

# ISyE 4106B Senior Design Syllabus

## Spring 2006

### 1 Overview

Senior design provides a problem analysis and system design experience similar to ISyE professional practice, and an opportunity for you to learn about the business world.

A design project may involve the analysis and presentation of data, cycle time analysis, simulation, determining standards, documenting process flow, etc., but in and of itself, these contributions do not constitute a senior design project. A senior design project must involve **design**; that is, *a recommendation for a change to a system and an economic analysis of the cost and benefits of the proposed change(s)*. Moreover, the project must require the use of *significant* industrial and systems engineering tools and methods learned in the curriculum. For example, many senior design projects deliver Excel programs as part of their deliverables. The Excel program must contain ideas and/or methods not generally recognizable by a non industrial engineer or manager. Simply building a tool (e.g. a simple spreadsheet) for an engineer or manager to use may be quite valuable for a company but constitutes a consulting project, not a senior design project.

Each group member is expected to spend a *minimum* of 12 hours per week on the project for a total of 180 hours for the semester, which equates to a minimum of 1080 hours for a six-member group. **The project's scope must be consistent with this expectation.**

### 2 Objectives

You will learn how to

- properly define and scope a problem;
- identify and analyze relevant factors;
- choose and apply appropriate industrial engineering methodologies and computational tools;
- generate and evaluate alternative solutions.

In addition, you will improve your skills in

- technical writing;
- public speaking;
- working within a team;
- project and time management.

### 3 Organization

The **Faculty Committee (FC)** consists of the faculty advisors and an outside evaluator from the ISyE faculty. The FC will assign a faculty advisor to your group. You will be responsible for keeping your advisor informed of the group's progress and intentions on a regular basis.

#### Faculty Advisors

<b>Dr. Anton Kleywegt</b>	<b>Dr. Eva Lee</b>	<b>Dr. Roshan Vengazhiyl</b>
Groseclose Room 409	Groseclose Room 426	Groseclose Room 337
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#### External Faculty Evaluator

**Dr. Paul Griffin**  
Groseclose Room 210  
404-894-2431  
pgriffin@isye.gatech.edu

#### Administrative Assistant

**Dr. Harry Sharp**  
Groseclose Room 232  
404-894-6545  
hsharp@isye.gatech.edu

#### Webpage

Some examples of reports from Fall semester will be placed on the following website; please view them for examples of content and organization.

<http://www2.isye.gatech.edu/~hsharp/ie4106spring2006/>

#### Meetings and Attendance

All presentations to the FC take place in the assigned meeting room for the class (IC205).

- *Presentations to the FC and the client.* Attendance is mandatory. In exceptional cases a student may request an exemption, full or partial, from the faculty advisor **prior** to the presentation date. In general, exceptions will not be granted for ordinary personal business, such as non-emergency doctor's appointments, interviews, vacations, etc. If an emergency situation prevents a student from attending a presentation, the faculty advisor must be informed as soon as it is feasible to do so.

- *Meetings with the faculty advisor or other members of the FC.* The day-to-day schedule will be determined by the faculty advisor. Every group is expected to meet with their faculty advisor once a week. On occasion a member of the FC may request a special meeting. All group members are expected to attend to and participate in all the meetings. In the **rare** case that a student needs to miss a meeting, an exemption should be requested from the faculty advisor **prior** to the meeting date. For each meeting the group will bring in an agenda for the meeting, a progress report on the work done over the previous week, a list of unresolved issues, and the proposed next steps in written form.

## ISyE Workforce Communication Lab

The ISyE Workforce Communication Lab assists Senior Design students on their presentation and writing skills. In the Lab students can receive comments on their slides and can practice their presentations.

The Lab is located in Room 115 on the first floor of the Main ISyE Building (the old Management Building). An announcement will be made when regular and extended Lab hours begin. The Director of Workforce Communication is Dr. Judith Norback, Room 314. For further information about the Workforce Communication Lab please consult the web site <http://www.isye.gatech.edu/communication/> .

## 4 Project Description

A senior design project consists of three phases, each of which requires a written and oral report.

### Phases

- *Project definition phase:* The problem, deliverables, design strategy, and the value to the company are defined.
- *Interim phase:* Data are collected, analyzed and validated; relevant factors are understood; and the design strategy is finalized.
- *Final phase:* Design strategy is implemented and its value demonstrated.

### Written reports

There are four written reports:

- The **Group Composition Report** includes
  - the list of group members (including names, phone numbers, electronic pictures and e-mail addresses);
  - a one-page resume for each member describing professional interests and experience (if any), together with a schedule of courses being taken this semester.

Designate one person on the team to be the lead contact.

