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

COURSE OUTLINE

AREA 210 - SUSTAINABLE BUILDING

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CANINO SCHOOL OF ENGINEERING TECHNOLOGY
MECHANICAL & ENERGY TECHNOLOGY

May 2015

A. **TITLE:** Sustainable Building

B. **COURSE NUMBER**: AREA 210

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 weeks

F. **SEMESTER(S) OFFERED:** Spring

G. **HOURS OF LECTURE:** 3 – 50 minutes lectures per week

H. **CATALOG DESCRIPTION:** This course is an introduction to building science. Basic topics are introduced such as air leakage, heating, cooling, and insulation. Students will also see different types of building construction and how they relate to building science.

I. **PRE-REQUISITES/CO-COURSES:** None

J. **GOALS:**
By the end of this course, the student will:

Course Objectives	*Institutional SLO*
a. Identify the basic equipment for doing building science	**2. Critical Thinking** **3. Professional Competence**
b. Demonstrate how energy flows in a building	**3. Professional Competence**
c. Research the different methods used to improving envelope and thermal efficiency	**1. Communication** **3. Professional Competence**
d. Identify basic improvements that can be made to improve building efficiency and indoor air quality	**2. Critical Thinking** **3. Professional Competence**
e. Calculate an energy load for a building, savings to investment ratio, simple payback, and annual savings	**3. Professional Competence**
f. Identify building flaws	**2. Critical Thinking** **3. Professional Competence**
g. Demonstrate the safety required when doing building science	**3. Professional Competence**

K. **TEXT:** Krigger, J. and Dorsi, C. Residential Energy: Cost Savings and Comfort for Existing Buildings (5th Edition), Saturn Resource Management 2009

L. **REFERENCES:** N/A

M. **EQUIPMENT:** Technology enhanced classroom

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

O. **MEASUREMENT CRITERIA/METHODS:** Homework, quizzes, and exams.

P. **DETAILED TOPICAL OUTLINE:**

1. Principles of Energy and Personal Safety
    a. Types of heat transfer
    b. Laws of thermodynamics
    c. Energy and Pressure
    d. Personal Protection
2. Moisture and Airflow
    a. Laws of Thermodynamics
    b. Temperature and heat
    c. Sensible and latent heat
    d. Energy and pressure flow
3. Building envelope and blower doors
    a. Building construction
    b. Heat flow through building shell
    c. Diagnosis building energy flow
    d. Basics of blower doors
        i. Preparation and setup
        ii. usage
4. Insulation and thermal and pressure boundaries
    a. Types of insulation
    b. Face and barriers
    c. Retrofitting
    d. Evaluating the thermal and pressure boundaries
5. Windows, Doors and Air Sealing
    a. Characteristics and testing
    b. Selecting
    c. Components and R-value
    d. Air Sealing with regards to thermal and pressure boundaries
6. Calculations
    a. Heat load
    b. Heat loss
    c. Cost effectiveness
    d. Payback
    e. Savings to investment ratio
7. Airflow, Ventilation and Combustion basics
    a. Building airflow standard
    b. Mechanical ventilation requirements
    c. Infiltration losses

    d. Basics of combustion
8. Heating systems
    a. Types
    b. Ventilation design
    c. Furnace
    d. Boiler
    e. Efficiency
9. Domestic water heating and safety
    a. Type
    b. Vent design
    c. Efficiency savings
    d. Safety and combustion safety basics
10. Combustion safety
    a. Ventilation
    b. CAZ
    c. Detection and Measurements
    d. BPI standards
11. Advanced topics
    a. Advanced pressure diagnostics
    b. Diagnostic testing for forced air
    c. Mechanical ventilation controls
    d. Sizing mechanical ventilation systems
    e. CAZ issues