MATA KULIAH	**Nama Mata Kuliah**	: Pemrograman Kontroller
	Kode MK	: VI231420
	Kredit	: 3 SKS
	Semester	: IV

DESKRIPSI MATA KULIAH

Matakuliah Pemrograman Mikrokontroller ini termasuk dalam rumpun matakuliah *Instrumentation* di Departemen Teknik Instrumentasi FV – ITS. Matakuliah ini membahas tentang penggunaan mikrokontroller dan *programmable logic controller* (PLC) pada sistem instrumentasi. Mata kuliah ini juga memberikan keterampilan bagi mahasiswa dalam memprogram dan merancang sebuah sistem menggunakan bahasa pemrograman.

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 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 (CPL 3)

- Mampu berkomunikasi, menulis laporan serta membuat presentasi secara efektif (CPL 4)
- 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

- Mampu memahami konsep dasar arsitektur mikroprosesor
- Mampu memahami fungsi dan prinsip kerja komponen – komponen digital pada arsitektur mikroprosesor.
- Mampu memahami dan mengaplikasikan pemrograman pada mikrokontroller dengan benar.
- Mampu memahami dan menggunakan *datasheet* dengan baik sehingga dapat menentukan spesifikasi dari divais dengan benar.
- Mampu memahami komponen *interfacing* dan *signal conditioning* pada mikrokontroller dengan benar.
- Mampu memahami dan mengaplikasikan pengembangan mikrokontroller pada sistem instrumentasi saat ini.

POKOK BAHASAN

- Pengantar Teknologi Kontroller
- Bahasa Pemrograman Kontroller
- Teknologi memprogram kontroller
- Konsep Prosesor pada Kontroller
- Konsep Sistem Tertanam
- Peripheral
- Konsep Input-output pada kontroller
- Konsep Multi-processing & Tasking
- Programmable Logic Devices
- Industrial Programming Logic

- ▪ Industrial standar komunikasi pada kontroller
- ▪ Advanced Controller Technology

PRASYARAT

1. Elektronika Digital
2. Elektronika Analog
3. Sistem Pengolahan Sinyal

PUSTAKA

Buku:

1. Palnitkar, Samit, "*Verilog A guide to digital design*", 2nd Edition, Prentice Hall, 2003.
2. Bai, Ying, "Practical Microcontroller Engineering with ARM Technology", John Wiley & Sons, Inc, 2016
3. Dr. Mark Fisher, "*ARM Cortex M4 Cookbook*", PACKT publisher, 2016.

4. Hugh Jack. "*Automatic Manufacturing System With PLCs*", sixth edition

COURSE	**Course Name**	: Microcontroller Programming
	Course Code	: VI231420
	Credit	: 3 SKS
	Semester	: IV

DESCRIPTION OF COURSE

This Microcontroller Programming Course is included in Instrumentation courses in the Instrumentation Engineering Department of FV - ITS. This course discusses the use of microcontrollers and programmable logic controllers (PLC) in instrumentation systems. This course also provides students with skills in programming and designing a system using a programming language.

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 manage self-learning, and develop oneself as a personal lifelong learner to compete at national and international levels, in order to make a real contribution to solving problems by implementing information and communication technology and paying attention to the principles of sustainability and understanding technology-based entrepreneurship (CPL 3)

- Able to communicate, write reports and make presentations effectively (CPL 4)
- 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 basic principles of microprocessor architecture.
- Students are able to understand basic function of digital components in microprocessor architecture.
- Students are able to understand and use right programming in microcontroller.
- Students are able to understand and utilize datasheet to determine the devices spesification.
- Students are able to understand interfacing and signal conditioning principle in microcontroller.
- Students are able to understand the development of microcontroller in instrumentation system.

MAIN SUBJECT

- *Introduction to Controller Technology*
- *Controller Programming Language*
- *Controller programming technology*
- *Processor Concept on Controller*
- *Embedded System Concept*
- *Peripherals*
- *Input-output concept on controller*
- *The concept of Multi-processing & Tasking*
- *Programmable Logic Devices*

- *Industrial Programming Logic*
- *Industrial standard communication on the controller*
- *Advanced Controller Technology*

PREREQUISITES

1. Digital Electronics
2. Analogue Electronics
3. Signal Processing

REFERENCE

Book:

1. Palnitkar, Samit, "*Verilog A guide to digital design*", 2nd Edition, Prentice Hall, 2003.
2. Bai, Ying, "Practical Microcontroller Engineering with ARM Technology", John Wiley & Sons, Inc, 2016
3. Dr. Mark Fisher, "*ARM Cortex M4 Cookbook",* PACKT publisher, 2016.

4. Hugh Jack. "*Automatic Manufacturing System With PLCs*", sixth edition