COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Commercial Energy Use Analysis & Simulations	**Date submitted:**	May 2020 (AAC: 20-21)
Department:	STEAM		
Curriculum:	Tech Studies: Energy Management Option		

Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system.

Course Code: (eg. ACC 101)	NRG 241
Course Type:	X

A: Clinical B: Lab D: Distance Learning
I: Individual/Independent L: Lecture N: Internship
M: Seminar P: Practicum U: Studio
X: Combined Lecture/Lab Y: Combined Lecture/Clinical/Lab Z: Combined Lecture/Studio

Elective Type:	G

AH: Art History E: English FA: Fine Arts FL: Foreign Language G: General HI: History HU: Humanities LAS: Liberal Arts & Sciences M: Math S: Science SS: Social Science

Credit Hours:	3
Developmental: (yes/no)	No
Contact Hours: Lecture:	1
Clinical:	0
Lab:	3
Studio	0
Other:	0
TOTAL:	4
Class Maximum:	24
Semesters Offered:	Sp/F

Prerequisites:

C- or higher in NRG 122 – Commercial HVAC Systems and Controls AND NRG 123 – Energy Efficiency Methods

Corequisites:

None

Other Requirements:

None

Catalog Course Description:

Provides students with exposure to the entire energy analysis process work flow with a "hands-on" implementation of an actual building energy study and an energy modeling using Building Information Modeling and AutoDesk Revit, eQuest software and other specialized modeling tools.

Topical Outline: List course content in outline format.

- Introduction to course and overview of skills to be developed, energy use in commercial buildings and common metrics such as Energy Utilization Intensity (EUI)
- Introduction to schematic design energy modeling using eQuest
- Schematic design parametric energy analysis studies using eQuest
- Introduction to Building Information Model (BIM) design and energy modeling
- BIM based parametric energy design studies
- Full energy modeling work flow
- Introduction to conducting commercial building ASHRAE Level 1 and 2 energy audits
- Introduction to data logging application and analysis
- Subject building design document review, audit and data logger deployment
- Subject building BIM modeling and full modeling work flow integration

	• Subject building Energy Conservation Measure (ECM) parametric modeling studies • ECM financial analysis and feasibility methods • Subject building results presentations
Outcomes: Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.	**Upon successful completion of this course, the student will be able to:** • distinguish between different activities involved in a comprehensive energy analysis effort, i.e., plan review, walk- through, identification of Energy Conservation Measures (ECMs), cost estimating, energy savings calculations and report writing • demonstrate an understanding of the preparation requirements for doing a commercial building energy analysis • use appropriate energy audit forms and develop good record keeping habits. • demonstrate an understanding of, recognize, and describe major energy using systems found in typical commercial buildings • use common auditing and field measurement instruments during actual audit • show familiarity with a broad range of energy conservation measure technologies • prepare cost estimates for at least one energy conservation measure • show familiarity with good cost estimating techniques for energy conservation measures • calculate savings for at least one energy conservation measure • distinguish between the commonly used methods for computing energy savings for energy conservation measure including manual methods (hours of operation and connected load), variable degree-day calculations, bin methods and hourly simulations
	TECH STUDIES PROGRAM, ENERGY OPTION: *(Numbering reflects Program Outcomes as they appear in the college catalog)* 6. identify energy conversion processes and their relation to engineering and technology 7. demonstrate technical competency in a functional area of technology. The specialization may include, but is not limited to: electricity, computer aided drafting and design, manufacturing, and construction.
	GENERAL EDUCATION: *(Numbering reflects General Education Outcomes as they appear in the college catalog)* None
Evaluation: List how the above outcomes will be assessed.	Class Assignments Scoping Report Class Project Final Presentation
Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.	Computer classroom

Textbook(s)	Suggested Student Resources: Procedures for Commercial Building Energy Audits, 2nd Edition (ASHRAE) Building Energy Simulation Guidelines Packet eQuest Software (provided on CD by instructor) DOE2.2. Documentation (provided on CD by instructor) AutoDesk Revit, provided on workstations an from Autodesk student license download Energy Analysis Resources (provided on CD by instructor) Integrating Energy Engineering & Performance Modeling into the Design Process Various hand-outs (by instructor)