

# Syllabus for CEIE 499/690 Sustainable Development Fall 2008

*"Suburbia is where the developer bulldozes out the trees, then names the streets after them." Bill Vaughn*

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**Office Hours:** Mondays, 10:30-1:30 pm

**Course Time:** Mondays, 4:30-7:10 pm

**Texts:** There is no required text for this class. Electronic copies of class notes will be distributed. Handouts will be provided on an as needed basis.

**Course Objective:** Students will demonstrate a familiarity with sustainability concepts and terminology. Students will be capable of developing and using sustainability indices. Students will demonstrate an introductory level competency with sustainability tools and frameworks such as the Leadership in Energy and Environmental Design (LEED) Green Building Rating System and The Natural Step (TNS) Framework. Students will complete a case study evaluation and comparison between conventional and sustainable communities in the Northern Virginia area.

**Speakers and Tours:** A sustainability panel will discuss their experiences in development. The panel will include developers, local government and Federal government architects and engineers who have experience with "Green Buildings" and/or sustainable design and construction. The panel will share innovative design/development methods used by their organizations and their experiences with sustainable buildings and neighborhoods. Students will identify and visit a local sustainable development. Students will tour a construction site on or near campus and perform a preliminary LEEDS site assessment.

**Grades:**

CEIE 499	70% Homework 20% Project - Report 10% Project – Oral Presentation
CEIE 690	60% Homework 10% Graduate Paper 20% Project - Report 10% Project – Oral Presentation

## Fall 2008 Preliminary Schedule

Date	Description	Assignment Due
Week 1 08/25/08	Introduction – What is sustainability?	None
Week 2 9/8/08	Sustainability Indicators – National, City, Neighborhood, Building	HW 1 – Personal experiences
Week 3 09/15/08	Sustainability Panel	HW 2 – Panel Questions
Week 4 09/22/08	Sustainability Rating Systems/Tools	None
Week 5 9/29/08	LEED – Sustainable Sites	HW 3 – What is important in sustainable development?
Week 6 10/07/08	LEED - Water/Energy Efficiency	None
Week 7 10/13/08	LEED – Materials and Resources	HW 4 – LEED SITE Evaluation
Week 8 10/20/08	Sustainable Community Tour	None
Week 9 10/27/08	LEED – Indoor Air Quality	HW 5- Sustainable Community Report
Week 10 11/03/08	Case study comparisons and rankings	None
Week 11 11/10/08	Economic Analysis of Sustainable Development	HW6 – Case study comparisons and rankings
Week 12 11/17/08	Economic evaluations	HW 7 – Economic Analysis of a Sustainable Factor
Week 13 11/24/08	Student Presentations	Oral Presentations
Week 14 12/1/08	Student Presentations	Oral Presentations Written Project (Due)

## Homework – Fall 2008

If you are unable to attend class, please make arrangements to hand in your written work on the date assigned. In you are not able to attend the final presentations; you must schedule another presentation date/time with the course instructor (*in advance*).

### Assignment 1 – Personal Experiences

(Due 9/8/08)

How can you be more sustainable? Make a journal of your personal habits for one day. How much and what type of food do you eat? How much water do you use? Do you recycle? What type of car do you drive? How much gas do you consume a week? Do you bike or walk often? Do you turn off lights when not in use? Do you use compact fluorescents? Do you turn off your computer and other appliances when not in use? Do you purchase green or organic products? Pick one of your “unsustainable” practices. Set a sustainability goal for one day and try to achieve it. What were the obstacles associated with accomplishing your goal. How did you feel? Did you achieve what you set out to do? Why or why not. Write a 2-page paper detailing the sustainability of your personal practices, the goal you set and your personal reflection on ability to accomplish the goal.

### Assignment 2 – Panel Questions

(Due 9/15/08)

A group of developers familiar with sustainable practices will hold a panel discussion on 9/17/08. Prepare a list of at least five questions to ask the panel. The questions are intended to solicit enough information to complete assignment 2. You will ask your questions of the panel on 9/17/08. A typed list of the questions will be submitted for grading. You are not limited to asking only the questions on your typed list. Questions should be of a unique nature so as to avoid duplication with classmates.

