

Silabus Mata Kuliah
Program Studi Sarjana Terapan Teknologi Rekayasa Instrumentasi

MATA KULIAH	Nama Mata Kuliah	: Perancangan Sistem Kontrol Proses
	Kode MK	: VI231631
	Kredit	: 3 SKS
	Semester	: VI

DESKRIPSI MATA KULIAH

Mata kuliah Perancangan Sistem Kontrol Proses (PSKP) ini termasuk dalam rumpun mata kuliah Instrumentasi di PS S. Tr. TRI – ITS. Mata kuliah ini membahas berbagai proses yang ada di industri mulai dari power plant, oil and gas, petrochemical serta penerapan renewable energy yang didalamnya mempelajari detail terkait langkah-langkah merancangan kontrol proses serta membuat instrument index yang merupakan bagian pekerjaan dari seorang instrument engineer.

CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBAHKAN MATA KULIAH

- Mampu mengkaji kasus penerapan ilmu pengetahuan dan teknologi di bidang keahlian sesuai standar kompetensi kerja, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir atau bentuk kegiatan pembelajaran lain yang luarannya setara dengan tugas akhir melalui pemikiran logis, kritis, inovatif, bermutu dan terukur dengan mempertimbangkan kesehatan, keselamatan, keamanan, dan lingkungan. (CPL 2)
- Mampu berkomunikasi, menulis laporan serta membuat presentasi secara efektif (CPL 4)
- Mampu merancang solusi untuk masalah teknologi dan rekayasa Instrumentasi serta dapat berkontribusi pada desain sistem, komponen maupun proses untuk memenuhi kebutuhan tertentu dengan mempertimbangkan standar keamanan, kesehatan dan keselamatan publik (CPL 7)
- 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)

CAPAIAN PEMBELAJARAN MATA KULIAH

- Mahasiswa mampu memahami berbagai macam industri proses (Power Plant, Oil and Gas, Petrochemical)
- Mahasiswa mampu memahami peran kontrol dalam berbagai macam industri proses
- Mahasiswa mampu memahami langkah-langkah perancangan kontrol proses
- Mahasiswa mampu merancang regulatory
- Mahasiswa mampu merancang supervisory control
- Mahasiswa mampu menganalisis performa hasil perancangan sistem kontrol proses

POKOK BAHASAN

- Pengantar PSKP
- Filosofi Proses di Industri
- Analisis kesetimbangan massa dan energi pada proses
- Penentuan Control Degree of Freedom (CDOF)
- Perancangan Regulatory Control
- Perancangan Supervisory Control
- Penentuan Input Output Modul
- Instrument Specification and Sizing
- Cause and Effect Matrix
- Desain Logic Control
- Integrasi Proses
- Penerapan PSKP di Industri

PRASYARAT

- Dasar sistem instrumentasi
- Teknik Otomasi
- Sistem Instrumentasi Industri

PUSTAKA

Buku:

1. McMillan ,Gregory K. Considine, Douglas M, “*Process/Industrial Instruments And Controls Handbook*”, McGraw-Hill, 1999.
2. Zoitl,Alois, Strasser Thomas , “*Distributed Control Application:Guidelines, Design Pattern, Application Examples with the IEC 61499*”, CRC Press, 2016

COURSE	Course Name	: Design of Process Control Systems
	Course Code	: VI231631
	Credit	: 3 SKS
	Semester	: VI

DESCRIPTION OF COURSE

This Process Control System Design (PSKP) course is included in the Instrumentation subject group at PS S. Tr. TRI – ITS. This course discusses various processes in the industry starting from power plants, oil and gas, petrochemicals and the application of renewable energy in which details are studied regarding the steps for designing process controls and making instrument indexes which are part of the work of an instrument engineer.

LEARNING OUTCOMES

- Able to review cases of the application of science and technology in the field of expertise according to work competency standards, and able to make appropriate decisions from the results of their own work or group work in the form of final project reports or other forms of learning activities whose output is equivalent to the final task through logical, critical thinking , innovative, quality and measurable by considering health, safety, security and the environment. (CPL 2)
- Able to communicate, write reports and make presentations effectively (CPL 4)
- Able to design solutions to Instrumentation technology and engineering problems and can contribute to the design of systems, components and processes to meet specific needs by considering public security, health and safety standards (CPL 7)
- Able to investigate industrial instrumentation problems, search, select relevant data from 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)

COURSE LEARNING OUTCOME
▪ Students are able to understand various types of process industries (Power Plant, Oil and Gas, Petrochemical) ▪ Students are able to understand the role of control in various process industries ▪ Students are able to understand the steps of process control design ▪ Students are able to design regulatory ▪ Students are able to design supervisory control ▪ Students are able to analyze the performance of process control system design results
MAIN SUBJECT
▪ PSKP introduction ▪ Process Philosophy in Industry ▪ Process mass and energy balance analysis ▪ Determination of Control Degree of Freedom (CDOF) ▪ Regulatory Control Design ▪ Supervisory Control Design ▪ Determination of Module Input Output ▪ Instrument Specifications and Sizing ▪ Cause and Effect Matrix ▪ Logic Control Design ▪ Process Integration ▪ Application of PSKP in Industry
PREREQUISITES
▪ Basic instrumentation system ▪ Automation Engineering ▪ Industrial Instrumentation Systems
REFERENCE

Silabus Mata Kuliah
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Book:

1.