MATA KULIAH	**Nama Mata Kuliah**	: Dinamika Sistem
	Kode MK	: VI231313
	Kredit	: 2 SKS
	Semester	: 3

DESKRIPSI MATA KULIAH

Mata kuliah Dinamika Sistem ini termasuk dalam rumpun matakuliah Basic Science di Departemen Teknik Instrumentasi FV – ITS. Pada mata kuliah ini, mahasiswa belajar memahami disiplin ilmu Dinamika Sistem dalam kehidupan sehari-hari. Matakuliah ini merupakan pengetahuan dasar yang memberikan ketrampilan bagi mahasiswa dalam mengembangkan kemampuan diri dan mampu beradaptasi dengan teknologi yang ada saat ini.

CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBANKAN 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 menerapkan pengetahuan matematika, ilmu alam, dasar-dasar instrumentasi pengukuran, pengendalian dan pengamanan untuk prosedur, proses, sistem maupun metodologi teknik yang diterapkan dalam suatu proses industri (CPL 5)

CAPAIAN PEMBELAJARAN MATA KULIAH

- Mahasiswa mampu membuat model matematis dari sistem mekanik dalam bentuk persamaan differensial, Laplace dan state-space.
- Mahasiswa mampu membuat model matematis dari sistem listrik dalam bentuk persamaan differensial, Laplace dan state-space.

- Mahasiswa mampu membuat model matematis dari sistem elektromekanik dalam bentuk persamaan differensial, Laplace dan state-space.
- Mahasiswa mampu membuat model matematis dari sistem thermal dalam bentuk persamaan differensial, Laplace dan state-space.
- Mahasiswa mampu membuat model matematis dari sistem fluida dalam bentuk persamaan differensial, Laplace dan state-space.

POKOK BAHASAN

- Pengantar Dinamika Sistem & Transfer Function
- Diagram blok, penyederhanaan dan operasi percabangan (summing point)
- State-space Variabel
- State-space Variabel
- Model Matematis Sistem Termal
- Model Matematis Sistem Termal
- Model Matematis Sistem Elektrik
- Model Matematis Sistem Elektrik
- Model Matematis Sistem Fluida
- Model Matematis Sistem Fluida
- Model Matematis Sistem Mekanik
- Model Matematis Sistem Mekanik

PRASYARAT

PUSTAKA

Buku:

1. Close, Charles M.; Frederick, Dean H.; Newel, Jonathan C., “Modelling and Analysis of Dynamic Systems”, 3rd Edition, John Wiley & Sons, Inc. ISBN 0-471-39442-4, 2002

COURSE	**Course Name**	: System Dynamics
	Course Code	: VI231313
	Credit	: 2 SKS
	Semester	: 3

DESCRIPTION OF COURSE

The System Dynamics course is included in the Basic Science class in the Instrumentation Engineering Department FV – ITS. In this course, students learn to understand the discipline of System Dynamics in everyday life. This course is basic knowledge that provides skills for students in developing their own abilities and being able to adapt to existing technology.

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 apply knowledge of mathematics, natural sciences, the basics of measurement instrumentation, control and security for procedures, processes, systems and technical methodologies applied in an industrial process (CPL 5)

COURSE LEARNING OUTCOME

- Students are able to make mathematical models of mechanical systems in the form of differential equations, Laplace and state-space.
- Students are able to make mathematical models of electrical systems in the form of differential equations, Laplace and state-space.
- Students are able to make mathematical models of electromechanical systems in the form of differential equations, Laplace and state-space.

- Students are able to make a mathematical model of a thermal system in the form of differential equations, Laplace and state-space.
- Students are able to make mathematical models of fluid systems in the form of differential equations, Laplace and state-space.

MAIN SUBJECT

- Introduction to System Dynamics & Transfer Function
- Block diagram, simplification and branching operations (summing point)
- State-space Variables
- State-space Variables
- Mathematical Models of Thermal Systems
- Mathematical Models of Thermal Systems
- Mathematical Models of Electrical Systems
- Mathematical Models of Electrical Systems
- Mathematical Models of Fluid Systems
- Mathematical Models of Fluid Systems
- Mathematical Models of Mechanical Systems
- Mathematical Models of Mechanical Systems

PREREQUISITES

REFERENCE

Book:

- Close, Charles M.; Frederick, Dean H.; Newel, Jonathan C., “Modelling and Analysis of Dynamic Systems”, 3rd Edition, John Wiley & Sons, Inc. ISBN 0-471-39442-4, 2002