

COURSE SYLLABUS

CT 207 Digital Logic II

CREDIT HOURS: 3.00

CONTACT HOURS: 60.00

COURSE DESCRIPTION:

An advanced course in digital electronics as applied in the modern digital computer. This course covers the various types of memories, ALU's, interfacing (A/D and D/A), conventional codes and large-scale shift register memories. Laboratory is an essential phase of this course which includes digital counters, multiplexers, memories and multivibrators. Techniques of interfacing and input/output devices are examined.

PREREQUISITES:

CT 203

EXPECTED COMPETENCIES:

Upon completion of this course, the student will be familiar with:

1. Read and understand digital IC terminology as specified in manufacturers' data sheets.
2. Compare the characteristics of standard TTL and the various TTL series.
3. Determine the fan-out for a particular logic device.
4. Use logic devices with open-collector outputs.
5. Analyze circuits containing tristate devices.
6. Compare the characteristics of the various CMOS series.
7. Analyze circuits that use a CMOS bilateral switch to allow a digital system to control analog signals.
8. Describe the major characteristics of and differences among TTL, ECL, MOS and CMOS logic families.
9. Cite and implement the various considerations that are required when interfacing digital circuits from different logic families.
10. Use voltage comparators to allow a digital system to be controlled by analog signals.
11. Use a logic pulser and a current tracer as digital circuit troubleshooting tools.
12. Analyze and use decoders and encoders in various types of circuit applications.
13. Compare the advantages and disadvantages of LEDs and LCDs.
14. Utilize the observation/analysis technique for troubleshooting digital circuits.
15. Understand the operation of multiplexers and demultiplexers by analyzing several circuit applications.
16. Compare two binary numbers by using the magnitude comparators circuit.
17. Understand the function and operation of code converters.
18. Cite the precautions that must be considered when connecting digital circuits using the data bus concept.
19. Use CUPL's truth table entry format to implement the equivalent of MSI logic circuits.

20. Understand the theory of operation and the circuit limitations of several types of digital-to-analog converters (DACs).
21. Read and understand the various DAC manufacturer specifications.
22. Use different test procedures to troubleshoot DAC circuits.
23. Compare the advantages and disadvantages among the digital-Oramp analog to-digital converter (ADC), successive-approximation ADC, and flash ADC.
24. Analyze the process by which a computer in conjunction with an ADC digitizes an analog signal and then reconstructs that analog signal from the digital data.
25. Describe the basic operation of a digital voltmeter.
26. Understand the need for using sample-and-hold circuits in conjunction with ADCs.
27. Describe the operation of an analog multiplexing system.
28. Understand the features and basic operation of a digital storage oscilloscope.
29. Understand the basic concepts of digital signal processing.
30. Understand and correctly use the terminology associated with memory systems.
31. Describe the difference between read/write memory and read-only memory.
32. Discuss the difference between volatile and nonvolatile memory.
33. Determine the capacity of a memory device from its inputs and outputs.
34. Outline the steps that occur when the CPU reads from or writes to memory.
35. Distinguish among the various types of ROMs and cite some common applications.
36. Understand and describe the organization and operation of static and dynamic RAMS
37. Compare the relative advantages and disadvantages of EPROM, EEPROM, and flash memory.
38. Combine memory IC s to form memory modules with larger word size and/or capacity.
39. Use the test results on a RAM or ROM system to determine possible faults in the memory system.
40. Understand the differences in architecture of various PLDs.
41. Read and understand data books that describe PLDs.
42. Identify features and limitations of various modes of operation for GAL devices.
43. Make wise decisions in selecting input and output pins when using GAL devices.
44. Use CUPL to take full advantage of a PLD's architecture.

ASSESSMENT METHODS:

Student performance may be assessed by examination, quizzes, case studies, oral conversation, group discussion, oral presentations. The instructor reserves the option to employ one or more of these assessment methods during the course.

GRADING SCALE:

90%-100% = A

80%-89.9%= B

70%-79.9%= C

60%-69.9%= D

<60% = E