

COURSE SYLLABUS

Course Title:	Commercial HVAC Systems & Analysis	Date submitted:	4/26/18 (18-18)	
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*122	Prerequisites:	
	Course Type:	X/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			C- or better in Introductory Physics PHY*110 or permission of the Program Coordinator
	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			Corequisites:
	Credit Hours:	3		
	Developmental: (yes/no)	No		
	Lecture:	2		
	Clinical:	0		
	Lab:	2		
Studio:	0			
Other:	0			
TOTAL:	4	Other Requirements:		
Class Maximum:	24			
Semesters Offered:	Sp			
Environmental Systems (ARC*240)				
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:	Familiarity with and the analysis of building HVAC systems is a basic necessity for commercial energy auditors. Students will gain an understanding of the operation and application of various types of commercial HVAC Systems by touring mechanical rooms around campus to identify different parts of the commercial HVAC system (boilers, chillers, air handlers). Hands-on lab enables students to analyze the operation, efficiency, and programming of these systems. Data logging may be included for calculations and analysis.			
Topical Outline: List course content in outline	<ol style="list-style-type: none"> 1. Heating and cooling load calculations 2. Psychrometrics of air conditioning processes and air conditioning systems 			

<p>format.</p>	<ol style="list-style-type: none"> 3. Furnaces, boilers and other heating equipment 4. Air conditioning systems and equipment: from PTAC to Advanced VAV 5. Refrigeration Systems: <ol style="list-style-type: none"> a. Vapor-compression refrigeration cycle, absorption refrigeration, heat pumps 6. Fluid flow in ductwork and piping systems 7. Fans and air distribution devices. Pumps and hydronic systems 8. Central Plant Equipment: Boilers, Chillers, Cooling Towers 9. HVAC Control Overview 10. HVAC Energy Utilization and Conservation
<p>Outcomes: Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.</p>	<p>Upon successful completion of this course, the student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Demonstrate their understanding of various systems of commercial building heating, cooling, ventilation, refrigeration, and humidity control. 2. Use appropriate energy calculations to determine heating and cooling usage; determine system energy efficiency; calculated psychometrics, log and analyze data from actual system operations. 3. Develop an understanding of how systems are designed the way they actually operate. 4. Be familiar with mechanical rooms and gathering critical information from equipment as well as facilities personal. 5. Learn to read and understand a fan/pump curve. <p>PROGRAM: <i>(Numbering reflects Program Outcomes as they appear in the college catalog)</i></p> <ol style="list-style-type: none"> 1. evaluate energy use patterns of commercial buildings 2. produce energy evaluation technical reports 3. develop and evaluate inferences and predictions that are based on collected data 4. read and analyze building blue prints including floor, mechanical, and electrical plans 5. use problem-solving techniques & mathematics to transform concepts into energy related projects <p>GENERAL EDUCATION: <i>(Numbering reflects General Education Outcomes as they appear in the college catalog)</i></p> <ol style="list-style-type: none"> 2. Critical Analysis/Logical Thinking - Students will be able to organize, interpret, and evaluate evidence and ideas within and across disciplines; draw reasoned inferences and defensible conclusions; and solve problems and make decisions based on analytical processes. <p>Demonstrates: Identifies the issue(s); formulates an argument; explains and analyzes relationships clearly; draws reasonable inferences and conclusions that are logical and defensible; provides support by evaluating credible sources of evidence necessary to justify conclusions.</p> <p>Does Not Demonstrate: Identifies few or no issues; formulates an argument without significant focus; provides an unclear explanation of analysis and relationships; drawing few reasonable inferences and conclusions that are illogical and indefensible; provides little to no support using credible sources of evidence necessary to justify conclusions.</p>

<p>Evaluation: List how the above outcomes will be assessed.</p>	<p>Assessment will be based on the following criteria: Assignments/Spreadsheets Quizzes Final Exam/Project Class Participation Labs/Midterm</p>
<p>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.</p>	<p>Required: "Fundamentals of HVACR," Third Edition, 2017, Carter Stanfield and David Skaves, Hardcopy packaged with MyLab HVAC ISBN-13: 978-0-13-489507-9, Digital eBook packaged with MyLab HVAC ISBN-13: 978-0-13-401792-1, eBook subscription with MyLab HVAC access ISBN ISBN-13: 978-0-13-443597-8</p> <p>Desired: Collaboration with Director of Facilities</p>
<p>Textbook(s)</p>	<p>Recommended text, latest version of: Air Conditioning Principles and Systems – An Energy Approach, Pita.</p>