

# CIEG 461 SENIOR DESIGN 2007-2008

## Course Syllabus

### COURSE STRUCTURE

The senior design course is taught over two semesters for nominally two credits in each semester. Students are divided into several teams (or companies) that compete for an engineering commission from a client (“the owner”) for a complex, multi-disciplinary project. Once awarded the commission, the teams compete against each other to produce the best preliminary engineering design for the project.

In past years, your fellow students have demonstrated clearly that there is more than one good or correct solution or design for the project – and that the differences in the overall quality of the several designs are small and often subjective.

Each team includes four engineering disciplines: structural, transportation, civil/land development, and environmental.

Instructors who are practicing professionals present engineering information, techniques, and strategies in their respective disciplines that build upon your past coursework and can be used to develop the preliminary design for the project. In addition, the instructors serve as senior mentors for all the teams.

A young practicing professional serves as a mentor for each team, advising on task performance (non-technical) and team maintenance.

Several project “deliverables” are required from each team during the course:

1. *team plan*: a document that outlines how the team intends to execute its work (fall semester).
2. *proposal*: a document describing the company, its personnel and expertise, and the approach it will take to the engineering design engagement (fall semester).
3. *proposal presentation*: an oral presentation by each team summarizing the important aspects of the proposal (fall semester).
4. *progress meeting*: an oral presentation summarizing the company’s progress on the project to date (end of the fall semester *and* early in the spring semester).
5. *preliminary engineering report*: a document that describes in detail the preliminary design (spring semester).
6. *preliminary engineering presentation*: an oral presentation by each team summarizing the important components of the preliminary design (spring semester).

All four disciplines also will have discipline-specific assignments or deliverables, at least one of which will be an individual assignment that is given in the fall semester. These discipline-specific assignments or deliverables are either described in the discipline “attachments” or will be explained by each instructor as the course progresses. The schedules for these discipline assignments generally are set in each discipline by each instructor.

Early in the fall semester, each student will produce a *proposal outline* and a draft *project understanding*. This individual proposal assignment is described in a separate document.

All of the team and project deliverables, many of the discipline-specific assignments or deliverables, and the individual proposal assignment will be graded.

### GRADING

Your grade in the course will reflect your performance in four aspects:

- The quality of your discipline-specific individual assignment and your individual proposal assignment,
- Your contributions to your team with respect to task achievement and team maintenance,
- The quality of your team deliverables, each taken as a whole, and
- The quality of your work in your discipline within your team's overall efforts.

The assessment of your contributions to your team will include peer evaluations by your teammates, evaluations by the management of your team, and evaluations by your team's mentor. These three types of evaluations will focus on your commitment, your dedication, and the quality of your efforts for your team and on behalf of your teammates.

As stated, the four aspects listed above will determine your grade and you can see that three aspects are based on team work. Poor performance in any single aspect will tend to carry extra weight. In other words, to achieve overall excellence you must do well in all individual assignments, your discipline and team must do well in all group deliverables, and you must perform well as a member of your team.

### PARTICIPATION IN ORAL PRESENTATIONS

As noted above and on the class schedule, there are several presentations in this course: the proposal presentation, the progress presentations (noted as "progress meetings" on the schedule), and the presentation of the preliminary engineering design. To maximize student involvement, *each student must act as a "presenter" in one of these presentations and no student may act as a presenter in BOTH the proposal presentation and the presentation of the preliminary engineering design*. Typically, four or five students serve as presenters in the proposal presentation and the final presentation. The teams are encouraged to select their most gifted public speakers for both of these events, keeping in mind that the presentations in order of increasing importance are the progress presentations, the proposal presentation, and the final presentation of the preliminary design.

### WINNING TEAM

The winning team will have its team name added to the Senior Design Plaque. Determination of the winning team will be made as follows:

- Proposal (written and oral): 30%
- Progress Presentations: 10%
- Final Preliminary Design (written and oral): 60%

A more detailed breakdown regarding the assessment within each individual component listed above may be discussed at a later date.

## PRINTING DRAWINGS

Because the course involves preliminary design, many if not most drawings will be suitable and can be prepared in an 11x17 format, which many office printers can produce. Some drawings, however, will require a larger format (paper size) that necessitates the use of a plotter.

The department has a plotter that may be used for printing large format drawings. Details on the plotter's location and procedures for using it will be provided later. As a possible alternative, one or more local engineering firms may permit single-print plotting. Details on this alternative also will be provided later. Copying and multiple-print plots may not be done at these firms, though many copy shops (i.e., Kinko's) can print large copies.

Plotters and large-format printers are relatively finicky machines, so you should not leave plotting until the last minute and you should allow plenty of time for test-runs and final production.

## COURSE EXPENSES

Each team will be allocated \$275 to defray the costs of printing, plotting, binding, etc. associated with the production of team documents. Since no textbooks are required for this course, you should expect to contribute an additional \$30 or so each for publication costs incurred by your team throughout the course. Team leaders should annotate and compile receipts and turn them in to Debbie Whitesel in the Department of Civil and Environmental Engineering in May, 2008 for reimbursement up to the limit of \$275 per team for the year.

## COURSE REFERENCES

Many materials are on reserve for this course in Morris Library. A list of these materials will be on the course web site and will be updated as materials are added.

## INSTRUCTORS, MENTORS, AND COORDINATOR

The instructors are Brandt Butler (Environmental), Ronnie Carpenter (Civil), Ted Januszka (Structural), and Philip Horsey (Transportation). Diane Kukich will serve as a "consulting" instructor for written communication. Michael Paul is the course coordinator.

The mentors are Ross Bickhart, Kate Coleman, Tommy Coleman, Matthew Hayes, Sara Henderson, Adrienne Morell, Jason Winterling, and Kevin Yezdimer.

Contact information for all of the above individuals is listed on the course web page.

The coordinator will act as the owner's representative on a routine basis and will answer questions about the course and the project. The instructors will be acting as expert consultants to the owner in their respective disciplines and as senior mentors. Although the instructors can and will advise on your engineering for the project, they cannot answer questions about the project itself. These should be directed to the owner. In order to maintain fairness and assure that questions to the owner are answered adequately and consistently, ALL questions about the project and the owner's requirements and preferences for the project should be directed to the coordinator.

The mentors will serve as advisors for their teams. They will not tell you what to do but will try to help you think critically, think "big picture," think "like an owner," consider options, and weigh advantages and

disadvantages. Your mentor may guide or facilitate your initial team meetings but he or she will not “run” your meetings. Mentors will switch teams at the start of the spring semester.

The Course Commentary and Recommendations and the several discipline Attachments recommend minimum requirements for preparation of the proposal and execution of the preliminary engineering for the project. Questions about the engineering recommendations in these documents should be addressed to the appropriate instructor. Note that these questions about engineering (requirements, procedures, strategies, and assumptions) are different than questions about the project and the owner’s requirements and preferences.

Finally, please note now and recall often that the instructors, mentors, and coordinator generally will not tell you exactly what to do or exactly how to do it (except for methods and techniques in your discipline) in your work in this course. They probably will answer your questions with more questions as they try to help you formulate and decide on a good path forward.