



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	SUST
Course Number:	209
Descriptive Title:	Sustainable Building Methods & Materials
Division:	Industry and Technology
Department:	Environmental Technology
Course Disciplines:	Environmental Technology
Catalog Description:	This course covers the principles of sustainability and fosters an understanding of environmental awareness leading to stewardship. The content presented and demonstrated in the course introduces conventional and alternative building methods and materials and the analyzes the trade-offs that exist in the specification process. The principles of 'cradle to cradle' and carbon reduction practices will be examined and applied, to best illustrate resource allocation and lifecycle.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	Sustainable Design 201 and Eligibility for English 1A
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	4
Outside Study Hours:	4
Total Course Hours:	108
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	2/19/2013
Transfer UC:	No
Effective Date:	
General Education:	ECC
Term:	
Other:	
CSU GE:	

	Term:
	Other:
	IGETC:
	Term:
	Other:
Student Learning Outcomes:	<p>SLO #1 Applied Technologies</p> <p>Given instruction in the current and emerging alternative applied technologies of building and infrastructural systems, processes and equipment, the student will design and develop a project that utilizes the same.</p> <p>SLO #2 Residential or Commercial Building Design</p> <p>Given instructions in the applied technologies that make up many of the sustainable building components, specifically to include LEED and/or other rating systems, a student will design and specify the equipment for an environmentally friendly and energy efficient building site and incorporate the various technology into a residential home and or commercial building type.</p> <p>SLO #3 Rating System Certification Exam Prep</p> <p>Given instruction in LEED and other rating systems, the student will gain the necessary knowledge to be prepared to sit for the various trade-associated examinations for the various rating systems.</p>
Course Objectives:	<ol style="list-style-type: none"> 1. Examine the various green products available. Interpret the products use and evaluate the products efficiency for its green rating. 2. List the methodologies and materials for a specific green or sustainable energy solution into a system that can be constructed. An example would be a system of photovoltaic, solar thermal, wind, or waste bio-reaction. 3. Utilize the various products and design a new building and its site for Leadership Energy Environmental Design (LEED) certification. Compare to standards for an existing building and site and apply LEED rating. 4. Utilize the various products and design systems for implementing watershed and waste management principles into an existing site and building design for LEED certification. 5. Evaluate the processes of recycling and reclamation of materials. Interpret data presented in class and formulate a system of implementing a recycling program for a series of varying institutions.
Major Topics:	<p>I. HISTORY AND OVERVIEW OF RENEWABLE BUILDING MATERIALS (6 hours, lecture)</p> <ol style="list-style-type: none"> A. Recycling concepts B. Recyclable processes C. Restorative and readapted use of materials - LEED principles D. Just because you can recycle - should you? Cost benefit analysis <p>II. RENEWABLE BUILDING MATERIALS - MATRIX (15 hours, lab)</p> <ol style="list-style-type: none"> A. Cross reference matrix illustrating the recycling process B. Cost / benefit analysis to recycling

III. SUSTAINABLE AND REGENERATIVE DESIGN THEORY AND PRACTICE (9 hours, lecture)

- A. Cradle to cradle design theory
- B. Making houses more efficient by design - LEED principles
- C. Making vehicles more efficient by design
- D. Zero carbon footprint concepts
- E. Solar photovoltaic (PV) products - LEED principles
- F. Solar thermal products
- G. Electric cars
- H. Regenerative systems and details - LEED principles

IV. PREPARE REPORTS DIAGRAMS AND DRAWINGS FOR REGENERATIVE DESIGN (21 hours, lab)

- A. Matrix for applying regenerative design theory - LEED principles
- B. Materials application to building for thermal efficiencies - LEED principles
- C. Designing a concept car
- D. Developing factory / manufacturing model for zero carbon footprint
- E. Develop residence off of grid
- F. Schematically develop and present diagrams that represent regenerative design theory system and details

V. CASE STUDY REVIEWS (6 hours, lecture)

- A. Pre fabricated design study
- B. Product use and implementation

VI. CASE STUDY ANALYSIS AND REPORT (18 hours, lab)

- A. Analyze and report on case studies
- B. Efficacy of varying systems

VII. WATERSHED MANAGEMENT / WASTE MANAGEMENT (9 hours, lecture)

- A. Water reclamation products
- B. Permeable paving products - LEED principles
- C. Bio retention system products
- D. Systems and details
- E. Fats, Oils, Grease Systems (FOGS) in waste management

