MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MKTX 325 – Microcontrollers

Created by: 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:** Microcontroller

B. **COURSE NUMBER:** MKTX 325

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

   # Credit Hours: 3
   # Lecture Hours: 2 per week
   # Lab Hours: per week
     Other: 2 hours recitation 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 course introduces microcontrollers. The fundamental skills needed to understand, use, and design microcontroller-based systems are explored. The course focuses on 8-bit microcontroller architecture.

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

   MKTX 215/216 Digital Fundamentals and Logic Design/Laboratory

   **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>Understand the fundamentals of microprocessors and commercially available microcontroller architectures.</td>
<td>a, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
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<tr>
<td>Understand the microcontroller programming model and its instruction set.</td>
<td>a, c, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
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<tr>
<td>Demonstrate a strong understanding of logic, bit manipulation, and basic arithmetic operations facilitated by microcontrollers</td>
<td>a, c, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA Subsets Subsets</td>
</tr>
<tr>
<td>Demonstrate familiarity with application programs and the fundamentals of software design</td>
<td>a, c, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA Subsets Subsets</td>
</tr>
<tr>
<td>Understand the mechanism of system input/output and data conversion</td>
<td>a, k</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA IA Subsets Subsets</td>
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**KEY**

<table>
<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 Oral [O], Written [W]</td>
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<tr>
<td>2</td>
<td>Critical Thinking Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<td>3</td>
<td>Foundational Skills Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<td>4</td>
<td>Social Responsibility 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:**

N/A

L. **REFERENCES:**

N/A

M. **EQUIPMENT:** None ☒ Needed:

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

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

- Tests, Quizzes
- Projects
- Homework

P. **DETAILED COURSE OUTLINE:**

I. Microprocessor and Microcontroller Fundamentals
II. 8-bit Microcontroller Architecture
III. Microcontroller Programming Model and Its Instruction Set
IV. Programming and Problem Solving
V. Introduction to Data Copy (Move), Arithmetic, and Branch Instructions
VI. Introduction to Logic, Bit Manipulation, and Multiply-Divide Operations
VII. Stack and Subroutines
VIII. Application Programs and Software Design
IX. Input and Output (I/O) Ports and Interfacing
X. Interrupts
XI. Timers
XII. Data Converters
XIII. Serial I/O

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