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***	:	Sistem Multi Agen / *Multi-Agent Systems*
2	**Kode Mata Kuliah / *Course Code***	:	EE234740
3	**Kredit / *Credits***	:	2 SKS
4	**Semester / *Semester***	:	0

Deskripsi Mata Kuliah / *Course Description*

Mata kuliah Sistem Multi Agen membahas tentang konsep sistem multi agen: pengaturan dan aplikasinya, protokol kesepakatan statis antar agen, protokol kesepakatan dinamis antar agen, kesepakatan antar agen dalam gangguan acak, pengaturan formasi antar agen, pengaturan kooperatif antar agen, estimasi berdasarkan informasi berasal dari multi agen, konflik antar agen. / *The Multi-Agent Systems course covers the concept of multi-agent systems, their organization, and applications. It includes topics on static agreement protocols among agents, dynamic agreement protocols among agents, agreement among agents in random disturbances, formation control among agents, cooperative control among agents, estimation based on information from multi-agents, and conflict resolution among agents.*

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

CPL 3   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 mengimplementasikan teknologi informasi dan komunikasi dan memperhatikan prinsip keberlanjutan serta memahami kewirausahaan berbasis teknologi / *Able to manage one's own learning and continually self-develop as a lifelong learner to compete at the national and international levels, with the goal of making a tangible contribution to problem-solving by implementing*

	information and communication technology and considering sustainability principles, as well as understanding technology-based entrepreneurship.
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 menguasai fakta, konsep, prosedur, dan prinsip sitem multi agen / *Able to master the facts, concepts, procedures, and principles of multi-agent systems.*
2. Mampu menganalisis protokol kesepakatan, pengaturan formasi, pengaturan kooperatif, estimasi informasi multi agen, konflik antar agen / *Able to analyze agreement protocols, formation control, cooperative control, multi-agent information estimation, and conflicts among agents.*
3. Mampu menggunakan software Matlab/Simulink untuk melakukan simulasi protokol kesepakatan, pengaturan formasi, pengaturan kooperatif, estimasi informasi multi agen, konflik antar agen / *Able to use Matlab/Simulink software to simulate agreement protocols, formation control, cooperative control, multi-agent information estimation, and conflicts among agents.*
4. Mampu menunjukkan kinerja mandiri, bermutu, dan terukur dalam menganalisis permasalahan sistem multi agen / *Able to demonstrate independent, quality, and measurable performance in analyzing multi-agent system problems.*

Pokok Bahasan / *Contents*

1. Konsep sistem multi agen: pengaturan dan aplikasinya / *Multi-Agent System Concepts: Regulation and Applications*
2. Protokol kesepakatan statis antar agen / *Static Agreement Protocols Among Agents*
3. Protokol kesepakatan dinamis antar agen / *Dynamic Agreement Protocols Among Agents*
4. Kesepakatan antar agen dalam gangguan acak / *Agreement Among Agents in Random Disturbances*
5. Pengaturan formasi antar agen / *Formation Control Among Agents*
6. Pengaturan kooperatif antar agen / *Cooperative Control Among Agents*
7. Estimasi berdasarkan informasi berasal dari multi agen / *Estimation Based on Information from Multiple Agents*
8. Konflik antar agen / *Conflict Among Agents*

Prasyarat / *Pre-requisite*

Pustaka / *Reference*

1. Mehran Mesbahi, Magnus Egerstedt, "Graph Theoritic Methods in Multiagent Networks," 1st Edition, Princeton, New Jersey, 2010
2. Wei Ren PhD, Randal W. Beard PhD, "Distributed Consensus in Multi-vehicle Cooperative Control: Theory and Applications", 2008

3. Zhongkui Li, Zhisheng Duan, "Cooperative Control of Multi-Agent Systems: A Consensus Region Approach", 2014, CRC Press
4. Frank L. Lewis, Hongwei Zhang, Kristian Hengster-Movric, Abhijit Das, "Cooperative Control of Multi-Agent Systems: Optimal and Adaptive Design Approaches, 2014