CONS 182 Course Outline as of Fall 2011

CATALOG INFORMATION

Dept and Nbr: CONS 182 Title: HOME PERFORM ENERGY STAR
Full Title: Home Performance with Energy Star, Level 1
Last Reviewed: 3/14/2011

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
Introduction to building science and home performance principles for home energy conservation improvements. This overview class is Level 1 of Home Performance with Energy Star training and prepares the student for additional training leading to certification.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100 and Course Completion or Concurrent Enrollment in CONS 63

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to building science and home performance principles for home energy conservation improvements. This overview class is Level 1 of Home Performance with Energy Star training and prepares the student for additional training leading to certification. (Grade or P/NP)
Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100 and Course Completion or Concurrent Enrollment in CONS 63
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	Effective:	Inactive:

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of the course, students will be able to:
1. Identify building systems and components and evaluate their relationship to energy consumption.
2. Identify and develop energy conservation opportunities in new and existing construction.
3. Select from a variety of energy conservation methods and apply appropriate measures to acheive and verify cost effective, high level energy conservation.
4. Describe how to mitigate the effects of poor indoor air quality, moisture intrusion, and inadequate combustion safety.

Topics and Scope:

I. Introduction
  A. Overview of course
  B. Working with clients to provide a service
  C. Importance of customer relations
  D. Importance of a good work ethic
II. Energy consumption
  A. Comparing energy sources
  B. Understanding home energy use
  C. Analyzing an energy bill
III. Basic building science
  A. Principles of energy
    1. Forms of energy
    2. Energy transformation and heat flow
    3. Principles of sensible and latent heat
    4. Comfort and energy

B. Factors affecting building performance
1. Laws of thermodynamics
2. How heat moves
3. Air pressure and flow
4. Moisture levels
5. Thermal boundary

IV. Site conditions affecting energy use
A. Physical considerations
1. Topography
2. Water
3. Soil
B. Climate considerations
1. Climate zones and impact on energy strategies
2. Impact of the sun: building orientation and solar heat gain
3. Impact of the wind
4. Impact of precipitation
C. Biological considerations: trees and other foliage

V. The building envelope components: foundation to roof
A. The foundation
B. The building frame
C. Windows and doors
D. Insulation
E. Vapor barriers
F. Finish materials

VI. Evaluating air leakage in the envelope
A. Impacts of air leakage
1. How air enters a building
2. How air moves
3. Energy loss associated with air leakage
B. Construction defects and air leakage in the envelope
C. Principles of air sealing
1. Pressures behind leakage
2. Pressure and air flow
D. Materials and methods for air sealing
E. Test methods

VII. Evaluating moisture leakage in the envelope
A. Moisture
1. How moisture enters building
2. How moisture moves
3. Energy loss associated with moisture leakage
B. Construction defects and moisture leakage in the envelope
C. Materials and methods for moisture sealing
1. Moisture barriers
2. Moisture removal systems
D. Test methods
1. Moisture meters
2. Humidity levels

VIII. Heating systems and energy use
A. Principles of heating systems
1. Air flow and humidity
2. Energy loss
3. Combustion safety

- B. Types of heating systems
  - 1. Forced air and ducts
  - 2. Steam and hot water heating
  - 3. Heat pumps
  - 4. New energy-efficient furnaces and boilers
- C. Comparisons of heating systems
  - 1. Energy use
  - 2. Comfort and air quality

IX. Cooling systems and energy use
- A. Principles of cooling systems
  - 1. Air flow and humidity
  - 2. Refrigerant charge
  - 3. Energy loss
- B. Types of cooling systems
  - 1. Forced air and ducts
  - 2. Heat pumps
  - 3. New energy-efficient cooling systems
- C. Comparisons of cooling systems
  - 1. Energy use
  - 2. Comfort and air quality

X. Water heating, lighting, appliances and energy use
- A. Water heating systems
  - 1. Energy use and efficiency of storage water heaters
  - 2. Energy use and efficiency of alternatives to storage water heaters
- B. Lighting systems and fixtures
  - 1. Types
  - 2. Energy use
  - 3. Efficacy
- C. Household appliances
  - 1. Types
  - 2. Energy use
  - 3. Efficiency

XI. Home evaluation/energy audit
- A. Objectives of a home evaluation/energy audit and overview of process
- B. Site inspection
- C. Dealing with clients
- D. Occupant interview
- E. Testing procedures
  - 1. Building envelope and air leakage
  - 2. Building envelope and moisture leakage
  - 3. Indoor air quality
  - 4. Heating and cooling equipment
  - 5. Water heating, lighting and appliances
- F. Recording and interpreting the test results

XII. Reporting the results and developing strategies for improvements
- A. Formatting data to be included
- B. Providing plan of home to identify location of problems
- C. Identifying the problems
- D. Presenting options for cost effective energy retrofits
- E. Suggesting phasing of improvements
- F. Writing the final report

XIII. Next steps

A. Career opportunities
B. Additional training opportunities
C. Certification process

Assignment:

1. Reading (10-30 pages per week)
2. Weekly problem solving assignments (10-20)
3. Case study (analysis of home performance)
4. Midterm exam
5. Final exam

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem solving questions; case study (analysis of home performance).	Problem solving 40 - 60%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Midterm and final exam (objective questions, multiple choice, true-false, matching, completion, short answer, essay)	Exams 40 - 60%

Other: Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation.	Other Category 0 - 10%

Representative Textbooks and Materials:
1. Residential Energy - Cost Savings and Comfort For Existing Buildings. John Krigger and Chris Dorsi - Fifth Edition, Saturn Resources Management, Inc., 2009
2. HVAC Workbook. S. Don Swenson - Third Edition, Building Performance Institute,

California Home Performance Contractors Association, 2003 (classic).
3. Reference sources: Building Science. Com
4. Instructor prepared materials