Washtenaw Community College Comprehensive Report

CST 140 Digital Logic and Computer Design
Effective Term: Fall 2025

Course Cover

College: Business and Computer Technologies
Division: Business and Computer Technologies
Department: Computer Science & Information Technology
Discipline: Computer Systems Technology
Course Number: 140
Org Number: 13420
Full Course Title: Digital Logic and Computer Design
Transcript Title: Digital Logic and Computer Des
Is Consultation with other department(s) required: Yes
Please Explain:
This is a shared course between computer science and the system tech departments.
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: New Course
Change Information:
Rationale: A new course for the CST department and for the new Semiconductor and Battery Manufacturing certificate.
Proposed Start Semester: Fall 2025
Course Description: In this course, students will explore foundational concepts in digital logic and computer design, and will develop the skills necessary to understand and implement digital systems. Binary numbering systems, Boolean algebra, digital logic gates, logic simplification, standard and sequential logic circuits, flip-flops, memory components, and other related topics will be discussed. Students will practice analyzing, designing, and simplifying digital circuits using Karnaugh maps and Boolean expressions. The practical application and integration of digital logic into computer systems is a key component of this course.

Course Credit Hours

Variable hours: No
Credits: 3
Lecture Hours: Instructor: 45 **Student:** 45
Lab: Instructor: 0 **Student:** 0
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 45 **Student:** 45
Repeatable for Credit: NO
Grading Methods: Letter Grades
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Level 4

Requisites

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Apply Boolean expressions, numbering systems, binary arithmetic, and Karnaugh maps in digital logic problems.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2028
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students score 70% or higher.
   Who will score and analyze the data: Departmental faculty

2. Apply appropriate functions and applications to logic gates, decoders, multiplexers, adders, and encoders.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2028
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students score 70% or higher.
   Who will score and analyze the data: Departmental faculty

3. Analyze the roles and functions of flip-flops, latches, and master/slave devices in digital systems.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2028
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students score 70% or higher.
   Who will score and analyze the data: Departmental faculty

Course Objectives

1. Convert between Binary, Decimal, Hex and Octal numbering systems.
2. Discuss the use of 1’s complement, 2’s complement, and Binary Arithmetic toward error detection in digital systems.
3. Explain logic functions that use Minterms and Maxterms and how they contribute to a circuit design.
4. Produce Boolean algebra expressions and Karnaugh maps.
5. Understand the use of expression simplification for optimizing circuit designs.
6. Implement logic circuits using logic gates.
7. Describe the roles of decoders, multiplexers, demultiplexers, adders, and encoders in digital circuits.
8. Explain the appropriate use of latches, flip-flops, and master/slave.
9. Understand the fundamental concepts of Verilog in modeling and simulating digital circuits.

New Resources for Course

OER material and LinkedIn videos.

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Khaled Mansour	*Faculty Preparer*	*Sep 21, 2024*
Department Chair/Area Director:		
Scott Shaper	*Recommend Approval*	*Sep 24, 2024*
Dean:		
Eva Samulski	*Recommend Approval*	*Oct 22, 2024*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Feb 11, 2025*
Assessment Committee Chair:		
Jessica Hale	*Recommend Approval*	*Feb 13, 2025*
Vice President for Instruction:		
Brandon Tucker	*Approve*	*Feb 14, 2025*