

STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK



MASTER SYLLABUS

ELEC 166 - Digital Fundamentals & Systems Laboratory

Updated By: Stephen Frempong

CANINO SCHOOL OF ENGINEERING TECHNOLOGY  
ELECTRICAL ENGINEERING TECHNOLOGY & ENGINEERING SCIENCE  
DEPARTMENT  
FALL 2018

## **ELEC 166 – Digital Fundamentals & Systems Laboratory**

A. **TITLE**: Digital Fundamentals & Systems Laboratory

B. **COURSE NUMBER**: ELEC 166

C. **CREDIT HOURS**: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

# Credit Hours: 1 !

# Lecture Hours:      per week \$

# Lab Hours: 2 per week \$

Other:              per week

Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE**: NO

E. **GER CATEGORY**: NONE

F. **SEMESTER OFFERED**: Fall and Spring

G. **COURSE DESCRIPTION**: A digital laboratory course with emphasis on topics such as: Adder/ Subtraction Circuit, Code Converters, Multiplexers and De-multiplexers, JK Flip-Flop Circuits, Counters, Shift Registers, Timers, , Memories Devices, Analog to Digital and Digital to Analog Converts and Digital Circuit Troubleshooting.

H. **PRE-REQUISITES**: Electric Circuits I and Laboratory (ELEC 101/109), or !  
permission of instructor. !

CO-REQUISITES: NONE

I. **STUDENT LEARNING OUTCOMES**

**Institutional Student Learning Outcome (ISLO's)**

(1) Communication Skills (2) Critical Thinking (3) Foundational Skills

(4) Social Responsibility (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

**Accreditation Board for Engineering and Technology ABET- Student Outcomes (a-k)**

<u>Course Objectives</u>	ABET-Student Outcomes (a-k)	ISLO's
1. Construct and Evaluate Logic Circuits Using Tri-State Buffers and Inverters Circuits 2. Design, Construct and Evaluate a Digital Electronic Switch Circuit. 3. Design, Construct and Evaluate a Three Bit Decoder Circuit for a Seven Segment LED Readout.	(c) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	(2) Critical Thinking  (5) Industry, Professional, Discipline-Specific Knowledge and Skills.
4. Construct and Evaluate a two decade BCD Counter Circuit Using Seven-Segment LED Readouts. 5. Construct and Evaluate a 2048 Byte, 8 Bit Memory System.	(c) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;	(2) Critical Thinking  (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

**J. APPLIED LEARNING COMPONENT: LAB**

**K. TEXTS:**

- 1) Tokheim, Roger L. (2014). *Digital Electronics: Principles & Applications. 8th Ed.* New York: McGraw-Hill.
- 2) Jennings, Robert. (2017) *Laboratory Manual –ELEC 166 Digital Fundamentals and Systems Laboratory.* Potsdam: SUNY Potsdam Central Duplicating.

**L. REFERENCES: NONE**

**M. EQUIPMENT: Students are required to purchase laboratory components.**

**N. GRADING METHOD:** A-F

**O. SUGGESTED MEASUREMENT CRITERIA/METHODS**

- Completion of Laboratory Experiments
- Laboratory Practicum.
- Laboratory Reports

**P. DETAILED COURSE OUTLINE :** NONE

**Q. LABORATORY OUTLINE:**

- 1 CHARACTERISTICS OF LOGIC GATES
- 2 CONSTRUCTION OF an INPUT PORT (Logic Switches) and An OUTPUT PORT (LIGHT EMITTING DIODES – LEDS)
- 3 CONSTRUCTION OF a 1Hz and 10 Hz CLOCK SOURCE
- 4 TWO BIT DECODER CIRCUITS
- 5 DIGITAL ELECTRONIC SWITCH
- 6 TRI-STATE GATES APPLICATIONS
- 7 CHARACTERISTICS OF SEVEN SEGMENT READOUTS and the DESIGN OF A THREE BIT DECODER for SEVEN SEGMENT READOUTS with a HEADS-UP DISPLAY OPTION
- 8 OPERATING CHARACTERISTICS and APPLICATIONS of the ! 74LS47 DECODER
- 9 CONSTRUCTION OF A TWO DECADE EVENT COUNTER USING SEVEN SEGMENT READOUTS
- 10 ON-SCREEN CHARACTER GENERATOR --Part 1, Construction of an Eight Bit Input/Output Tri-State Data Bus and the Design of an 1ms Pulser
- 11 ! ON-SCREEN CHARACTER GENERATOR --Part 2, Addition of an Eight Bit Memory System to the Eight Bit Input/Output Tri-State Data Bus

12 ON-SCREEN CHARACTER GENERATOR --Part 3, Addition of Digital to Analog Converters to Exp. # 11 (Two Weeks)