

CSIT 175: DIGITAL LOGIC & CIRCUITS

1. Course Information

Subject

CSIT - Computer Science/ Information Technology

Course Number

175

School

Science, Technology, Engineering, Mathematics

Course Title

Digital Logic & Circuits

2. Hours

Semester Hours

3

Lecture

3

Lab

0

Practicum

0

3. Catalog Description

For display in the online catalog

This course introduces the fundamentals of digital logic and logic circuits implementation in digital computers, robotics and electronic control systems. The students will learn the digital concepts, numbering systems, Boolean algebra, as well as logic gates, combinational logic, sequential logic and their applications in computer CPU, memory, and other devices. Additional topics include concepts of integrated circuits and programmable logic which will be introduced to expand students' vision. The content of this course can work as preparation for Computer Organization and Architecture. Open lab time required.

4. Requisites

Prerequisites

None

Corequisites

None

5. Course Type

Course Fee Code

3

Course Type for Perkins Reporting

vocational (approved for Perkins funding)

6. Justification

Describe the need for this course

This can be used as an elective for any computer science, engineering, and mechatronics related program.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

No

If the course does not satisfy a general education requirement, which of the following does it satisfy:

Elective

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

Add item	
1	Providing student-centered, high quality educational experiences that prepare and empower diverse learners (Mission Statement)
2	Cultivating a technologically progressive spirit (Mission Statement)
3	Providing and supporting the delivery of high quality, relevant, and emerging STEM courses (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution

Brookdale CC

Course Title

Computer Logic and Design

Course Number

COMP-126

Number of Credits

3

Institution

Mercer County CC

Course Title

Digital Circuit Fundamentals

Course Number

EET 251

Number of Credits

4

Institution

Raritan Valley CC

Course Title

Digital Logic Design

Course Number

ENGR 215

Number of Credits

4

Institution

Hudson County CC

Course Title

Computer Logic & Discrete Math

Course Number

CSC 113

Number of Credits

3

Transferability of Course**Georgian Court University**

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Elective Credits (3 credits)	Elective	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CPS1231 (3 credits)	Math	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
IT250: INTERNET AND NETWORK TECHNOLOGY (3 credits)	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
INTR99088: GENERAL EDUCATION COURSE (3 credits)	General Education	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01198110 Principles of Computer Science (with a combination of coursework) or Computer Science Elective 3-credits	Major Elective course	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
COMP SCIENCE & INFO SYS ELECTIVE (3 credits)	Elective	

10. Course Learning Outcomes**Learning Outcomes**

Students who successfully complete this course will be able to:	
CLO1	Explain the concepts of digital logic.
CLO2	Distinguish among the numbering systems (binary, octal, decimal and hexadecimal, etc.) and perform conversions.
CLO3	Illustrate logic gates (AND, OR, NAND, NOR, XOR, inverter, etc.) and logical functions.
CLO4	Analyze combinational logic circuits using the rules of Boolean algebra, Karnaugh maps, and DeMorgan's theorem.
CLO5	Simulate and build combinational logic circuits using commonly used logic IC chips.
CLO6	Illustrate the functional operation and characteristics of logic devices such as encoders, decoders, multiplexers, and flip-flops.
CLO7	Analyze sequential logic circuits utilizing timing diagrams and applications of memory devices and counters.

CLO8	Conceptually design computer hardware using logic circuits.
CLO9	Explore the concepts and usage of large-scale integrated circuits, Programmable Logic Array (PLA), Field Programmable Gate Array (FPGA), and other new technologies.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
T01	Digital Concepts a. Analog and digital signals and waveforms b. Overview of digital logic functions c. Digital logic test and measurement	<ul style="list-style-type: none"> • Reading of textbook • Homework exercises • Class discussion 	Exam	CLO1
T02	Number Systems & Conversions a. Decimal numbers b. Binary numbers c. Octal, hexadecimal, and other numbers d. Conversions among the number systems e. Introduction to various digital codes	<ul style="list-style-type: none"> • Reading of textbook • Homework exercises • Internet research • Real case analysis 	Exam	CLO2
T03	Logic Gates and truth table a. AND and OR gates and truth table b. Inverter and truth table c. NAND, NOR gates and truth table d. X-OR and X-NOR gates and truth table e. 7400 serials logic IC chips f. Building logic circuits	<ul style="list-style-type: none"> • Reading of textbook • Homework exercises • Hands-on lab 	Exam and Lab assignment	CLO3
T04	Boolean Algebra and Combinational Logic Circuit Analysis a. Boolean algebra b. DeMorgan's Law c. Karnaugh maps d. Simplification techniques using different methods e. Logic circuits simulation using computer software	<ul style="list-style-type: none"> • Reading of textbook • Homework exercises • Internet research 	Exam	CLO4, CLO5
T05	Combinational Logic Circuits a. Complex logic circuits b. Encoders/decoders and applications c. Multiplexers/demultiplexers and applications d. Latches and applications e. Control circuits design	<ul style="list-style-type: none"> • Reading of textbook • Class discussion • Hands-on lab 	Exam and project	CLO5, CLO6
T06	Sequential Logic Circuits a. Timing diagram and logic event analysis b. Different types of flip-flops and applications c. Various type of registers and memories d. Various type of counters	<ul style="list-style-type: none"> • Reading of textbook • Real case analysis • Hands-on lab 	Exam and project	CLO7

T07	Logic Circuits in Digital Computers and Advance Topics a. Logic circuits in an ALU b. Logic circuits in a CPU c. Logic circuits in a computer bus controller d. ROM, PROM, EPROM, EEPROM, etc. e. Introduction to PLA and FPGA	• Reading of textbook • Internet research • Class discussion • Real case analysis	Exam	CLO8, CLO9
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12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Class lecture, discussion, demonstrations, lab assignments, online learning, and presentations.

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Technological Competency

Yes

Related Course Learning Outcome

CLO1 - CLO9

Related Outline Component

T01 - T07

Assessment of General Education Goal (Recommended but not limited to)

Exams & projects

Independent/Critical Thinking

Yes

Related Course Learning Outcome

CLO1 - CLO9

Related Outline Component

T01 - T07

Assessment of General Education Goal (Recommended but not limited to)

Exams & projects

14. Needs

Instructional Materials (text etc.):

Appropriate textbooks or OER materials will be selected by the department. Circuit lab kits needed for individual student.

Technology Needs:

None

Human Resource Needs (Presently Employed vs. New Faculty):

Existing faculties.

Facility Needs:

None

Library needs:

None

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates

New course board approved: May 20, 2021