

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



MASTER SYLLABUS

**COURSE NUMBER – COURSE NAME
MKTX 370 – Mechatronics Laboratory II**

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Canino School of Engineering Technology

Department: Mechatronics Engineering Technology

Semester/Year: Fall/2018

A. **TITLE:** Mechatronics Laboratory II

B. **COURSE NUMBER:** MKTX 370

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:**

This mechatronics laboratory emphasizes the applications of analog electronics, digital electronics, sensors and transducers, actuators, and microcontrollers. Laboratory experiments are designed to give the student hands-on experience with components and measurement equipment used in the design of mechatronic products. Design and construction of mechatronics systems are emphasized

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

MKTX 320

CO-REQUISITES: None Yes If yes, list below:

MKTX 325

I. STUDENT LEARNING OUTCOMES: (see key below)

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

<u>Course Student Learning Outcome</u> <i>[SLO]</i>	<u>Program Student Learning Outcome</u> <i>[PSLO]</i>	<u>GER</u> <i>[If Applicable]</i>	<u>ISLO & SUBSETS</u>	
Distinguish the basic elements underlying analog and digital electronics	a, b, k		2-Crit Think ISLO ISLO	CA IA Subsets Subsets
Use sensors, actuators, microcontrollers, and embedded software in mechatronics applications	a, b, c, k		2-Crit Think 3-Found Skills ISLO	CA IA IM Subsets
Design and develop system models for mechatronic systems.	a, b, c, k		2-Crit Think ISLO ISLO	CA IA Subsets Subsets
Design and develop control architectures for mechatronic systems	a, b, c, k		2-Crit Think ISLO ISLO	CA IA Subsets Subsets
Tune, modify, and implement control systems in mechatronics projects	a, b, c, k		2-Crit Think ISLO ISLO	CA IA Subsets Subsets
Demonstrate effective team-work and collaborative skills	d		4-Soc Respons ISLO ISLO	T Subsets Subsets Subsets
Demonstrate comfortability with giving oral and written presentaitons	g1		1-Comm Skills ISLO ISLO	O Subsets Subsets Subsets

KEY	<u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u>
ISLO #	ISLO & Subsets
1	Communication Skills Oral [O], Written [W]
2	Critical Thinking <i>Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS]</i>
3	Foundational Skills <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
4	Social Responsibility <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	Industry, Professional, Discipline Specific Knowledge and Skills

J. **APPLIED LEARNING COMPONENT:** Yes No

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

- | | |
|---------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> Classroom/Lab | <input type="checkbox"/> Civic Engagement |
| <input type="checkbox"/> Internship | <input checked="" type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input checked="" type="checkbox"/> Research |
| <input type="checkbox"/> Practicum | <input type="checkbox"/> Entrepreneurship |
| <input type="checkbox"/> Service Learning | (program, class, project) |
| <input type="checkbox"/> Community Service | |

K. **TEXTS:**

Faculty-Created Lab Manual

L. **REFERENCES:**

The Next Step in Training in Mechatronics Technologies, Lab-Volt Systems Inc., Farmingdale, NJ

M. **EQUIPMENT:** None Needed: Computers with MatLab, Simulink, and Data Acquisition capabilities

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

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

- Lab practical
- Lab-reports
- Projects
- Participation & Team Work

P. **DETAILED COURSE OUTLINE:**

See laboratory outline.

Q. **LABORATORY OUTLINE:** None Yes

I. Fluid Power Circuit

II. Electro-Pneumatic System

III. Speed control in AC and DC drives

IV. Servo controller interfacing with DC motors

V. Proportional Integral Derivative (PID) controller design and development.

VI. Stepper motor microcontroller system

VII. Modeling and digital simulation of electrical, hydraulic, and pneumatic systems using MatLab and Simulink

VIII. Data logging, archiving, and mining

IX. Independent Component Analysis

- X. Principle Component Analysis**
- XI. Fundamentals of Machine Learning I**
- XII. Fundamental of Machine Learning II**
- XIII. Implementing Machine Learning and Decision Systems**