



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	<b>Nama Mata Kuliah / Course Name</b> : Otomasi Sistem / <i>Automation Systems</i>
2	<b>Kode Mata Kuliah / Course Code</b> : EE234532
3	<b>Kredit / Credits</b> : 3 SKS
4	<b>Semester / Semester</b> : 5

#### **Deskripsi Mata Kuliah / Course Description**

Mata kuliah ini memberikan pemahaman kepada peserta mata kuliah tentang bentuk-bentuk aplikasi sistem otomasi di industri, macam-macam sistem otomasi, prinsip-prinsip pengendalian dan berbagai metode perancangan ladder di bidang otomasi, dan teknologi instrumentasi dan pengendalian proses. / *This course provides participants with an understanding of the various forms of automation system applications in industry, types of automation systems, control principles, various ladder design methods in automation, and instrumentation and process control technology.*

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

- 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.*

CPL 7	Mampu mengetahui dan mengaplikasi metode, keahlian sesuai perkembangan terkini di bidang ilmu pengetahuan dan teknologi untuk menyelesaikan permasalahan teknik elektro dengan mengedepankan nilai-nilai universal / <i>Able to understanding and applying the latest methods and skills in the field of science and technology to solve electrical engineering problems while emphasizing universal values.</i>
<b>Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes</b>	
<ol style="list-style-type: none"> <li>1. Menguasai konsep dan prinsip sistem otomasi di industri. / <i>Mastering the concepts and principles of automation systems in the industry.</i></li> <li>2. Mampu menerapkan produk – produk teknologi sistem dan kontrol lainnya / <i>Capable of applying various technological products in system and control.</i></li> <li>3. Mampu menganalisis dan merancang sistem otomasi di industri / <i>Able to analyze and design automation systems in the industry.</i></li> <li>4. Menunjukkan sikap bertanggungjawab atas pekerjaan di bidang keahliannya secara mandiri / <i>Demonstrating a responsible attitude towards work in their field of expertise independently.</i></li> </ol>	
<b>Pokok Bahasan / Contents</b>	
<ol style="list-style-type: none"> <li>1. Konsep otomasi sistem / <i>Concepts of system automation</i></li> <li>2. Peralatan otomasi sistem / <i>Automation system equipment</i></li> <li>3. Membuat Wiring Diagram PLC sederhana / <i>Creating a simple PLC Wiring Diagram</i></li> <li>4. Basis bilangan, persamaan Logika, persamaan boolean / <i>Number systems, logic equations, Boolean equations</i></li> <li>5. Timer di PLC / <i>PLC timers</i></li> <li>6. Counter di PLC / <i>PLC counters</i></li> <li>7. Perancangan diagram ladder berdasar metode sequence chart / <i>Ladder diagram design based on the sequence chart method</i></li> <li>8. Perancangan diagram ladder berdasar metode cascade / <i>Ladder diagram design based on the cascade method</i></li> <li>9. Perancangan diagram ladder berdasar state diagram / <i>Ladder diagram design based on state diagrams</i></li> <li>10. Perancangan diagram ladder berdasar metode perubahan sinyal input / <i>Ladder diagram design based on input signal change method</i></li> <li>11. Perancangan diagram ladder berdasar metode huffman / <i>Ladder diagram design based on Huffman method</i></li> <li>12. Perancangan diagram ladder berdasar Grafchet / <i>Ladder diagram design based on Grafchet</i></li> <li>13. Perancangan diagram ladder berdasar PetriNet / <i>Ladder diagram design based on Petri Nets</i></li> </ol>	
<b>Prasyarat / Pre-requisite</b>	
Dasar Sistem Kontrol / <i>Fundamentals of Control Systems</i>	
<b>Pustaka / Reference</b>	

1. Pessen, David W. Industrial automation: circuit design and components. John Wiley & Sons, 1989
2. Ndjountche, Tertulien. Digital Electronics 2: Sequential and Arithmetic Logic Circuits. John Wiley & Sons, 2016.
3. Dr Ilango Sivaraman, Pneumatics and Pneumatic Circuits: Industrial Applications of Compressed air, Dr Ilango Sivaraman, 2018
4. Jack, H, Automating Manufacturing Systems with Plcs, Lulu.com, 2005
5. Michel. Parent , Logic and Programming, T.J. Press, 2013
6. J. S. Lee dan P. L. Hsu, a new approach to evaluate ladder logic diagrams and petri nets via the if then transformation, IEEE Conference, vol 4, pp 2711-2716, 2001
7. Paul Baracos, Grafchet Step by Step, Famic Automation, 1992