Fall 9-1-2018

CSTN 282.01: Green Building Concept & Design I

John R. Freer
University of Montana - Missoula

THE UNIVERSITY OF MONTANA
COLLEGE OF TECHNOLOGY
DEPARTMENT OF INDUSTRIAL TECHNOLOGY

COURSE SYLLABUS

COURSE NUMBER AND TITLE: CSTN 282 Green Building Concepts and Design I

DATE REVISED: August 2018

SEMESTER CREDITS: 4

CONTACT HOURS PER SEMESTER: Lecture hours per week – 4
2018 Schedule: 9/5/2018-1016/2018
Tues., Wed., Thurs. 1:00PM-3:50PM, TT011

PREREQUISITES: CSTN 120, 122, 142, and 143

FACULTY: John Freer, Master CGP, LEED AP BD&C
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Office Hours: By appointment or as posted on Faculty office door

RELATIONSHIP TO PROGRAM(S): This course is in the second year of the AAS Sustainable Construction Technology Degree program.

COURSE DESCRIPTION: Concepts of sustainability are reviewed. The principles of heat transfer, moisture migration and airflow are examined along with their impact on building performance. Integrated green building design, building site selection and evaluation, review of alternative construction materials, indoor air quality, water efficiency and green building project management are covered. The elements and design patterns for successful passive solar buildings as well as strategies for green remodel and retrofit are discussed.

STUDENT PERFORMANCE OUTCOMES:
Occupational Performance Objectives
Upon completion of this course, the student will be able to:

1. Understand the guiding principles of green building as well as the importance of sustainability throughout the built environment.
2. Understand the role of integrated building design in sustainable construction.
3. Identify and understand the conditions when selecting and designing any building site that will contribute to increased energy performance and lower environmental impact.
4. Understand the principles of building science and their impact on built structures.
5. Evaluate building assemblies and apply the building science principles to recognize best practices in building and design systems.
6. Understand the theoretical basics for using solar energy to generate heat and electricity in both active and passive systems.

7. Recognize how buildings consume energy, understand the measurement and predictions of energy use calculations and identify strategies in design and construction for energy reduction.
8. Evaluate building and design techniques to minimize material quantities, enhance material durability, and improve sustainable qualities.
9. Understand Indoor air quality and ventilation strategies to avoid and eliminate all potential indoor air contaminants.
10. Recognize material differences in composition in materials that impact the overall environmental footprint of individual materials and assemblies.
11. Understand Life Cycle Analysis tools used for whole building or assembly evaluation.
12. Identify and compare cost and performance of building materials with recycled components.
13. Identify and make use of salvaged building materials.
14. Perform demolition in ways that allow for salvage of re-usable building materials.
15. Compare cost and performance of composite construction products.
16. Be aware of natural, non-petroleum based materials and low volatile organic compound points, adhesives and sealants.
17. Use construction materials and methods that more easily allow for salvage and re-use of building materials.
18. Be able to integrate all of the components into the design of a green residence or remodel.

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grading Scale:

90 - 100% = A
80 - 89% = B
70 - 79% = C
60 - 69% = D
0 - 59% = F

NOTE: Courses must be passed with a 'C minus (C-)' or greater to count toward degree/certificate requirements.

Grade Breakdown:

Lecture:	Tests	60%
	Attendance	30%
	Participation	10%

Note:

1. Tests will be as required.
2. Safety glasses are required when in the lab.
3. Hearing protection is required in lab.
4. Hardhats are required in the lab and on jobsites.

HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:

1. Student course evaluations
2. Peer feedback
3. Advisory committee feedback

ATTENDANCE POLICY: Students missing 20% or more of the classes will be dropped 1 grade point.

REQUIRED TEXT: **Green Building: Principals & Practices in Residential Construction.** (2013) Kruger and Seville.

NAHB Green Building for Building Professionals (Will be Provided**)**

ACADEMIC INTEGRITY: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/SA/VPSA/index.cfm/page/1321.

DISABILITY ACCOMMODATION: Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at http://www.umt.edu/dss/ or call 406.243.2243 (Voice/Text).

NOTE: Faculty reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances.

COURSE OUTLINE:

1. Sustainability concepts
    a. What is sustainability
    b. Why is it important
    c. Three E's of sustainability
    d. Critical thinking.
2. Introduction to the Physics of Building Science
    a. Heat Transfer
    b. Moisture Migration
    c. Airflow and Pressure
3. Building Site Evaluation and Development.
4. Passive Solar Design
    a. Siting Strategies
    b. Design Concepts
5. Energy Efficiency.
    a. Energy Conservation
    b. Seasonal and Base Load Energy Consumption
    c. Renewable Energy Generation
6. Resource Efficiency
    a. Material Quantity in Design and Construction Practices
    b. Material Content, Re-use and Recyclability
    c. Durability
    d. Material handling and Waste Management
7. Indoor Air Quality
    a. Environmentally Less toxic materials
    b. Natural non-petroleum based materials
    c. VOC's and toxicity
    d. Controlling and Managing Indoor Air
8. Maintenance, Operation, and Performance.
9. Green Remodeling and Retrofit

    a. Evaluating Existing Buildings
    b. Energy Retro-Fit
    c. Green and Sustainable Strategies for Upgrade.
10. Green Building Business Management
11. Green Design
    a. Integrated Project Design