CE 410W: Sustainable Residential Subdivision Design

Fall Semester, 2010

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Class Meeting	Lecture, 267 Willard	Lab, 228 Sackett
Section 1	Tu/Th 8:00 – 9:15	Wed 8:00 – 9:55
Section 2	Tu/Th 8:00 – 9:15	Wed 10:10 – 12:05

Office Hours

Tu / Th 10:00 – 11:30 and by appointment

Text and Reference Materials

- Recommended:
  T.R. Dion, P.E., L.S., *Land Development for Civil Engineers,* Second Edition, John Wiley & Sons, New York, New York, 2002.
- Handouts in class or posted on ANGEL
- Additional reference material on reserve at the library

Prerequisites

AE 372 - Introduction to the Building Industry, or
CE 332 - Construction Project Development, and
Seventh-semester standing in AE or CE

Course Description

The course is designed for seniors and graduate students in Civil and Architectural Engineering interested in learning the principles of residential design and development. The course covers the subdivision and land development regulatory process, zoning issues, and all elements of civil infrastructure design required in the residential land development process. Conservation design and sustainable development techniques are emphasized throughout the course.

For effective residential subdivision design, students must be proficient in applying basic principles of mathematics, science, and economics included in accredited academic engineering programs. An understanding of design software and its application has also become an integral part of the land development design process. The course discusses the scope and nature of the residential land development process. Students will be expected to perform design and analysis necessary for appropriate subdivision layout and infrastructure design. Students will be introduced to several design and analysis software packages during the course. Issues in engineering ethics and

professional responsibility related to land development are interwoven into class discussions and assignments.

During the first part of the semester students will work individually to complete various assignments. The purpose of these assignments is to give students an introduction to the elements of design, and exposure to the process of conveying their design through the preparation of construction drawings. During this first phase of the course students will also be required to attend a municipal board meeting and report on projects presented at that meeting.

For the second part of the course, the class will be divided into 4 person teams to work on the semester project(s). Each team will be required to prepare an engineering study, a subdivision conceptual layout using conservation design techniques, and then use engineering methods and practices to design the necessary site geometry and infrastructure. The final project deliverable will be a set of construction drawings and engineering calculations supporting subdivision and infrastructure design. Groups will be expected to make two formal presentations during the semester; one at the completion of the conservation design phase; and the second at the completion of the semester project.

The pace of the course is brisk, and ***lectures <u>will</u> <u>not</u> include detailed coverage of all necessary engineering methods and practices.*** Students are expected to independently learn design methods in areas where their background is currently insufficient (very much like the real world). Dion (2004) is an excellent land development design reference; other resources will be suggested during the course.

Students will prepare construction drawings for the assignments and the semester project using either the AutoCAD and Land Desktop software available on the server in the computer. Software is also available in the computer lab to assist with stormwater management and conveyance design. Some instruction in the use of these industry standard software packages will be provided. However, efficient use of these complex engineering tools will require significant effort on the part of the student. The level of effort necessary to complete the necessary designs using these tools is expected in this course.

Work on the semester project should be divided equally team members. A final statement of group member participation will be required as a part of the final submission. This statement will need to be signed by all group members. Group participation will be considered as a weighting to a students' final grade.

Educational Objectives and Outcomes:

Education Objective	**Outcome**
A solid understanding of the basic principles of mathematics, science, and engineering and the technical competency to use the techniques, skills, and sustainable technology for residential subdivision design	A demonstrated ability to design a sustainable residential subdivision
The ability to design, manage, and present a	Completion of an overall residential subdivision

residential subdivision design in a team setting	design system; A demonstrated ability to communicate the concept in both writing and in group presentations
An awareness of agencies, technical requirements, and required leadership skills that are needed with the to be successful in the land development profession; An in-depth understanding of the most difficult issues (ethical and technical) currently facing the land development industry	A demonstrated understanding of professional and ethical responsibility in involved in balancing the demands of a land owner (client) with the public safety responsibility of the engineer. A specific presentation that addresses your design's impact of in a global and societal context. A demonstrated knowledge of contemporary issues facing land development engineers.
Recognition of individual and group limitations in skill, knowledge, and professional expertise.	A demonstrated recognition of what is within the scope of professional development and what is beyond your scope of expertise (use of a sub-consultant)

Lecture Material

Lecture material will be presented using a variety of different media including PowerPoint, overhead projector and blackboard. If PowerPoint is being used, the slides will be posted to the course ANGEL site the day before class. Some material in the slides may be left blank to fill in during class. Some examples worked on the overhead projector or blackboard may be posted to ANGEL after class, but do not expect all material covered in class to be posted to ANGEL.

Course Grading

Course grading will be will be as follows:

Individual Assignments (35%)	
Mini project (4 parts)	30 %
Public Meeting Minutes / Report	2.5 %
Zoning Assignment	2.5 %
Final Project (65%)	
Progress Reports	5 %
Concept Plan	20 %
Final Project	40 %

All written materials must be professional and grammatically correct. Graphic presentation must be clear, understandable, and professional. Seventy percent (70%) of the grade for each assignment will be based on technical merit and accuracy. Thirty percent (30%) of each assignment grade will be based on format, professionalism, and presentation quality.

Projects must be submitted by the due date. 10% will be deducted from an assignment for each day it is late.

For the mini-project assignment, each plan sheets may be revised and resubmitted once to raise the grade. You can earn up to 75% of the missed points. For example if you earned 6/10 on the originally graded assignment, you can earn up to 9/10 by correcting errors. Missed points for late submissions cannot be earned. If you would like your work reevaluated, submit the revised plan sheet along with the original sheet showing instructor evaluation. Revised work will be reviewed up to 2 weeks after the original is returned in class. Beyond 2 weeks after the assignments are returned in class, the original grade stands. If you are not in class the day work is returned, you will not get any extension of the 2 week revision period. The deadlines for resubmission, based on when assignments are returned, will be posted on ANGEL.

Grading Scale

A = 94 - 100%
A- = 90 – 93%
B+ = 87 – 89%
B = 84 – 87%
B- = 80 – 83%
C+ = 77 – 79%
C = 74 – 77%
C- = 70 – 73%
D = 60 – 69%
F < 60%

Academic Integrity Policy

"Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.**"**

—From Penn State's *University Faculty Senate Policy 49-20*
Full statement of academic integrity can be found at http://www.senate.psu.edu/policies/47-00.html#49-20

Note: Penn State University welcomes students with disabilities into the University's educational programs. If anyone in this course has a disability, please contact the Office for Disability Services located in room 116 Boucke Building or call at 863-1807. If you have further questions or concerns please make an appointment during my office hours.