MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MKTX 320 – Mechatronics Laboratory I

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**: Mechatronics Laboratory I

B. **COURSE NUMBER**: MKTX 320

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

   # Credit Hours: 1
   # Lecture Hours: per week
   # Lab Hours: 3 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**:

   In this laboratory, the experiments are designed to give students hands on experience with components and measurement equipment used in the design of mechatronic products. Students learn the functions of operational amplifier, diodes/LEDs, Transistors, relays, sensor, and digital components.

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

   ENGS 264, MKTX 216

   **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>Function on a multidisciplinary team</td>
<td>d</td>
<td></td>
<td></td>
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<tr>
<td>Demonstrate the functions of diodes and LEDs in electronic circuits</td>
<td>a, b, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
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<tr>
<td>Explain the functions of BJT and MOSFET transistors in electronic circuits.</td>
<td>a, b, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
</tr>
<tr>
<td>Identify the functions of digital components.</td>
<td>a, b, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
</tr>
<tr>
<td>Select and use the proper sensors for a particular application.</td>
<td>a, b, c, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
</tr>
<tr>
<td>Apply techniques appropriate for sensor signal processing</td>
<td>a, b, k</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA IA Subsets Subsets</td>
</tr>
<tr>
<td>Apply conventional techniques for data analysis - statistical or otherwise</td>
<td>a, b, c, e, k</td>
<td>2-Crit Think 3-Found Skills 5-Ind, Prof, Disc, Know Skills</td>
<td>CA IA IM Subsets</td>
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**KEY**

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
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<tbody>
<tr>
<td>1</td>
<td>Communication Skills</td>
</tr>
<tr>
<td>2</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td>3</td>
<td>Foundational Skills</td>
</tr>
<tr>
<td>4</td>
<td>Social Responsibility</td>
</tr>
<tr>
<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
</tr>
</tbody>
</table>

**ISLO & Subsets**

- d: Social Respons
- a, b, k: Critical Think ISLO ISLO
- CA: Critical Analysis
- IA: Inquiry & Analysis
- PS: Problem Solving
- IM: Information Management
- QTR: Quantitative Lit./Reasoning
- ER: Ethical Reasoning
- GL: Global Learning
- IK: Intercultural Knowledge
- T: Teamwork
- IM: Information Management
- IM: Information Management
- IM: Information Management
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:**

Lab Manual created by SUNY Canton Faculty

L. **REFERENCES:**


M. **EQUIPMENT:**

- None ☐ Needed: Oscilloscopes, Computers with Data Acquisition capabilities

N. **GRADING METHOD:**

A-F

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

- Lab-reports
- Projects
- Participation & Team Work

P. **DETAILED COURSE OUTLINE:**

See lab outline.

Q. **LABORATORY OUTLINE:**

- None ☐ Yes ☒

1. Laboratory Safety and Basic Measurements
2. Basic Electronic Components and their Functions in Electrical Circuits
3. Operational Amplifier
4. Diodes and LEDs
5. BJT and MOSFET Transistors
6. Operational Amplifier (Op-Amp)
7. Relays
8. Digital Circuit Components
9. Sensors
10. Signal Processing and Data Acquisition
11. Data Analysis and Post-Processing
12. State Space Model Implementation of System Models
13. Feedback Control