

Industrial and Systems Engineering 426 – Microprocessors Applications

Weekly schedule: TUESDAY & THURSDAY: 11.10 a.m. → 1 p.m.
004 lecture hours

Textbook:

S. Brian Morriss, “Programmable Logic Controllers”, First Edition
Prentice Hall, 2000

Course catalog description:

Fundamentals of digital logic and microprocessors. Use of microprocessor-based devices in manufacturing. Different generations of Allen Bradley PLC’s are covered (AB-PLC 5 and AB-PLC500, AB-RSLOGIX 5000). PID controllers and applications.

Prerequisite courses:

ET 240 & ISE 305

Course outcomes:

At the end of this course students should be able to:

- a) Understand, test and build basic digital circuits using NAND, AND, NOR, OR, NOT, XOR and FLIP FLOPS
- b) Perform operations in binary, octal and hexadecimal numeric systems
- c) Understand and explain the basic microcontroller structure and its applications
- d) Understand and describe the PLC structure and applications
- e) Program a PLC with RSLOGIX 5000 and handheld programmers (SLC 100) with emphasis in : Timer, Counters, Analog modules and Bit level instructions
- f) Solve practical problems with PLC (12 inputs/12 outputs maximum)

Topics covered:

- 1) Introduction to digital logic/circuits and numeric systems
- 2) Overview of Microprocessors Applications. /Industrial Control
- 3) Introduction to PLC’s. and PLC’s components
- 4) Programming in Binary Logic/Ladder Logic/Relay Equivalent Instructions
- 5) Counters and Timers
- 6) Memory Organization and Data manipulations.
- 7) Manipulation of Data Elements, Data in Files, Blocks, Arrays and Structures.
- 8) Program Structure and Structured Programming
- 9) Interrupts, Process Control and other PLC capabilities

Laboratory: This course includes laboratory practices: at least 12 hours of instructor guided practices and an individualized final project that may demand an average of 12 hours in the lab is suggested

Designation as a ‘required’ or ‘elective’ course:

This is an elective course for the Industrial and Systems Engineering Program.

Contribution of course to meeting the professional component, Criteria 4:

This course satisfies 3 credit hours (100%) of engineering science and 1 hour of engineering design for the Industrial and Systems Engineering Program.

Relationship of course to the Industrial and Systems Engineering Program outcomes:

Person who prepared this description and date of preparation:

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