CE 401: Civil Engineering Project – Site Development

CE 402: Construction Engineering Project – Site Development

Instructors: Dr. Robert Pitt, P.E., BCEE, D. WRE
Office: 347B HM Comer
Office Hours: M 3 to 5 pm and W 5 to 6 pm and other times by appointment and by email
Phone: 348-2684
e-mail: rpitt@eng.ua.edu/rpittal@charter.net

Dr. Andrew Graettinger
Office: 272 HM Comer
Office Hours: M 9 to 12 am
Phone: 348-1707
e-mail: andrewg@eng.ua.edu

Design Partner: Dr. Walter Schoel III, P.E.
Company: Walter Schoel Engineering Co., Inc.
e-mail: ce401@schoel.com

TAs: Qiang Tran (AutoCad only); Alan Brown, and Redahagn Sileshi

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

Prerequisites
Senior standing in civil engineering. Students are required to have completed all required junior-level CE classes before this class. This class is normally taken during the last term on campus.

Co-requisites
None

Course Objectives
Students will work in teams on a civil/construction engineering design project, from project conception to production of construction drawings. These classes (CE 401 and 402) focus on site development, while the associated CE 403 design class focuses on building design. At the conclusion of the course, students will:

- complete a comprehensive civil/construction engineering design,
- demonstrate use of modern engineering tools, including relevant computer applications,
- work in collaborative teams,
- communicate their work in oral, written and graphical modes, and
- possess an improved understanding of the practice of civil/construction engineering.

Course Website
http://unix.eng.ua.edu/~rpitt/Class/Senior%20Design/linked%20senior%20design.htm

Required Texts and References
None, but outside readings will be periodically assigned, as noted below.
Suggested Texts and References

Relevant Specifications, Building Codes, Environmental Regulations, and Cost Estimation Manuals. Additional references and information will be presented during the class.

Design Teams & Team Leaders

Team leaders will be selected by the faculty instructor with input from department faculty and staff, as well as students enrolled in the course. Selection as a team leader is an honor and is based on past evidence of leadership abilities.

All students will submit a survey of interests and skills to assist in selection of team leaders and team members. The selection of team members will be done by the instructors in consultation with the team leaders. Every effort will be made to distribute students based on interests, skills, and experience such that all teams are equally positioned for success. Student design teams will consist of no less than 4 to and no more than 6 members, including an assigned team leader.

To illustrate the qualifications based selection (QBS) process, a statement of qualifications will be prepared and submitted by each team as part of the first weekly team report. The statement of qualifications must include, at a minimum, a concise statement of the team’s qualifications to complete the project and individual one-page resumes for each team member. Students will indicate if they have passed the FE by indicating they are (or will be upon graduation) an EI (Engineer Intern).

Student teams will also prepare a preliminary scope of work as part of the second weekly team report. This report will describe the components of the design project that the team is qualified to perform, meeting as much of the project objectives as possible. It is likely that some specialized components of the project may not be fully completed by each team due to lack of specialization. In this case, the project scope report will include an outline of the work that would be needed, but is beyond the expertise and training of the team. There will be many facets of the design project where detailed work can be accomplished by each team member, so this should not be looked upon as an excuse for brevity.

Grading

The course grade will be determined based on two categories: (1) individual effort (reports completed and submitted as an individual) and (2) group effort (projects and reports complete and submitted as a member of a group).

Grades resulting from the group effort will be adjusted base on both peer and instructor evaluations (i.e., not everyone in a team will receive the same grade for their group effort).

<table>
<thead>
<tr>
<th>Individual Effort (see descriptions of each item)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly and Biweekly Reports¹</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm Report¹</td>
<td>5%</td>
</tr>
<tr>
<td>Final Report¹</td>
<td>5%</td>
</tr>
<tr>
<td>Group Effort (see descriptions of each item)</td>
<td>25%</td>
</tr>
<tr>
<td>Preliminary Written Report/Presentation</td>
<td>50%</td>
</tr>
<tr>
<td>Final Report/Presentation</td>
<td>10%</td>
</tr>
</tbody>
</table>

¹Students must receive a passing grade on the individual reports to receive a passing grade in the course. Both writing skills and use of appropriate computer applications will be assessed.
**Attendance Policy**

Students are expected to attend all class meetings. Additionally, students are expected to meet all team-scheduled meetings outside of class. If an absence is unavoidable, the student must notify the instructor and his/her team members as soon as possible. **Excessive absences will result in grade reductions.**

---

**Weekly Team Progress Reports**

Weekly project reports are required from each team. These reports must be written in a professional manner and include, at a minimum, a list of the week’s accomplishments, problems that may have been encountered during the week, and a plan for the upcoming week (including plans on how the problems will be rectified). The planned and completed activities of each team member will be identified. A Gantt Chart or equivalent should be included with each weekly group report.

