

**Eastern WV Community & Technical College
Master Course Record**

Course Prefix and Number: ELM 220
Course Title: Introduction to Automated Systems
Recommended Transcript Title: Introduction to Automated Systems
Date Approved/Revised: June 18, 2008
Credit Hours: 3 Contact hours per week (Based on 15 week term): Lecture: 3 Lab:
Prerequisite: Corequisite: Pre/Corequisite:
Grading Mode: Letter grade
Catalog Description: This course introduces the student to discrete and continuous process control principles and techniques. The measurement of process variables such as pressure, temperature, flow and level will be covered. The application of transmitter signals will be emphasized. Students will be introduced to the fundamental concepts, operation and parameters of industrial robots. The construction, application and control of robotic devices will be examined.
Course Outcomes: <ol style="list-style-type: none"> 1. Explain the difference and advantages/disadvantage of discrete and continuous process control. 2. Draw a block diagram of an open-loop control system. 3. Explain the function of the major components of an open-loop control system. 4. Draw a block diagram of a closed-loop control system. 5. Explain the function of the major components of a closed-loop control system. 6. Explain the difference between open-loop and closed-loop control systems. 7. Describe how the feedback signal affects the control process. 8. Give an example and describe a typical indicating device in a control system. 9. Explain the function of a transmitter used in a control system. 10. Explain the basic functions of a control system: measurement, comparison, computation and correction. 11. Sketch a representative diagram of an open-loop process illustrating the basic functions of a control system (measurement, comparison, computation and correction). 12. Sketch a representative diagram of a closed-loop process illustrating the basic functions of a control system (measurement, comparison, computation and correction). 13. Define the term "process" in relation to a process control system. 14. Define the term "controlled variable" in relation to a process control system. 15. Define the term "controller" in relation to a process control system. 16. Define the term "setpoint" in relation to a process control system. 17. Define the term "sensor" in relation to a process control system.

18. Define the term “control element” in relation to a process control system.
19. Describe a typical open-loop and closed-loop pressure control system.
20. Describe a typical open-loop and closed-loop flow control system.
21. Describe a typical open-loop and closed-loop level control system.
22. Describe a typical open-loop and closed-loop temperature control system.
23. Describe a typical analytical process control system.
24. State the “official” definition of an industrial robot provided by the Robotics Industries Association (RIA).
25. Define programmable automation.
26. List 3 reasons for using industrial robots.
27. List 3 types of power sources for industrial robotic systems.
28. Define the industrial robotic “work envelope”.
29. Define “degrees of freedom”.
30. Explain “end-of-arm tooling”.
31. List 3 examples of end-of-arm tooling.
32. Discuss the difference between grippers and process tooling end effectors.
33. Describe an example of a gripper application.
34. Describe an example of a process tooling application.
35. Explain the difference between non-servo and servo robotic systems.
36. Describe 3 types of robotic design configurations.
37. Explain “compliance” in an industrial robotic system.
38. State an example of “active” compliance.
39. State an example of “passive” compliance.
40. Explain the function of sensors in industrial robotic system.
41. List 3 typical sensors used in industrial robotic systems.
42. List 3 application for vision in industrial robotic systems.
43. Describe 3 methods of entering program commands into industrial robotic systems.
44. List 3 typical causes of employee injuries in an industrial robotic environment.
45. List 3 primary methods to help eliminate hazards and promote safety in the workplace.

Implementation Cycle: Spring

Role in College Curriculum:

☞ General Education Core

X Technical Core

☞ Restricted Elective

☞ General Elective

☞ Workforce Education

☞ Other

Course Fee: Yes

Instructor’s Qualifications: BS Engineering/Technology or related discipline and/or expertise and experience in the field.

Expanded Course Description:

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parameters of industrial robots. The construction, application and control of robotic devices will be examined.

Prepared by:

Name, Title Date

Approved Per LOT Minutes

Dean, Academic and Student Services Date