

COURSE SYLLABUS

Course Title:	Lighting Fundamentals & Applications		Date submitted:	Fall 2015 (AAC: 15-64)	
Department:	Business & Technology				
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*133	Prerequisites:		
	Course Type:	X/D	C- or better in Introductory Physics (PHY*110) and Intermediate Algebra (MAT*137), or permission of Program Coordinator		
	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	Corequisites:		
	Developmental: (yes/no)	No	None		
	Lecture:	2			
	Clinical:	0			
	Lab:	2			
Studio:	0				
Contact Hours:	Other: 0				
	TOTAL: 3	Other Requirements:			
Class Maximum:	24	None			
Semesters Offered:	F				
Catalog Course Description:	Competence with lighting systems analysis is a basic necessity for commercial energy auditors. Topics include assessment of quantity and quality of light, light sources, luminaries, lighting controls, manufacturer lamp and ballast specifications, lighting power density, lighting-HVAC interactions, retrofit opportunities, cost savings analysis, and lighting codes/regulations. Students create a directly supervised lighting audit project.				
Topical Outline: List course content in outline format.	<ul style="list-style-type: none"> • Assessment of quantity and quality of light • Light sources • Luminaries • Lighting controls • Manufacturer lamp and ballast specifications • Lighting power density • Lighting-HVAC interactions • Retrofit opportunities • Cost savings analysis • Lighting codes/regulations 				

	<ul style="list-style-type: none"> • Lighting audit project <p>In lab, students evaluate lighting systems, luminaries and associated components and perform illuminance calculations, become familiar with the IES (Illumination Engineering Society) illuminance selection procedure and IES recommended practices for various space types. Students will work as team members.</p>
<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> <ul style="list-style-type: none"> • demonstrate an understanding of the terminology that is used in the lighting industry • identify and evaluate the various quantitative and qualitative characteristics of light sources • identify and evaluate the various characteristics and components of luminaries • use accepted methods for assessing illumination levels and lighting quality metrics • assess various lighting related strategies for achieving an energy efficient and effective luminous environment • demonstrate an understanding of basic lighting control strategies • assess and analyze energy and cost savings associated with various lighting measures • develop an awareness for lighting applications, approaches and strategies • show a familiarity with federal and state legislation related to lighting • document and evaluate existing lighting systems, lighting controls, illumination levels and lighting quality characteristics • review and compare luminaire cut-sheets and fixture components, identifying more efficient equipment • evaluate retrofit or replacement opportunities for energy efficiency and lighting quality, and make recommendations • evaluate and recommend lighting control system upgrades • use Visual Lighting software to estimate baseline and proposed illumination levels • demonstrate an understanding of utility incentive and rebate programs • conduct a comprehensive lighting audit for an existing commercial building Prepare a comprehensive lighting report detailing upgrade strategies, energy and economic analysis, and other benefits. • research current lighting technology, compile fact sheet glossary of new energy-efficient lighting sources <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 residential and commercial buildings 2. recommend energy efficiency and renewable energy solutions for high energy consuming buildings 3. demonstrate an understanding of the interaction between energy consuming building systems and based on that understanding make energy consumption recommendations 4. produce energy evaluation technical reports and make presentations leading to project implementation 5. develop and evaluate inferences and predictions that are based on collected data 6. read and analyze building blue prints including floor, mechanical, and electrical 7. 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"> 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. <p>Demonstrates: Interprets numerical information and applies sufficient laws of logic and</p>

	<p>mathematics to solve problems using numbers, symbols, graphs and/or descriptions.</p> <p>Does Not Demonstrate: Misinterprets numerical information or insufficiently applies laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions.</p>
<p>Evaluation: List how the above outcomes will be assessed.</p>	<p>Assessment will be based on the following criteria:</p> <p>Assignments/Spreadsheets Quizzes (2) Final Exam/Project Class Participation Instructor Evaluation</p>
<p>Instructional Resources:</p> <p>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: Coordination with campus Facilities Dept.</p> <p>Desired: Advanced Lighting Guidelines – (www.algonline.com) This requires a subscription, paid by grant.</p>
<p>Textbook(s)</p>	<ul style="list-style-type: none"> • Advanced Lighting Guidelines – (www.algonline.com) This requires a subscription. • Lighting Retrofit and Relighting, Benya & Leban, ISBN 978-0470568415 Publisher: John Wiley & Sons, Inc • Advanced Lighting Guidelines – 2003 Edition • EPRI Lighting Upgrade Manual (electronic) • EPRI Lighting Controls – Patterns for Design (electronic)