

Bossier Parish Community College  
Master Syllabus

**Course Prefix and Number:** AMFG 104

**Credit hours:** 3-2-1

**Course Title:** Automation

**Course Prerequisites:** MATH 098

**Textbook(s):** None

**Course Description:** Teaches an introduction to the automation components of manufacturing. Provides hands on experience with electrical circuits, instrumentation, Programmable Logic Controllers (PLC), computers, and how to safely use this equipment.

**Learning Outcomes:**

At the end of the course, the student will:

- A. demonstrate problem solving using basic math skills by examining an electrical circuit and performing calculations for voltage, current, and resistance using Ohm's Law;
- B. analyze an electrical drawing that contains multiple parallel branches with attached components and explain the operation and analyze a control circuit with a start/stop station, auxiliary contacts, a coil, and a set of overloads;
- C. describe the types of instruments used in process control, explain instrumentation diagrams including symbols and numbering, and list and explain the industry standards concerning instruments;
- D. show how to use the Human Machine Interface (HMI) workstation, identify the different types of HMI devices in manufacturing environments, and analyze and explain an automatic control system; and
- E. define the parts of a robotic system, explain how robotics are used in industrial automation, and explain safe practices working with robotics equipment.

To achieve the learning outcomes, the student will or will be able to:

(The letter designations at the end of each statement refer to the learning outcome(s).)

1. demonstrate the ability to perform basic math using liquid volume units, weight units, and length units; (A)
2. explain the different types of hazards associated with low voltage (under 600 Volt) electrical energy; (A)
3. describe the effects on equipment and personnel of an arc flash/blast; (A)
4. describe the various electrical circuit components and their symbols; (A)
5. explain the relationships of voltage, current and resistance using Ohm's law circuits; (A)
6. differentiate the basic circuit laws for voltage, current and resistance in series, parallel and series-parallel circuits; (B)
7. explain why typical controls circuits use a lower voltage to control a higher voltage; (B)
8. discuss the various contact types, normally open (NO), normally closed (NC) and

- momentary contact used in control relays; (B)
9. differentiate between main and auxiliary contact function in a relay controlled circuit; (B)
  10. explain the operation of thermal overload and magnetic overload relays and how their activation affects operation of the control circuit; (B)
  11. demonstrate the understanding of physical measurement instruments (temperature, pressure, level, and flow of liquid and solids; (C)
  12. demonstrate an understanding of instrumentation terms, symbols, and diagrams; (C)
  13. demonstrate the ability to use process controls of the HMI to control and interact with an automated system; (D)
  14. identify and explain the parts of an automation control system and their purpose; (D)
  15. demonstrate the ability to analyze a diagram of an automatic control system; (D)
  16. demonstrate proper use of a computer (PC) database entry system and its parts and their purpose and data; (D)
  17. demonstrate an understanding of terms used in robotic systems and the parts and their purpose; (E)
  18. demonstrate an understanding of the parts of a robotic system and their purpose; (E)
  19. demonstrate an understanding of the types of robotics used in industry; (E)
  20. demonstrate an understanding of robotics as used in packaging, machine loading, welding, and hazardous environments; (E) and
  21. demonstrate an understanding of the types of safety devices used in robotic systems and their purpose. (E)

**Course Requirements:** Complete all homework assignments, in-class equipment exercises, in class tests, and final exam.

**Course Grading Scale:**

- 90 – 100 = A
- 80 – 89 = B
- 70 – 79 = C
- 60 – 69 = D
- 0 – 59 = F

**Attendance Policy:** The college attendance policy is available at <http://www.bpsc.edu/catalog/current/academicpolicies.html>

**Course Fees:** This course is accompanied with an additional non-refundable fee for supplemental materials, laboratory supplies, software licenses, certification exams and/or clinical fees.

**Nondiscrimination Statement:** Bossier Parish Community College does not discriminate on the basis of race, color, national origin, gender, age, religion, qualified disability, marital status, veteran's status, or sexual orientation in admission to its programs, services, or activities, in access to them, in treatment of individuals, or in any aspect of its operations. Bossier Parish Community College does not discriminate in its hiring or employment practices.

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