- The **Project Proposal** spells out the work you plan to do and the value the company can expect to receive. It should be regarded as a “contract” and you will be expected to perform as promised, both by your client and by the FC. The format for the project proposal is as follows:
  - Accompany your proposal with a cover letter to your corporate contact thanking her or him for suggesting the project and indicating your desire to work on it.
  - After the cover letter, include a title page with all group members, faculty advisor, and information about the sponsor.
  - Follow the title page with a one-page executive summary.
  - The body of the proposal should include these sections:
    - \* brief introduction;
    - \* project description;
    - \* description of deliverables and estimates of their value;
    - \* project plan and accompanying timetable;
    - \* description of what your group will require from the company.

Each section should begin on a separate page.

- The **Interim Report** describes the preliminary analyses and conclusions, including data collected, and the plans for the remainder of the semester.
- The **Final Report** contains a comprehensive and self-contained presentation of the work completed during the semester. Your advisor will work with you on what is expected in the final report.

All written reports

- should be professional and concise, and should be prepared with great care;
- should have page numbers;
- should be submitted according to the course schedule (as late reports will be severely penalized);
- should incorporate the FC’s feedback in subsequent revisions;
- should be received by the client *no later* than the time of the client presentation;
- should be turned in to the FC accompanied by all previously-reviewed drafts.

## Oral Reports

- Instructors will provide feedback on the class presentation, which should be used to improve presentation to the client.
- Each group member must present a significant portion of either the interim or final presentation.
- Your presentations should be of professional quality. You must spend time and effort to create and practice each presentation. A clear presentation of the problem definition, solution and economic analysis of prime importance.
- The team member(s) who present should be prepared to defend the team's assumptions, methods, and solution, and to answer questions from the FC and the client.
- Strict time limits will be imposed for the presentations to the FC:
  - at most 10 minutes for the Project Proposal;
  - at most 15 minutes for the Interim Presentation;
  - at most 20 minutes for the Final Presentation.
- Your attire for the client presentations should be in accordance with that of your client contacts. However, nothing short of business-casual is appropriate.
- Client presentations must be scheduled at times that are suitable to all attending parties (all group members, faculty advisor, and all client-side attendees). You are encouraged to hold one or more of your client presentations on campus, provided the client agrees.
- Reports and Presentations must be submitted both in hardcopy form and in an electronic version to your faculty advisor and to the administrative assistant for the course, Dr. Harry Sharp.

## 5 Schedule

Date	Time	Activity
Jan 11	Noon	Group Composition Report Due
Jan 16–20	WC Lab	Optional Lab visit for preparation advice
Jan 23	Noon	Project Proposal Due
Jan 25,27	In-class	Presentations to the FC due; Presentation of Project Proposal to FC
Jan 30 – Feb 3	TBD	Presentations to the client due; Presentation of Project Proposal to Client
Feb 8	Noon	Workforce Writing Workshop
Feb 22 or Feb 24	Noon	Senior Executive Panel on Communication
Feb 20–24	WC Lab	Optional Lab visit for preparation advice
Feb 27	9am	Interim Report Due
March 1,3	In-class	Presentations to the FC due; Interim Presentation to FC
March 6–10	TBD	Presentations to the client due; Interim Presentation to Client
April 10–14	WC Lab	Optional Lab visit for preparation advice
April 17	9am	Final Report Due
April 19,21	In-class	Presentations to the FC due; Final Presentation to Class and FC
April 24–28	TBD	Presentations to the client due; Final Presentation to Client

**NOTE:** The order of the presentations to the FC will be determined by the FC. Do not request a specific date for your group’s presentation, unless there are extenuating circumstances.

## 6 Grading and Feedback

### Feedback

The FC will evaluate your project proposal and interim presentation. In each case the FC will provide written feedback and will render a decision about the group’s progress and accomplishments to date. There are four possible outcomes:

- *Pass*—The progress and accomplishments to date are most satisfactory.
- *Conditional Pass*—The FC has some concerns about the progress and accomplishments to date.
- *Conditional Failure*—The FC has major concerns about the progress and accomplishments to date. The FC will prescribe the necessary course of action.
- *Failure*—The progress and accomplishments to date are completely unacceptable. This outcome will most likely result in failure of the course.