The responsibility (authorship) for the report will rotate equally among team members, with the report author clearly identified. These reports will be used to confirm appropriate progress is being made on the project and will be graded for both technical and grammatical content. Reports will be graded by the faculty instructor and returned prior to the next report submission.

---

**Biweekly Individual Reports**

Each student is to submit a biweekly personal/individual progress report. These reports must be written in a professional manner and include, at a minimum, specific, detailed discussions of the student’s own contributions to the project, including documentation of use of appropriate computer applications, and specific design activities.

Individual reports will be graded for both technical and grammatical content by the faculty instructor and returned prior to the next report submission.

---

**Preliminary Team Project Report**

Each team will provide a comprehensive preliminary report and present the report to the instructors and an instructor-selected review panel. Report style and specific content information will be provided by the instructor.

---

**Final Team Project Report**

Each team will provide a comprehensive final report and present the report to the instructors and an instructor-selected review panel. Report style and specific content information will be provided by the instructor. All final project reports will be graded by the instructor and retained by the department for ABET documentation.
| **Individual Midterm Report** | Immediately following the team’s preliminary report submission, an individual midterm report is required from each student. This report will be in lieu of a biweekly individual report.  

The content of the report shall focus on the individual contributions of the student to the team to date, including documentation of use of appropriate computer applications to fulfill the design requirements. The report must also include a thorough self evaluation and peer evaluation of each team member.  

This is a non-technical report and is similar to employee evaluations which may be required of an engineering manager in practice.  

Report style and specific content information will be provided by the instructor. The report will include only original writing of the individual student, but may contain graphical and design summaries that are the work of the team.  

This report will be graded by the instructors and returned to the students. |
|---|---|
| **Individual Final Report** | Immediately following the team’s preliminary report submission, an individual midterm report is required from each student.  

The content of the report shall focus on the individual contributions of the student to the team to date, including documentation of use of appropriate computer applications to fulfill the design requirements, and additional design activity documentation.  

The report will also include a thorough self evaluation and peer evaluation of each team member. These peer evaluations may be used to adjust grades of individual team members. This is similar to employee evaluations which may be required of an engineering manager in practice.  

Report style and specific content information will be provided by the instructor. The report will include only original writing of the individual student, but may contain graphical and design summaries that are the work of the team.  

This report will be graded by the instructor and retained by the department for ABET documentation. |
| **Graduation Portfolio** | In CE 401/402, each student must submit a graduation portfolio. Students are expected to draw evidence from many different courses, including senior design, as well as other officially recognized University co- and extra-curricular activities associated the undergraduate program (e.g., cooperative education, student organizations, and formal internships).  

A review and help session will be offered during the semester to assist students in preparing their portfolio. Students are expected to begin assembling their graduation portfolios well in advance of the help session and final portfolio due date. Graduation portfolios will be evaluated by faculty and members of the advisory board, and will be retained by the department for ABET documentation. |
| **Portfolio Grading** | Each graduation portfolio will be reviewed and evaluated by both faculty and members of the department’s advisory board. Students MUST demonstrate acceptable achievement of all program outcomes in order to receive a passing grade in this course. Incomplete portfolios will result in failure of the class, and a subsequent delay in graduation. |
As noted in the grading policy, students must receive a passing grade from the individual report assignments to receive a passing course grade. As a W course, the writing of the various reports will be assessed. As a C course, the use of appropriate computer applications for completion of the project will also be assessed.

a. A passing grade requires demonstration of writing proficiency. Such proficiency includes the ability to write coherent, logical, and carefully edited prose. A student who does not write with the skill normally required of an upper-division engineering student will not be given a passing grade, no matter how well the student performs other course requirements.

b. A passing grade requires demonstration of computer proficiency. Such proficiency includes the ability to use appropriate software to complete the design project. A student who does not demonstrate the proper use of appropriate software will not be given a passing grade, no matter how well the student performs other course requirements.

c. At least two weekly team reports will be written by each individual on behalf of the team (ten weekly reports for a team of five, with each member writing two reports). Report style information will be provided later and must be followed. At least one of each individual’s weekly reports will be required to be submitted and will be graded and returned by midterm and in advance of the submission of the individual midterm report. In case of an unsatisfactory performance on the first report, a rewrite may be allowed. The second report cannot be rewritten.

d. Biweekly reports will be written by each individual. Report style information will be provided later and must be followed. Prior to the comprehensive midterm report (item d), a rewrite may be allowed in case of an unsatisfactory performance on a biweekly report. Subsequent reports cannot be rewritten.

