

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



MASTER SYLLABUS

**COURSE NUMBER – COURSE NAME
AUTO 240 – HYBRID AND ELECTRIC VEHICLES**

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Updated by:

Canino School of Engineering Technology

Department: AUTOMOTIVE TECHNOLOGY

Semester/Year: FALL 2022

- A. **TITLE:** HYBRID AND ELECTRIC VEHICLES
- B. **COURSE NUMBER:** AUTO 240
- C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

Credit Hours: 3
Lecture Hours: 2 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 course covers the details and diagnosis of the powertrain of hybrid vehicles that are electric and internal combustion engine propelled as well as vehicles that are electric propulsion only. The internal combustion engine is not covered in this course. Coverage in this course includes safety, tools, scan tools, types, and diagnostic procedures primarily focusing on the electric portion of vehicle drivetrains.

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

AUTO 113, 114, 141, 144 or ASE Certification with 4 years of automotive experience, or instructor's permission.

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

			ISLO ISLO ISLO	Subsets Subsets Subsets Subsets
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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

*Include program objectives if applicable. Please consult with Program Coordinator

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:**

Electric Drive: Hybrid and Electric Vehicle Technology, by Electude, ISBN: 978-0-578-42251-0

L. **REFERENCES:**

ShopKeyPro

M. **EQUIPMENT:** None Needed: hybrid and electric vehicles, coated tools, UL certified rubber and leather gloves

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

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

Tests, homework, and lab performance

P. **DETAILED COURSE OUTLINE:**

I. Safety

Utilize safe practices in relation to high-voltage electrical circuits with insulated tools and certified clothing.

II. Introduction to high-voltage tools

III. Charging Stations: Apps and type

IV. Hybrid Types

A. Series

B. Parallel

- C. **Series-Parallel**

- V. **Electric Motors Generators**
 - A. **Motor Operation**
 - B. **Power Generation.**
 - C. **Motor Generator Management**

- VI. **Batteries**
 - A. **Identification of battery types and locations**
 - B. **AC charging stations**

- VII. **Cooling and Heating Systems**
 - A. **Battery Cooling**
 - B. **Heat Pumps**
 - C. **Air Conditioning**

- VIII. **Scan Tool Operation**
 - A. **PIDS**
 - B. **Component Testing**

Q. **LABORATORY OUTLINE:** None Yes

I. **Safety**

Utilize safe practices in relation to high-voltage electrical circuits with insulated tools and certified clothing.

II. **Introduction to high-voltage tools: Common tools, Megaohm meter, safety hook**

III. **Charging Stations: Nevaldine Inspection with visiting vehicle**

IV. **Hybrid Types: Inspection of visiting vehicles.**

- V. **Electric Motors Generators**
 - A. **Motor Operation**
 - B. **Power Generation.**
 - C. **Motor Generator Management with scan tool.**

- VI. **Batteries**
 - A. **Identification of battery types and locations**
 - B. **AC charging stations, including those provided with vehicle**
 - C. **Removal and individual cell charging.**

- VII. **Cooling and Heating Systems**
 - A. **Battery Cooling**
 - B. **Heat Pumps**
 - C. **Air Conditioning**

- VIII. **Scan Tool Operation**
 - A. **PIDS: cell block, temperature, torque management**
 - B. **Component Testing**

- C. Actuator management**
- D. Repair diagnosis**