

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



MASTER SYLLABUS

**COURSE NUMBER – COURSE NAME
CONS 368 - BUILDING ELECTRICAL AND MECHANICAL SYSTEMS**

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Updated by: Michael J. Newtown, P.E.

Canino School of Engineering Technology

Department: Civil and Construction Technology

Semester/Year: Fall 2018

A. **TITLE:** BUILDING ELECTRICAL AND MECHANICAL SYSTEMS

B. **COURSE NUMBER:** CONS368

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:**

An introduction to the major components that comprise the electrical and mechanical (HVAC) systems in a commercial building. Students study and interpret construction plans associated with these systems. Water supply, waste, drain and vent calculations are performed. Students are required to perform heat and energy calculations. Issues that impact building environmental health and indoor air quality are presented. Alternative energy approaches to heating, cooling and providing power to buildings are introduced.

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

MATH 123 PreCalculus

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:

<u>Course Student Learning Outcome</u> <u>[SLO]</u>	<u>Program Student Learning Outcome</u> <u>[PSLO]</u>	<u>GER</u> <i>[If Applicable]</i>	<u>ISLO & SUBSETS</u>	
Explain in general technical terms the components that make up a buildings mechanical and electrical systems.			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Interpret the mechanical and electrical prints from a set of building plans.			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Size waste, drain and vent systems			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Perform a building heat load calculation			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
Perform a building cooling load calculation			5-Ind, Prof, Disc, Know Skills 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:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Classroom/Lab | <input type="checkbox"/> Civic Engagement |
| <input type="checkbox"/> Internship | <input type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input 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:**

Building Electrical and Mechanical Systems 2nd Ed., Stein, Wiley Publishing

L. **REFERENCES:**

New York State Building Code, National Electric Code, International Building Code, and Mechanical and Electrical Equipment for Buildings 9th Ed., Stein and Reynolds, Wiley Publishing

M. **EQUIPMENT:** None Needed:

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

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

Homework, exams, research/design project, final exam

P. **DETAILED COURSE OUTLINE:**

- I. Mechanical Systems
- A. D-W-V systems
 - 1. Water Supply
 - a. Piping
 - b. Pumps
 - 2. Waste Water
 - a. Components
 - b. Sizing sanitary drains
 - 3. Venting
 - a. Materials
 - b. Purpose
 - c. Sizing Vents
 - 4. Storm Water
 - 5. Interpreting Pipe Drawings
- B. HVAC
 - 1. Heating Options
 - a. Heat Load Calculations

- b. Insulation and R-value
- 2. Ventilation
 - a. Air handling Equipment
 - b. Sizing duct work
- 3. Cooling and Conditioning
- 4. Cooling Load calculations
- 5. Interpreting HVAC Plans
- II. Electrical Systems
 - A. Interpreting Electrical Plans (drawings)
 - B. Electric code issues
 - C. Electrical Supply
 - 1. Wire and conduit
 - D. Electrical Distribution Components
 - E. Lighting Systems
- III. Alternative Energy Applications
 - A. Use of solar energy
 - 1. Passive
 - 2. Photovoltaic Electricity
 - B. Use of geothermal
 - C. DC-AC Inverters
 - D. Research Paper

Q. LABORATORY OUTLINE: None Yes