MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MKTX 216 – Digital Fundamentals and Logic Design Laboratory

Created by: Robert Jennings and Rashid Aidun, Ph.D.

Updated by: J. Miles Canino, Ph.D.

Canino School of Engineering Technology

Department: Mechatronics Engineering Technology

Semester/Year: Fall/2018
A. **TITLE**: Digital Fundamentals and Logic Design Laboratory

B. **COURSE NUMBER**: MKTX 216

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**: Yes ☐ No ☑

E. **GER CATEGORY**: None: ☑ Yes: GER

*If course satisfies more than one: GER*

F. **SEMESTER(S) OFFERED**: Fall ☑ Spring ☐ Fall & Spring ☐

G. **COURSE DESCRIPTION**:

This laboratory course emphasizes on topics such as: Adder/Subtraction Circuits, Code Converters, Multiplexers and De-Multiplexers, JK Flip-Flop Circuits, Counters, Timers, Memory devices, Analog to Digital and Digital to Analog Converters, and Digital Circuit Troubleshooting.

H. **PRE-REQUISITES**: None ☐ Yes ☑ If yes, list below:

CITA 152 or ENGS 102, AND PHYS 132/136

**CO-REQUISITES**: None ☐ Yes ☑ If yes, list below:

MKTX 215
I. STUDENT LEARNING OUTCOMES: *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
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<tbody>
<tr>
<td>Construct and evaluate logic circuits using Tri-State buffers and inverters circuits.</td>
<td>a, b, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA PS Subsets</td>
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<tr>
<td>Design, construct, &amp; evaluate a Digital Electronic Switch circuit.</td>
<td>a, b, c, k</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO</td>
<td>Subsets Subsets Subsets Subsets</td>
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<td>Design, Construct, &amp; evaluate a three bit decoder circuit for a seven segment LED (LCD) readout.</td>
<td>a, b, c, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA PS Subsets</td>
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<tr>
<td>Design, Construct, &amp; evaluate a two decade BCD counter circuit using seven-segment LED (LCD) readout</td>
<td>a, b, c, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA PS Subsets</td>
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**KEY**

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<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
<th>ISLO &amp; Subsets</th>
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<tbody>
<tr>
<td>1</td>
<td>Communication Skills</td>
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<td>Oral [O], Written [W]</td>
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<td>2</td>
<td>Critical Thinking</td>
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<td></td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<td>3</td>
<td>Foundational Skills</td>
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<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<td>4</td>
<td>Social Responsibility</td>
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<td></td>
<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
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<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
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J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

If YES, select one or more of the following categories:

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service

- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship (program, class, project)

K. TEXTS:

Laboratory manual covering the experiments listed below.

L. REFERENCES:

N/A

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Tests, Quizzes
- Design Projects
- Homework

P. DETAILED COURSE OUTLINE:

See Laboratory Outline

Q. LABORATORY OUTLINE: None ☐ Yes ☒

1. Number Systems, Operations, and Codes
2. Binary Coded Decimal (BCD) code
3. Logic Gates
4. Boolean Algebra and Logic Simplification
5. Combination Logic Analysis
6. Functions of Combinational Logic
7. Multiplexers and De-multiplexers
8. Latches and Flip-Flops
9. Counters
10. Solid State Memories
11. Digital to Analog Converters
12. Analog to Digital Converters