e. A comprehensive individual midterm report is required from each student. The report will include only original writing by the individual as well as specific documentation of the individual’s own use of appropriate computer applications to fulfill the requirements of the project. The report, however, may contain graphical and design summaries that are the work of the group. This report will be graded by the instructor for both technical and grammatical content. In case of an unsatisfactory performance on the midterm report, a rewrite may be allowed.

f. A final report is required from each student evaluating their own contribution, participation and role in the team effort; including documentation of the individual’s own use of appropriate computer applications to fulfill the requirements of the project. The report will also include an assessment of the other team members’ contributions, participation and roles in the team effort. As noted previously, this is similar to employee evaluations which may be required of an engineering manager in practice.

g. These written formal assignments must be individual efforts. Group effort within the design project is required; however, group writing of these individually authored reports is not appropriate, and will be considered plagiarizing.
Academic Misconduct
Any act of dishonesty in any work constitutes academic misconduct. The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct and will be handled by the Dean’s office.

Accommodations
Reasonable accommodations are made on an individualized basis. It is the responsibility of persons with disabilities, however, to seek available assistance and make their needs known. The University has designated the Office of Disability Services as the campus coordinating office for the provision and delivery of services and reasonable accommodations that ensure the University's programs, services, and activities are accessible to students with disabilities. The Office of Disability Services is available to assist any student who has a qualified and documented disability. Please contact the Office of Disability Services at 348-4285 for additional information.

Schedule/Topic Outline
The course schedule will be provided separately.

Midterm Exam
Date(s)
There are no exams in this course. Please refer to the schedule for important dates.

Final Exam
Date:
There is no final exam in this course. The final presentations will be made on Wednesday, April 21, 2010.

Other Important Dates:
Please refer to the schedule for other important dates.

Other Course Information
This course will require you to be flexible and to work with others. Professionalism and respect for your team members is critical to your success.
Contribution to Program Student Outcomes

As required for the accreditation of our BSCE and BSConE programs, the following student learning outcomes have been established. These outcomes describe what students are expected to know or be able to do at the time of graduation. At a minimum, the outcomes that have been checked below will be fully or partially addressed, perhaps at a lower level, in a significant and direct manner in this course.

- **✓ Outcome F1:** Solve problems in mathematics through differential equations, probability and statistics, calculus-based physics, general chemistry, and one additional area of science. *(Level 3)*
- **✓ Outcome F2:** Explain the importance of (1) humanities, literature, and fine arts, and (2) history and social behavior in the professional practice of civil or construction engineering. *(Level 3)*
- **✓ Outcome T1:** Analyze and solve problems in material science, mechanics of solids, and mechanics of fluids. *(Level 4)*
- **✓ Outcome T2:** Select and conduct program-relevant civil or construction engineering experiments to meet a need, and analyze and evaluate the resulting data. *(Level 4)*
- **✓ Outcome T3:** Apply relevant knowledge, techniques, skills, and modern engineering tools to identify, formulate, and solve engineering problems, including BSCE – problems in at least four technical areas appropriate to civil engineering or BSConE – problems in construction processes, communications, methods, materials, systems, equipment, planning, scheduling, safety, economics, accounting, cost analysis and control, decision analysis, and optimization. *(Level 3)*
- **✓ Outcome T4:** Explain the impact of historical and contemporary issues on civil or construction engineering, and predict possible impacts of a specific, relatively constrained engineering solution on the economy, environment, and society. *(Level 3)*
- **✓ Outcome T5:** Develop solutions to well-defined project management problems within civil or construction engineering. *(Level 3)*
- **✓ Outcome T6:** Design a system or process in more than one program-relevant civil or construction engineering specialty field to meet desired needs, including sustainability and within other realistic constraints such as economic, environmental, social, political, ethical, health and safety, and constructability. *(Level 5)*
- **✓ Outcome T7:** Explain key aspects of at least one traditional or emerging program-relevant area of advanced specialization. *(Level 2)*
- **✓ Outcome P1:** Analyze a situation involving multiple conflicting professional, legal, and ethical interests, to determine an appropriate course of action. *(Level 4)*
- **✓ Outcome P2:** Organize and deliver effective written, verbal, graphical and virtual communications. *(Level 4)*
- **✓ Outcome P3:** Demonstrate the ability to learn through independent study, without the aid of formal instruction. *(Level 3)*
- **✓ Outcome P4:** Demonstrate attributes supportive of the professional practice of engineering; apply leadership principles to direct the efforts of a small group to solve a relatively constrained problem; and function effectively as a member of a multidisciplinary team to solve open-ended engineering problems. *(Level 3)*
- **✓ Outcome P5:** Explain the importance of licensure, and basic concepts in engineering management, business, law, public administration, public policy, and globalization as related to the professional practice of civil or construction engineering. *(Level 2)*