COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Energy Efficiency Methods	Date submitted:	4/26/18 (18-19)
Department:	Business & Technology Department		
Curriculum:	Energy Management Program		

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*123
Course Type:	L/D

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 G: General HI: History HU: Humanities LA: Liberal Arts FL: Foreign Language
M: Math S: Science SS: Social Science

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

Prerequisites:

C- or better in Intermediate Algebra (MAT*137) OR Intermediate Algebra for Liberal Arts (MAT*137L) or Elementary & Intermediate Algebra Combined (MAT*139) AND Spreadsheet Applications (CSA*135)

Corequisites:

Commercial HVAC Systems & Analysis (NRG*122)

Other Requirements:

None

Ability Based Education (ABE) Statement:

At Tunxis Community College students are assessed on the knowledge and skills they have learned. The faculty identified the General Education Abilities critical to students' success in their professional and personal lives. In every class, students are assessed on course abilities, sometimes program abilities, and, in most classes, at least one General Education Ability. Students will receive an evaluation of the degree to which they have demonstrated or not demonstrated that General Education Ability.

Catalog Course Description:

A systems approach is used to analyze the input, output, and efficiency of commonplace energy conversion devices. Included are motors, fans, pumps, heat engines, domestic hot water heaters, furnaces, boilers, refrigeration devices, and heat pumps. In so doing students (1) become fluent in the use of the many different units used to denote and measure energy/power (2) learn what quantities need to be measured to determine energy/power in different systems (3) determine the energy/cost savings associated with

	different efficiency improvement strategies.
Topical Outline: List course content in outline format.	• Intro, Units, Scientific Notation, Significant Figures • Right Triangle Trig, Interpolation, Extrapolation • Mechanical Systems • Mechanical Systems, Flywheels, Motors • Fluid Systems, Fan Tables • Electrical Systems • Induction, 3-Phase Power, Power Factor • Thermal Systems • Thermodynamics, Heat Engines, Combustion • HVAC Efficiency, Heat Pumps
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 do the following: • Comprehend the various units of measure for energy and associated efficiencies. • Understand the elements of electric and natural gas utility rate tariffs and their impact on selection technologies for energy savings. • Demonstrate the understanding of the basic concepts of thermodynamics. • Evaluate the energy savings generated by implementing efficient electrical and mechanical building technologies and their impact on the performance of the building as a whole. • Determine the cost savings associated with the different efficiency improvement strategies. • Utilizing skills learned in class, produce a detailed energy analysis utilizing spreadsheets and granular environmental data available in the public domain.
	PROGRAM: *(Numbering reflects Program Outcomes as they appear in the college catalog)* 1. evaluate energy use patterns of residential and commercial buildings 2. demonstrate an understanding of the interaction between energy consuming building systems and based on that understanding make energy consumption recommendations 3. develop and evaluate inferences and predictions that are based on collected data 4. use problem-solving techniques & mathematics to transform concepts into energy related projects
	GENERAL EDUCATION: *(Numbering reflects General Education Outcomes as they appear in the college catalog)* 7. Quantitative Reasoning -Students will learn to recognize, understand, and use the quantitative elements they encounter in various aspects of their lives. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions. Demonstrates: Interprets numerical information and applies sufficient laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions. Does Not Demonstrate: Misinterprets numerical information or insufficiently applies laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions.
Evaluation: List how the above outcomes will be assessed.	Assessment will be based on the following criteria: 1. Ability of student to accurately describe energy using system 2. Student's use of appropriate energy units, conversion factors, and logic to accurately derive energy use and cost analyses 3. Make recommendations for energy and cost-saving measures based on analyses

	Homework Excel Worksheets Midterm Final exam
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.	Required: None Desired: None
Textbook(s)	Recommended, latest version of: • GUIDE TO ENERGY MANAGEMENT, 8th Edition, Capehart, Turner and Kennedy, published by The Fairmont Press, Inc., 2016. • www.fairmontpress.comHandbook of Formulae, Equations, & Conversion Factors for the Energy Professional, Author: Bryan. Kerwin and Kerwin, Publisher: JOB publications