Broward Community College
Course Outline

STATUS: A

COMMON COURSE NUMBER: CET 1114C

COURSE TITLE: Digital Techniques

CREDIT HOURS: 5

CONTACT HOURS BREAKDOWN:

Lecture/Discussion	64
Lab	32
Other	
Contact Hours/Week	6

CATALOG COURSE DESCRIPTION:

Prerequisite: None

Corequisite: None

The study and application of digital logic circuits. Topics include binary, ocatal and hexadecimal number systems, Boolean algebra, Karnaugh mapping, logic gates, flip flops, counters and registers, applications in combinational and sequential logic systems. Extensive laboratory practice. Student fee charged.

General Education Requirements - Associate of Arts Degree, meets Area(s):
General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. Number Systems, Codes, and Boolean Algebra
2. Combinational Logic
3. Sequential Logic
4. Digital Systems Using Combinational and Sequential Logic
5. Technical Reports

I. Course Overview:

Upon successful completion of this course, the students should be able to demonstrate an understanding of the fundamentals of positional significance numbering systems and the application of digital techniques to the solution of combinational and sequential logic problems. The students should be able to use computer software to solve technical problems and undertake technical projects requiring library resources with oral presentations.

II. Units:

Unit 1. Number Systems, Codes, and Boolean Algebra

General Outcome:

1.0 The students should be able to demonstrate an understanding of the fundamentals of positional significance number systems and Boolean algebra.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

1.1 Convert numbers between the binary and decimal systems.

1.2 Perform basic math in binary.

1.3 Convert binary numbers to octal and hexadecimal and vice-versa.

1.4 Convert between binary and Gray codes.

1.5 Read and generate ASCII code.

1.6 List the laws of Boolean algebra and simplify expressions using these laws and associated rules.

1.7 Simplify Boolean expressions using Karnaugh maps.

Unit 2. Combinational Logic

General Outcome:

2.0 The students should be able to demonstrate their understanding of the symbols and truth tables for basic logic gates and then analyze and implement combinations of logic gates using Boolean expressions and truth tables.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

2.1 List the names and draw the symbols for AND, OR, HAND, NOR gates and inverters.

2.2 Construct a truth table for each of the basic gates.

2.3 Interpret selected electrical characteristics of logic gates.

2.4 List the Boolean expressions relating input to output for basic logic gates.

2.5 Write Boolean expressions for combinational logic and simplify both the expressions and the logic implementations.

2.6 Draw a Karnaugh map for a given logic diagram and simplify the logic from the map.

2.7 Analyze the operation of commonly used medium scale integrated logic including adders, comparators, decoders, encoders, converters, multiplexers, and parity generators/checkers.

Unit 3. Sequential Logic

General Outcome:

3.0 The students should be able to demonstrate an understanding of the symbols and truth tables for bistable multivibrators and to analyze the operation of monostable and astable multivibrators.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

3.1 Draw and implement a basic latch using HAND or NOR gates.

3.2 Compare the operation of S-R latches, S-R flip-flops, D flip-flops, and J-K flip-flops using timing diagrams and truth tables.

3.3 Calculate the pulse length for a given monostable circuit and conversely, calculate component values to yield a specific pulse length.

3.4 Calculate the repetition rate or select components for a specific astable multivibrator.

3.5 Use a logic probe to analyze the operation of sequential logic circuits.

Unit 4. Digital Systems Using Combinational and Sequential Logic

General Outcome:

4.0 The students should be able to analyze the operation of a number of commonly used counters and registers.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

4.1 Identify and draw timing diagrams for binary synchronous and asynchronous counters.

4.2 Identify and draw timing diagrams for decade and other random modulus binary counters.

4.3 Identify and analyze with timing diagrams Johnson counters, ring counters, and shift registers.

4.4 Implement selected binary and shift type counters.

Unit 5. Technical Reports

General Outcome:

5.0 The students should be able to write an effective technical report based on literary research, and a project practical.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

5.1 Apply the eight basic steps in planning a report, including defining the problem identifying the reader, stating a purpose, defining terms, establishing procedures, considering scope and limitations, evaluating time and money constraints and making an outline.

5.2 Do library or other research to obtain information for the report.

5.3 Demonstrate how to write a report on an approved technical topic in correct format, including a title page, table of contents, objective, procedure, research, bibliography, appendices (if applicable), background, diagrams, charts, data tables, graphs, conclusions and applications.