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

COURSE OUTLINE

ELEC 166 Digital Fundamentals & Systems Laboratory

Prepared By: Robert Jennings

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
ELECTRICAL TECHNOLOGY & ENGINEERING SCIENCE DEPARTMENT
MAY 2015
A. **TITLE**: Digital Fundamentals & Systems Laboratory

B. **COURSE NUMBER**: ELEC 166

C. **CREDIT HOURS**: 1

D. **WRITING INTENSIVE COURSE**: NO

E. **WEEKS PER SEMESTER**: 15

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

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY**: 2 hours of laboratory per week.

H. **CATALOG 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.

I. **PRE-REQUISITES/CO-COURSES**: Pre or Co-Requisites: Electric Circuits I and Laboratory (ELEC 101/109, or permission of instructor.

J. **GOALS (STUDENT LEARNING OUTCOMES)**
   By the end of this course, seventy percent of the students will be able to:

<table>
<thead>
<tr>
<th>Course Objectives (STUDENT LEARNING OUTCOMES)</th>
<th>*Institutional SLO</th>
</tr>
</thead>
</table>
| 1. Construct and evaluate logic circuits using Tri-State buffers and inverters circuits | 2. Crit. Thinking  
3. Prof. Competence |
| 2. Design, construct and evaluate a Digital Electronic Switch circuit. | 2. Crit. Thinking  
3. Prof. Competence |
| 3. Design, construct and evaluate a three bit decoder circuit for a seven segment LED Readout. | 2. Crit. Thinking  
3. Prof. Competence |
| 4. Construct and evaluate a two decade BCD counter circuit using seven-segment LED readouts. | 2. Crit. Thinking  
3. Prof. Competence |
| 5. Construct and evaluate a 2048 byte, 8 bit Memory System. | 2. Crit. Thinking  
3. Prof. Competence |

*Intuitional Student Learning Objectives (SLO):

(1) Communication, (2) Critical Thinking, (3) Professional Competence, (4) Inter-Intrapersonal Skills
K. **TEXTS:**


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

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

M. **MEASUREMENT CRITERIA/METHODS**

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

O. **DETAILED LECTURE OUTLINE** (Not Applicable—Laboratory only course)

P. **LABORATORY OUTLINE**

See page 4

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**LABORATORY OUTLINE**

**LIST OF EXPERIMENTS**
<table>
<thead>
<tr>
<th>EXP. NO.</th>
<th>EXPERIMENT TITLE</th>
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<tbody>
<tr>
<td>1</td>
<td>CHARACTERISTICS OF LOGIC GATES</td>
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<tr>
<td>2</td>
<td>CONSTRUCTION OF an INPUT PORT (Logic Switches) and An OUTPUT PORT (LIGHT EMITTING DIODES – LEDS)</td>
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<td>3</td>
<td>CONSTRUCTION OF a 1Hz and 10 Hz CLOCK SOURCE</td>
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<td>4</td>
<td>TWO BIT DECODER CIRCUITS</td>
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<td>5</td>
<td>DIGITAL ELECTRONIC SWITCH</td>
</tr>
<tr>
<td>6</td>
<td>TRI-STATE GATES</td>
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<tr>
<td>7</td>
<td>CHARACTERISTICS OF SEVEN SEGMENT READOUTS and the DESIGN OF A THREE BIT DECODER for SEVEN SEGMENT READOUTS with a HEADS-UP DISPLAY OPTION</td>
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<tr>
<td>8</td>
<td>OPERATING CHARACTERISTICS and APPLICATIONS of the 74LS47 DECODER</td>
</tr>
<tr>
<td>9</td>
<td>CONSTRUCTION OF A TWO DECADE EVENT COUNTER USING SEVEN SEGMENT READOUTS</td>
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<tr>
<td>10</td>
<td>ON-SCREEN CHARACTER GENERATOR --Part 1, Construction of an Eight Bit Input/Output Tri-State Data Bus and the Design of an 1ms Pulser</td>
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<tr>
<td>11</td>
<td>ON-SCREEN CHARACTER GENERATOR --Part 2, Addition of an Eight Bit Memory System to the Eight Bit Input/Output Tri-State Data Bus</td>
</tr>
<tr>
<td>12</td>
<td>ON-SCREEN CHARACTER GENERATOR --Part 3, Addition of Digital to Analog Converters to Exp. # 11 (Two Weeks)</td>
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</tbody>
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Revised 5-22-2015