

Revised: Spring/2012

IND 251

Automated Manufacturing Systems I

COURSE OUTLINE

Prerequisites:

Basic knowledge of algebra, pneumatics, hydraulics, electricity, and PLC's.

Course Description:

With knowing basics of digital fundamentals and PLC technology, this course introduces the Siemens concept Totally Integrated Automation. After knowing PLC and the main components from Level 1 Course 4 "Digital Fundamentals and PLCs" this course focuses on the extension of this knowledge with regard to the automation pyramid, of course starting in the field level at analogue sensors and actuators. Later on they will go up to control level with networking and programming PLCs. For this course in particular, students will build on their previous knowledge of PLCs, either as part of the Level 1 course entitled "Digital Fundamentals and PLCs", or through equivalent education or experience. The knowledge of digital basics will be built upon to not only include more functions and advanced topics but to focus on communications between PLCs as well.

Semester Credits: 4 hrs **Lecture Hours:** 3 Hours **Lab/Recitation Hours:** 2 Hours

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Automated Manufacturing Systems I, IND 251

Course Outcomes

At the completion of this course, the student should be able to:

- Understand the role of analogue sensors, actuators and modules in PLC technology.
- Understand the use and function of PROFIBUS and MPI Bus.
- Apply the knowledge to ensure proper performance of networks.
- Use STEP 7 networking PLC components.
- Carry out troubleshooting and preventive maintenance of PLC networks.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Automated Manufacturing Systems I, IND 251

Required Materials:

Computer Integrated Manufacturing System

Textbook:

1. Manufacturing Engineering and Technology, 6/E, Kalpakjian & Schmid, Prentice Hall, 2010, ISBN # 978-0-13-608169-2

The following supplementary materials are available:

- 1.
- 2.
- 3.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Automated Manufacturing Systems I, IND 251

Content to be covered within this course includes the following topics:

1. Provide a basic knowledge of CIM cells
2. Interpret technical information and familiarization of CIM components of basic systems.
3. Provide selection, implementation and testing of various CIM components.
4. Install, maintain and repair CIM systems
5. Troubleshoot CIM systems
6. Determine the sequence of operations of an automated production system.
7. Identify major components of an automated production system.
8. Understand and operate manual overrides.
9. Understand the principles of flow control valves and set actuator speed.
10. Perform output mapping.
11. Perform input mapping.
12. Understand pneumatic diagrams.
13. Understand electrical schematics.
14. Disassemble automated production stations.
15. Disconnect electrical components and wiring.
16. Remove mechanical components from a station.
17. Understand the operation and function of sensors and limit switches.
18. Write simple PLC (programmable logic controller) programs.
19. Build an automated production station

.NOTE: The order in which the content will be discussed is dependent upon the mechatronic system which is being used. In each case, the component and/or class of components will be discussed within the context of the system and the module in which the component is located. This means that the exact order of presentation will vary according to the system available for instruction. It is also important that all classes of electrical components be discussed, whether available in the training system or not. Focus in all cases is on the role of the components within a module and system, identification of problems, routine maintenance, troubleshooting, and safety issues with the goal of preventing system downtime or reducing them to a minimum.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Automated Manufacturing Systems I, IND 251

Notes to Instructors

1. Fluid CIM, Automation Studio and CIROS (software packages for simulation) are required.
- 2.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273

