

MATA KULIAH	Nama Mata Kuliah : Sistem Instrumentasi Industri
	Kode MK : VI231525
	Kredit : 3 SKS
	Semester : V

DESKRIPSI MATA KULIAH

Mata kuliah Sistem Instrumentasi Industri ini termasuk dalam rumpun mata kuliah Instrumentasi di PS S. Tr. TRI – ITS. Mata kuliah ini membahas tentang Sistem Instrument di industry manufacture dan industry jasa (service) berupa BPCS (Basic Process Control System), Alarm System dan Safety Integrity System. Untuk dapat memahamis sistem instrument di industry, mahasiswa dibekali pemahaman tentang proses di industry ada yang bersifat kontinyu dan ada yang bersifat sequential.

CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBANKAN MATA KULIAH

- Mampu mengidentifikasi, merumuskan, meneliti literatur dan menganalisis masalah teknik di bidang teknologi Instrumentasi untuk mencapai kesimpulan yang dapat dibuktikan dengan menggunakan alat analisis sesuai standar disiplin ilmu teknik instrumentasi (CPL 6)
- Mampu melakukan investigasi terhadap permasalahan instrumentasi industri, mencari, memilih data yang relevan dari literatur, merancang dan melakukan eksperimen untuk memberikan kesimpulan yang valid (CPL 8)
- Mampu memilih, menggunakan dan menerapkan teknik dan sumber daya yang tepat termasuk penggunaan piranti keras maupun lunak yang mutakhir untuk memberikan solusi atas permasalahan di bidang rekayasa Instrumentasi (CPL 9)
- Menunjukkan pengetahuan dan pemahaman tentang prinsip-prinsip manajemen teknik dan menerapkannya pada pekerjaan sendiri baik sebagai anggota maupun pemimpin dalam tim untuk mengelola proyek di lingkungan multidisiplin. (CPL 12)

CAPAIAN PEMBELAJARAN MATA KULIAH

- Mahasiswa mampu memahami industry manufacture dan industry jasa.
- Mahasiswa mampu memahami proses kontinyu dan proses sequential.
- Mahasiswa mampu memahami BPCS (Basic Process Control System).
- Mahasiswa mampu memahami Alarm System.
- Mahasiswa mampu memahami Safety Integrity System (SIS)
- Mahasiswa mampu memahami SCADA

POKOK BAHASAN

- Konsep dasar SISTEM dan Fungsi Instrument
- Sistem Pengukuran dan Sistem Monitoring
- Soft sensor
- IoT pada Sistem Pengukuran
- Case study sistem pengukuran
- Sistem Pengendalian: Feed Forward, Feed Back Closed Loop Control System, Ratio Control System dan Cascade Control System
- IoT pada Sistem pengendalian
- Case study sistem pengendalian
- Alarm System
- Safety Instrument System (SIS)
- Analisa kinerja SIS pada simulator miniplant process pressure
- Case probleme perancangan SIS

PRASYARAT

- Dasar sistem instrumentasi
- Teknik Pengukuran
- Teknik Otomasi
- Elektronika analog dan digital
- Pemrograman komputer

PUSTAKA

Buku:

1. Pallas-Areny, R., Webster, John G., 1991, Sensors and Signal Conditioning, John Wiley & Sons, Inc., New York.
2. Fraden, J., 2004, Handbook Of Modern Sensors : Physics, Designs, and Applications, 3/ed, Springer Science + Business Media, LLC, New York

COURSE	Course Name	: Industrial Instrumentation System
	Course Code	: VI231525
	Credit	: 3 sks
	Semester	: V

DESCRIPTION OF COURSE

This Industrial Instrumentation Systems course is included in the Instrumentation subject group at PS S. Tr. TRI – ITS. This course discusses Instrument Systems in the manufacturing industry and service industries in the form of BPCS (Basic Process Control Systems), Alarm Systems and Safety Integrity Systems. To be able to understand instrument systems in industry, students are equipped with an understanding of industrial processes, some of which are continuous and some of which are sequential.

LEARNING OUTCOMES

- Able to identify, formulate, research literature and analyze technical problems in the field of Instrumentation technology to reach conclusions that can be proven by using analytical tools according to standard instrumentation engineering disciplines (CPL 6)
- Able to conduct investigations of industrial instrumentation problems, search for, select relevant data from the literature, design and conduct experiments to provide valid conclusions (CPL 8)
- Able to select, use and apply the right techniques and resources including the use of the latest hardware and software to provide solutions to problems in the field of Instrumentation engineering (CPL 9)
- Demonstrate knowledge and understanding of engineering management principles and apply them to one's own work as both a member and leader in a team to manage projects in a multidisciplinary environment (CPL 12)

COURSE LEARNING OUTCOME

- Students are able to understand the manufacturing industry and the service industry.
- Students are able to understand continuous processes and sequential processes.
- Students are able to understand BPCS (Basic Process Control System).
- Students are able to understand the Alarm System.
- Students are able to understand the Safety Integrity System (SIS)
- Students are able to understand SCADA
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MAIN SUBJECT

- The basic concept of SYSTEM and Instrument Functions
- Measurement System and Monitoring System
- Softsensors
- IoT in Measurement Systems
- Measurement system case studies
- Control System: Feed Forward, Feed Back Closed Loop Control System, Ratio Control System and Cascade Control System
- IoT on control systems
- Control system case study
- Alarm System
- Safety Instrument System (SIS)
- SIS performance analysis on the miniplant process pressure simulator
- SIS design problem case
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PREREQUISITES

- Basic instrumentation system
- Measurement technique
- Automation Engineering
- Analog and digital electronics
- Computer programming

REFERENCE

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Book:

- Pallas-Areny, R., Webster, John G., 1991, *Sensors and Signal Conditioning*, John Wiley & Sons, Inc., New York.
- Fraden, J., 2004, *Handbook Of Modern Sensors : Physics, Designs, and Applications*, 3/ed, Springer Science + Business Media, LLC, New York