Associate Degree Program

Specialization	**Industrial Control Technology**
Course Number	**020301245**
Course Title	**Industrial Automation Technology**
Credit Hours	**3**
Theoretical Hours	**3**
Practical Hours	**0**

Brief Course Description:

PLCs, classifications, programming, applications. NC and applications. Microprocessors and microcontrollers and their applications. Examples of automated Mechatronics systems: elevators, transportation belts, production lines, …

Detailed Course Description:

Chapter No.	Content	Time Needed
1	**Introduction to computing** 1. Semiconductor memory 2. CPU architecture: Von Neumann and Harvard 3. RISC and CISC : differences	1
2	The AVR Microcontroller 1. Microcontroller and Embedded processor 2. Overview of AVR Family 3. The main advantage of AVR	1
3	AVR architecture and assembly language 1. The AVR registers 2. Data and program memory 3. Data format and directives 4. Introduction to assembly Language - Branches, call and time delay loop - Logic and arithmetic instructions - Rotation, data serialization	2
4	Introduction to Arduino - ATmega328P Architecture - General-Purpose Input/output - Timer Ports - Analog Input Ports - Interrupt Processing - Serial Communications	1
5	Arduino programming - Program body - Loops, and functions - Compiler	1

	Introduction to Programmable Controllers Definition and Historical Background Principles of Operation . PLCs Versus Other Types of Controls Ladder Diagrams and the PLC advantages of PLCs PLC Circuits and Logic Contact Symbology	1
6	Processors, the Power Supply, and Programming Devices Processor Scan Error Checking and Diagnostics The System Power Supply Programming Devices	1
7	The Memory System and I/O Interaction - Memory Overview - Memory Types - Memory Structure and Capacity - Memory Organization and I/O Interaction - Configuring the PLC Memory—I/O Addressing	1
8	- The Discrete Input/Output System - Introduction to Discrete I/O Systems - I/O Rack Enclosures and Table Mapping - Remote I/O Systems 6-4 PLC Instructions for Discrete Inputs - Types of Discrete Inputs - PLC Instructions for Discrete Outputs - Discrete Outputs - Discrete Bypass/Control Stations - Interpreting I/O Specifications	2
9	Special Function I/O and Serial Communication Interfacing - Introduction to Special I/O Modules - Special Discrete Interfaces - Special Analog, Temperature, and PID Interfaces - Positioning Interfaces - ASCII, Computer, and Network Interfaces - Fuzzy Logic Interfaces - Peripheral Interfacing	2
10	- PLC PROGRAMMING	3

	- Introduction to Programming Languages - Types of PLC Languages - Ladder Diagram Format - Ladder Relay Instructions - Ladder Relay Programming - Timers and Counters - Timer Instructions - Counter Instructions - Program/Flow Control Instructions - Arithmetic Instructions - Data Manipulation Instructions - Data Transfer Instructions - Special Function Instructions - Network Communication Instructions - Boolean Mnemonics	

Textbooks

- The AVR microcontroller and embedded systems using assembly and C, Mohamad Ali Mazidi, Prentice Hall, 2011
- PROGRAMMABLE CONTROLLERS, THEORY AND IMPLEMENTATION, L. A. Bryan E. A. Bryan , Second Edition, Industrial Text Company

References

Process control Instrumentation Technology , Curtis D. Johnson, 8-th edition.