### Assignment 3 – What is Important in Sustainable Development?

(Due 9/29/08)

Prepare a brief written report not to exceed 5 pages, double-spaced that lists the important factors in sustainable development. Discuss attributes that must be present in order for a development to be considered “sustainable”. Note that a definition of “sustainable development” should be included in the report. The only reference that may be used for this paper is the panel discussion on 9/15/08.

### Assignment 4 – LEED Site Evaluation (Handout)

(Due 10/22/08)

Working in a group, you will select a construction site. This may be a site on campus or a commercial site. Make arrangements with the construction engineer to visit the site. Perform a LEED site evaluation and determine at what level the site would be evaluated. Prepare a poster to demonstrate the results of your evaluation.

### Assignment 5 – Sustainable Community Photo Album (Slide Show)

(Due 10/27/08)

Visit a local sustainable community such as EcoVillage or other sustainable development. A single house will not be sufficient; however a sustainably developed apartment or condominium is fine. Take a tour of the community/development and document the sustainable features. Take photos for development of your album. Create an electronic slide show photo album with a minimum of 10 photos that illustrate the sustainable features of your community. Document each slide to indicate the sustainable practice being

used. You may substitute a site map for up to 2 photos provided that you can list two sustainable features illustrated in the map. You may work in groups of two or individually.

### **Assignment 6 – Case Study Evaluations and Ranks (Handout)**

(Due 11/10/08)

Based on the case studies provided in class, evaluate the sustainability of each development. Rank the developments based on their sustainability. Briefly describe the basis for your ranking.

### **Assignment 7 – Economic Analysis of a Sustainability Design Concept (Handout)**

(Due 11/17/08)

Each student will be assigned a different sustainable design concept. Complete the economic analysis handout for your specific parameter. Bring the results to class and be prepared to present your results. The class will compare the economic impact of various sustainable features.

## Class Project

Background: The problem with sustainable development is that the benefits are not readily apparent to consumers. How can you convince a developer to incorporate sustainable concepts in a design if the potential property owner is not willing to make the additional up-front investment? The objective of this assignment is to convince the developer that the benefits of sustainable design outweigh the costs. This will be accomplished by comparing the sustainable features with a conventional design. To accomplish this objective you may either (1) compare two existing properties (conventional and sustainable) or (2) compare an existing development with the same development after modifications are incorporated to make it sustainable. You should select developments in Northern Virginia. The comparison must include a detailed description of the indicators used in the evaluation and the values of each indicator variable for the conventional and sustainable development.

Your findings will be presented as a 10-page written report and a 20-minute in-class oral presentation. Be sure to cite all references for data collected in this analysis. You will present your oral presentation on 11/24 or 12/1. Students will sign up for the date in class. The written report will be handed in on 12/1 following all oral presentations.

The oral presentation must include the following:

- Description of the conventional and sustainable developments that are being compared (sites must be approved in advance)
- Factors used in assessment of sustainability
- Data and results of sustainability assessment
- Comparison of the conventional and sustainable features
- Economic comparison of sustainable and conventional development
- Be sure to answer the following question

**Why should someone invest in the sustainable development?**

Please note that everyone will be required to submit an electronic copy of their Power Point presentation on 11/24. Attendance at both weeks' presentations is expected.

## Extra Credit

Assignments 4 and 5 and the class project may require you to take a visit off campus. For extra credit, travel to your site in a sustainable way. The level of sustainability will determine the number of extra credit points that you receive. Document your sustainable manner of travel in the form of a 1 page summary. Estimate the carbon footprint reduction that was accomplished by your action. The extra credit will be collected in class on 12/1. Please note that I will not tell you in advance how many points you will receive for your planned mode of travel.

## Graduate Paper (CEIE 690 or 892 Students Only)

Graduate students taking this course are required to prepare a 10-page paper on a specific subject related to one of the following topics:

- the design or construction of sustainable buildings or communities
- evaluating sustainability
- planning and zoning in support of sustainable cities
- smart growth
- managing sustainable communities
- sustainable laws

No case studies will be accepted for this assignment. However, case study information may be used to illustrate concepts. A 1-page abstract and reference list (minimum 8 references) is due Sept 29<sup>th</sup>. Papers will be due in class Nov 17<sup>th</sup>.