Governor, prinsip kerja AGC, peralatan kendali Auxiliarry, dan peralatan monitoring pada pembangkit.

This MK discusses the working principles of control and monitoring equipment in power plants. The details of the material include: voltage control equipment in power plants, frequency control equipment in power plants, Governor working principles, AGC working principles, Auxiliary control equipment, and monitoring equipment in power plants.

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

1. (CPL-05) Mampu mengimplementasikan penyelesaian permasalahan rekayasa yang memperhatikan faktor-faktor ekonomi, kesehatan dan keselamatan publik, kultural, sosial dan lingkungan.

   (PLO-05) Able to implement engineering problem solving that takes into account economic, public health and safety, cultural, social and environmental factors.

2. (CPL-06) Mampu menyusun konsepsi ilmiah dan hasil kajian berdasarkan kaidah, tata cara, etika ilmiah, dan mendokumentasikannya.

   (PLO-06) Able to compile scientific concepts and research results based on scientific rules, procedures, ethics, and document them.

3. (CPL-08) Mampu mengambil keputusan dalam konteks menyelesaikan masalah pengembangan ilmu pengetahuan dan teknologi yang memperhatikan dan menerapkan nilai humaniora berdasarkan kajian analisis atau eksperimental terhadap informasi dan data.

(PLO-08) Able to make decisions in the context of solving problems in the development of science and technology that pay attention to and apply humanities values based on analytical or experimental studies of information and data.

Capaian Pembelajaran Mata Kuliah / *Course Learning Outcomes*

1. Mahasiswa menguasai konsep kinerja AVR beserta rangkaiannya / *Students master the concept of AVR performance and its circuits.*
2. Mahasiswa menguasai konsep kinerja Governor beserta rangkaiannya / *Students master the concept of Governor performance and its series.*
3. Mahasiswa menguasai konsep kinerja AGC beserta rangkaiannya / *Students master the concept of AGC performance and its circuits.*
4. Mahasiswa menguasai konsep kinerja kendali auxiliary beserta rangkaiannya / *Students master the concept of auxiliary control performance and its circuits.*
5. Mahasiswa menguasai konsep kinerja alat monitor pembangkitan beserta rangkaiannya / *Students master the concept of the performance of the generation monitoring tool and its circuit.*
6. Mahasiswa menguasai konsep kinerja paralel pembangkit / *Students master the concept of parallel performance of power plants.*

Pokok Bahasan / *Contents*

1. Konsep dasar Peralatan Kendali Tegangan pada pembangkit : Prinsip kerja AVR. Rangkaian AVR. Mode Kerja AVR. Peralatan pelengkap AVR. / *Basic concept of Voltage Control Equipment in power plants: AVR working principle. AVR circuit. AVR working mode. AVR complementary equipment.*
2. Simulasi Kendali Tegangan dengan AVR : Pemodelan AVR. Parameter AVR. Setting parameter AVR. Simulasi dan evaluasi kinerja AVR. Meningkatkan performa AVR. / *Voltage Control Simulation with AVR: AVR Modeling. AVR Parameters. AVR Parameter Setting. AVR Performance Simulation and Evaluation. Improving AVR Performance.*
3. Konsep dasar Peralatan Kendali Frekuensi pada pembangkit : Prinsip kerja Governor dan AGC. Rangkaian Governor dan AGC. Mode Kerja Governor dan AGC. Peralatan pelengkap Governor dan AGC. / *Basic concept of Frequency Control Equipment in power plants: Governor and AGC working principle. Governor and AGC circuit. Governor and AGC working mode. Governor and AGC complementary equipment.*
4. Simulasi Kendali Frekuensi dengan Governor dan AGC : Pemodelan Governor dan AGC. Parameter Governor dan AGC. Setting parameter Governor dan AGC. Simulasi dan evaluasi kinerja Governor dan AGC. Meningkatkan performa Governor dan AGC. / *Frequency Control Simulation with Governor and AGC: Governor and AGC Modeling. Governor and AGC Parameters. Governor and AGC Parameter Setting. Governor and AGC Performance Simulation and Evaluation. Improving Governor and AGC Performance.*
5. Konsep dasar Peralatan Kendali dan monitoring Auxiliarry pada pembangkit : Prinsip kerja Peralatan Kendali dan monitoring Auxiliarry. Rangkaian Peralatan Kendali dan monitoring Auxiliarry. Mode Kerja Peralatan Kendali dan monitoring Auxiliarry. Peralatan pelengkap Kendali dan monitoring Auxiliarry. / *Basic concept of Auxiliary Control and Monitoring Equipment in power plants: Working principle*

of Auxiliary Control and Monitoring Equipment. Auxiliary Control and Monitoring Equipment circuit. Working mode of Auxiliary Control and Monitoring Equipment. Complementary equipment of Auxiliary Control and Monitoring.

6. Simulasi Kendali dan monitoring Auxiliarry Peralatan Kendali dan monitoring Auxiliarry : Pemodelan Peralatan Kendali dan monitoring Auxiliarry. Parameter Peralatan Kendali dan monitoring Auxiliarry. Setting parameter Peralatan Kendali dan monitoring Auxiliarry. Simulasi dan evaluasi kinerja Peralatan Kendali dan monitoring Auxiliarry. Meningkatkan performa Peralatan Kendali dan monitoring Auxiliarry. / *Simulation of Auxiliary Control and Monitoring Auxiliary Control and Monitoring Equipment: Modeling of Auxiliary Control and Monitoring Equipment. Parameters of Auxiliary Control and Monitoring Equipment. Setting of Auxiliary Control and Monitoring Equipment parameters. Simulation and evaluation of Auxiliary Control and Monitoring Equipment performance. Improving the performance of Auxiliary Control and Monitoring Equipment.*
7. Konsep dasar Parallel generator : Prinsip kerja Peralatan Paralel. Rangkaian Peralatan paralel. Simulasi Paralel. / *Basic concept of Parallel generator: Working principle of Parallel Equipment. Parallel Equipment circuit. Parallel Simulation.*

Prasyarat / *Pre-requisite*

Analisa Sistem Tenaga Listrik, sistem proteksi, peralatan tegangan tinggi / *Electrical Power System Analysis, Protection System, High Voltage Equipment*

Pustaka / *Reference*

Utama / *Primary*:

1. Philip Kiameh, “Power Plant Equipment, Operation and Maintenance Guide”, McGraw-Hill, 2011
2. Adi Soeprijanto, “ Analisis Kestabilan Multi generator dengan pendekatan SMIB”, Dee Press, 2017
3. Paul M Anderson, A.A. Fouad, “Power System Control and Stability, 2nd edition”, Wiley-IEEE Press, 2002
4. Hadi Saadat, “Power System Analysis”, McGraw-Hill Inc, 1999
5. Prabha Kundur, Power System Stability and Control, McGraw Hill, 2nd edition, 2002