VIII. LAND AND FOREST MANAGEMENT - A World Wide Discussion (3 hours, lecture)

- A. Green building materials
- B. Forest products
- C. Manufactured forest products
- D. Future trends - LEED principles
- E. Sustainable forest management systems and details

IX. QUARRY MANAGEMENT (3 hours, lecture)

- A. Overview of mining operations
- B. Compliance California Environmental Quality Act (CEQA)

	<p>C. Challenges facing business in light of the regulatory environment</p> <p>X. SYSTEMS MANAGEMENT - Watershed / Waste / Land / Forest / Quarry (18 hours, lab)</p> <p>A. Watershed systems overview</p> <p>B. Waste systems overview</p> <ol style="list-style-type: none"> 1. Reclaimed water 2. Secondary use water / grey water / black water <p>C. Land use - utilizing recycled products</p> <p>D. Forest products and utilization of secondary products</p> <p>E. Quarry operations management - ecological guidelines</p> <p>F. Systems integration for regulatory compliance</p>
Total Lecture Hours:	36
Total Laboratory Hours:	72
Total Hours:	108
Primary Method of Evaluation:	1) Substantial writing assignments
Typical Assignment Using Primary Method of Evaluation:	In a five- to seven-page report (with charts and photos), evaluate the various green building materials and apply them to the energy efficiency rating systems, from LEED to Living Building Challenge, and determine by analysis, the efficiency of the rating systems. Submit report to the instructor.
Critical Thinking Assignment 1:	Write a five- to seven-page report (with charts and photos) utilizing green building products for a construction project and establish a methodology for their implementation. Submit report to the instructor.
Critical Thinking Assignment 2:	Create a five- to seven-page report (with charts and photos) comparing the various rating systems LEED or Living Building Challenge and formulate an interpretation as to what system integrates principles of sustainability in the most efficient and economic way possible. Provide documentation for governmental / regulatory compliance. Submit report to the instructor.
Other Evaluation Methods:	<p>Essay Exams</p> <p>Reading Reports</p> <p>Written Homework</p> <p>Class Performance</p> <p>Homework Problems</p> <p>Term or Other Papers</p> <p>Presentation</p>
Instructional Methods:	<p>Demonstration</p> <p>Discussion</p> <p>Field trips</p> <p>Guest Speakers</p> <p>Laboratory</p> <p>Lecture</p> <p>Multimedia presentations</p>
If other:	

	<p>Study</p> <p>Answer questions</p> <p>Required reading</p> <p>Work Outside of Class: Problem solving activities</p> <p>Written work</p> <p>Journal</p> <p>Observation of or participation in an activity related to course content</p>
If Other:	
Up-To-Date Representative Texts:	<p>William McDonough & Michael Braungart. <u>Cradle to Cradle: Remaking the Way We Make Things</u>, North Point Press, 2002, (Discipline Standard)</p> <p>Ching, Francis. <u>Green Building Illustrated</u>, 2nd Edition. Wiley, 2020.</p>
Alternative Texts:	<p>Traci Rose Rider. <u>Understanding Green Building Guidelines for Students and Young Professionals</u>. W.W. Norton & Company, 2009. (Discipline Standard)</p>
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	Environmental Technology 201
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding	Knowledge of topics of ecology, sustainability, environmentalism, and developing green technologies.

course objective under each skill(s).	<p>SUST 201 – Knowledge and the ability to differentiate between the topics of ecology, sustainability, environmentalism, and emerging green technologies from an interdisciplinary approach.</p> <p>SUST 201 – Explain basic technical terms and concepts of various sustainable and green building systems.</p> <p>SUST 201 – Analyze and compare the conventional and alternative strategies for determining trade-offs.</p> <p>SUST 201 – Assess and compare properties and factors to determine value and costs (both economic and carbon) associated with building systems.</p> <p>SUST 201 – Evaluate and propose alternative methods as a more effective solution to certain conventional methods.</p>
Requisite Skill:	Eligibility for English 1A
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	<p>Students need well-developed reading skills in order to understand and interpret information in their textbooks and writing skills to develop essays and projects.</p> <p>Summarize, analyze, evaluate, and synthesize college-level texts.</p> <p>Write a well-reasoned, well-supported expository essay that demonstrates application of the academic writing process.</p>
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Greg George
Date:	09/26/2011
Original Board Approval Date:	02/19/2013
Last Reviewed and/or Revised by:	MARC YEBER
Date:	11/17/2023
Last Board Approval Date:	03/21/2024
Effective Term:	FALL 2024