MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MKTX 215/ELEC 165 - Digital Fundamentals and Systems

Created by: Robert Jennings and Rashid Aidun, Ph.D.
Updated by: Dr. Lucas Craig

Canino School of Engineering Technology
Department: Mechatronics Engineering Technology
Semester/Year: Spring 2021
A. **TITLE**: Digital Fundamentals and & Systems

B. **COURSE NUMBER**: MKTX 215/ELEC 165

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

   - # Credit Hours: 3
   - # Lecture Hours: 3 per week
   - # Lab Hours: 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**:

   The topics covered in this course are: number systems, logic operations and codes, logic gates, Boolean algebra and logic simplification, combinational logic analysis, functions of combinational logic, latches, flip-flops, counters and shift registers. Digital to Analog and Analog to Digital converters and Semiconductor memories are also covered.

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

   ENGS 263 & ENGS 264 or ELEC 101 & Elec 109

   **CO-REQUISITES**: None ☒ Yes ☐ If yes, list below:
## 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>
</tr>
</thead>
<tbody>
<tr>
<td>Perform number systems conversion</td>
<td>a, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA PS Subsets</td>
</tr>
<tr>
<td>Provide the simplest expression for the output using Karnaugh mapping with the &quot;Can't Happen&quot; conditions</td>
<td>a, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA PS Subsets</td>
</tr>
<tr>
<td>Design and analyze a synchronous Up/Down digital counter</td>
<td>a, c, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA PS Subsets</td>
</tr>
<tr>
<td>Describe the internal operations of a successive-approximation type of analog to digital converter</td>
<td>a, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills 1-Comm Skills</td>
<td>CA PS IA W</td>
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### KEY

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication Skills</td>
</tr>
<tr>
<td></td>
<td>Oral [O], Written [W]</td>
</tr>
<tr>
<td>2</td>
<td>Critical Thinking</td>
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<tr>
<td></td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<tr>
<td>3</td>
<td>Foundational Skills</td>
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<td></td>
<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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<tr>
<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
</tr>
</tbody>
</table>
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:**


L. **REFERENCES:**

N/A

M. **EQUIPMENT:** None ✔ Needed:

As determined by instructor

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

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Tests, Quizzes
- Design Projects
- Homework

P. **DETAILED COURSE OUTLINE:**

1. Number Systems, Operations, and Codes
2. Logic Gates
3. Boolean Algebra and Logic Simplification
4. Combination Logic Analysis
5. Functions of Combinational Logic
6. Latches and Flip-Flops
7. Counters
8. Solid State Memories
9. Digital to Analog Converters
10. Analog to Digital Converters

Q. **LABORATORY OUTLINE:** None ✔ Yes ☐