CE 401 Civil Engineering Design Project, Spring 2002
2:00 to 2:50 PM Monday and 2:00 to 4:50 PM Wednesday, Room 340

Catalog Data: Students use design software to design projects in teams, prepare construction drawings, and deliver engineering reports. 4 hours.


Reference: Relevant AASHTO Specifications, Building Codes, Environmental Regulations, and Cost Estimation Manuals

Instructor: Robert Pitt, P.E., Ph.D., Professor, room 347b. Office hours M and W after class (or other times by appointment), or by email rpitt@coe.eng.ua.edu or phone 348-2684.

Course Goals: Students will work in teams on a civil engineering design project, from project conception to production of construction drawings.

Prerequisites: Senior standing in civil engineering. Should have completed all required structural, environmental, transportation, and geotechnical classes before this class. This class is normally taken during the last term on campus.

Schedule:
First day of class: Wed, January 9, 2 to 4:50 PM
Last class period: Wed, May 1.
Final: Friday May 10, 2002, 2 to 4:30 PM
MLK holiday: January 21 (no class)
Spring holiday: March 22-29 (no class)

Note: The majority of work for this course is performed outside of class. The course has two weekly meeting times: a three-hour period and a one-hour period.

Topics: Practicing engineering from the community will speak to the class on topics pertaining to the project. In addition, we will also discuss engineering ethics, technical communication, and several other important topics. Specific seminar topics and schedules will be determined later.

Class Project:
This term we will prepare a development plan for a portion of the Northwood Lake watershed near Northport, AL. This 2.5 mi² watershed currently has substantial portions that are undeveloped (see rough attached maps), but ongoing development has degraded the lake. Your job will be to conduct a site selection and prepare engineering plans for a proposed 400 acre “village” development that will be located in this currently undeveloped area. Because of the sensitivity of this area, the proposed development will incorporate “Green Construction” features, a conscious attempt to incorporate environmental awareness into the design process. Some of these features will include:

- Minimize paved areas
- On-site runoff re-use
- On-site sewage disposal or sanitary sewage
- Water conservation
- Construction material selection (roofing materials, etc.)
- Minimize automobile traffic
- etc.
This development will be a “village” community having a variety of residential, recreation, community, and commercial land uses. There is no expected industrial activity.

The initial project activities will include:
- identify development requirements for this area
- identify which permits and applications will be needed
- research green construction ideas for your discipline
- determine the land use mix and specific types and numbers of buildings and support utilities needed
- identify features of the available undeveloped land that may hinder or may be especially helpful for this development
- conduct a site selection process and prepare a preliminary site plan and development proposal.

After the presentation of this proposal, you will prepare final site plans and appropriate supporting design documentation. These specific activities will be determined later as the initial plan is developed. These must include all representative civil engineering disciplines.

**Contribution of course to meeting the professional component:**
- Students will work in multi-disciplinary teams to design a civil engineering project for a client from the community.
- Projects will contain components of several civil engineering specialties (environmental, geotechnical, structures, transportation, and/or water resources).
- Each student team will define the project objective and scope, locate relevant codes and determine design specifications, formulate design criteria including the impact on the local community and the environment, perform site analyses for alternate sites, and present preliminary and final designs to their client.
- Students will write and present reports every two to three weeks throughout the semester to document their progress on the project. The reports will be reviewed by the course coordinators and returned with comments to the students as soon as possible. Reports will include calculations and construction drawings.
- Estimated Content: Engineering Design 4 credits, Engineering Science 0 credits.

**Grading:** One half of each student’s grade will be based on individual performance and one half will be based on the team performance.

<table>
<thead>
<tr>
<th>Individual Grades</th>
<th>%</th>
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<tbody>
<tr>
<td>Presentation #1 (1st half of course)</td>
<td>5</td>
</tr>
<tr>
<td>Presentation #2 (2nd half of course)</td>
<td>10</td>
</tr>
<tr>
<td>Design 30%</td>
<td>5</td>
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<tr>
<td>Design 60%</td>
<td>5</td>
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<tr>
<td>Plan in Hand</td>
<td>10</td>
</tr>
<tr>
<td>Plans, Specifications, and Engineering (PSE)</td>
<td>15</td>
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<tr>
<td><strong>Total</strong></td>
<td>50</td>
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<table>
<thead>
<tr>
<th>Group Grades</th>
<th>Presentation (%)</th>
<th>Report (%)</th>
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<tbody>
<tr>
<td>Preliminary proposal</td>
<td>2</td>
<td>2.5</td>
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<tr>
<td>Final proposal</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Design 30%</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Design 60%</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Walk-through</td>
<td>2.5</td>
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Plan in Hand 2 7.5
PSE 4 10
\[
\frac{4}{17.5\%} + \frac{10}{32.5\%} = 50\%
\]

Class Policies:

- Homework is due at the beginning of class. No late homework will be accepted.
- Students will keep all course material in a 3-ring notebook. The notebook will contain all material from the instructor and all completed student work and will be organized into four sections: notes & handouts, homework assignments, projects and exams.
- Students with disabilities should notify the instructor and accommodations will be made.
WATERSHED CHARACTERISTICS
NORTHPORT, ALABAMA

Northwood lake is located in the north of Tuscaloosa, Alabama. Recently this area has increased the construction of new houses for students and employees of the University of Alabama. The lake has been used for flood control and recreational activities like fishing and yachting. Neighbors to the lake have noticed an increase in the amount of sediment and bad odors that suggest the possible contamination of the lake.

[Map of Northwood lake with legend]

Northwood lake
LEGEND

S Schools  H Hospitals  P Populated Places  S Streets  C Counties

Facility Points
- Discharges to water
- Superfund sites
- Hazardous waste
- Toxic releases
- Air releases
- Others

Surface Waters
- Stream/River
- Canal/Ditch

--- Pipeline
- Lake/Pond
- Swamp/Marsh
- Ice Mass
- Wash
- Playa

Impaired Waters

Reservoir
- Sea/Ocean

Water Quality Standards

EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.