**Depending on the circumstances, individual group members may receive a special evaluation.**

## Grading

In addition to your final grade for the course, your group will receive an interim grade after your interim presentation. Both the interim and final grades will be determined by the FC and will be based on these components:

- **Work Product 40%** The FC will evaluate the group based on the following questions:
  - Approach
    - \* Did the group tackle the right problem?
    - \* Did the group exhibit creativity and initiative in how they approached the problem?
    - \* Did the group miss important aspects to the problem?
    - \* Did the group build a "tool" but then not use it to recommend a solution to the client?
  - Methodology:
    - \* Did the group apply the correct formula(s) and tool(s)?
    - \* Did the group understand what they used?
    - \* Did the group's "models" capture the salient features of their problem approach?
    - \* Were the group's "models" integrated in an appropriate way?
    - \* Were methodologies applied in an ad hoc or sloppy fashion?
  - Execution:
    - \* Did the group complete what it is they said they were going to do?
  - Value:
    - \* Did the group's deliverables create real value to the client?
    - \* Did the group's deliverables create value as perceived by the client?
    - \* What is the ratio of the realized value to the initial potential value of the project?
- **Professionalism 20%** The FC will evaluate the group based on the following questions:
  - Were any due dates missed?
  - Did the group members attend all meetings on time?
  - Were the group members attentive during meetings?
  - Did the group members show respect to the FC and to the client representatives at all times?
  - Did the group members take responsibility or blame others for the difficulties and failures encountered?
  - Did each group member participate equally in the project, contributing both time and intellectual product.

- **Oral Reports 20%** The FC will evaluate the group based on three factors: organization, content and presentation.
- **Written Reports 20%** The FC will evaluate the group based on three factors: organization, content and presentation.

Please note the following caveats:

- In general, group members receive the same grade, but it is not unusual for an individual group member to receive a different grade when the FC decides that the group member's performance was lacking. All group members are expected to significantly contribute to the project.
- When determining grades, the FC will consider the project's scope and any factors outside the control of the group that may have influenced the project's outcome. A narrowly scoped or "safe" project will receive less credit than a more ambitious project.
- The FC's opinion of the quality of the presentation components of the oral and written reports is final, despite advice given by the Workforce Communication Lab, other faculty members, or the client.
- Effort is absolutely necessary for a good grade, but not sufficient. You need to work hard *and* be smart.

## 7 Honor Code

You will be expected to conduct yourself in accordance with Georgia Tech's student honor code. Please consult the web site <http://www.deanofstudents.gatech.edu/Honor/>.

## 8 Legal Disclaimer

- Only the Office of Sponsored Programs and the Legal Services Department of the Georgia Institute of Technology are allowed to enter in a contract on behalf of the Georgia Institute of Technology.
- On all written communications, proposals, forms, data collection sheets, presentation handouts, and other documents, a **disclaimer must be prominently displayed** that the document has been created in the framework of a student design project and that the Georgia Institute of Technology does not officially sanction its content.
- Students are not allowed to receive formal compensation for work done in Senior Design.
- Companies may provide assistance in the form of photocopying and typing services, and in some cases, supplies and travel expenses.

## 9 Tips for Success

- The semester moves very fast, so get on it and stay on it. NEVER let up. Spend as much time at the client site as you can—learn their business and operations first-hand.
- Make sure to identify a company contact who the company agrees will take on the responsibility of providing your group the requisite information you will need in a timely and accurate manner.
- Work together as a team. Find a way to contribute. Lack of effective teamwork is a sure prescription for failure. Effective teamwork generally leads to a successful project.
- Project and time management are absolutely necessary. Make sure every week your group has specific tasks to accomplish and members know the tasks for which they are responsible.
- Keep focused on the goal—do not spend an inordinate amount of time on one specific task in relation to its value to the project.
- A necessary condition for a successful project is that your client is happy with your work, however, it is far from sufficient. Keep in mind that your faculty advisor and the other members of the FC are your *main* “bosses”—you are, after all, taking an academic course.
- “It is not about you; it’s about the client.” Always think about what you are doing from your client and client contact’s perspective. *Never forget this.*
- Stretch—don’t be afraid to learn something new and don’t be afraid to make mistakes. That’s how you learn, which is what this course is all about.
- Resolve any problematic issues (such as getting data from the client) as soon as possible. If you can’t resolve an issue on your own then contact the faculty advisor.
- Be professional and maintain your personal and academic integrity at all times.
  - Don’t be afraid to say “I don’t know” and “I was wrong”.
  - Be honest in your dealings with colleagues, sponsors and faculty.
  - Dress neatly and appropriately for the occasion.
  - Show respect.
- Writing is a skill that you need to develop. Here are a few tips:
  - Accept the fact it takes time and effort to write a good paragraph, all the more so for a good report. The first words you type ain’t going to cut it.
  - Figure out what you want to say and the order in which you want to say it. This is the “flow” or organization, which is absolutely essential. Make an outline, then a draft, then a new outline and new draft, etc.

- Use the “Law of 50%”: Approximately half the words used to write your first draft most likely involve redundant and/or meaningless sentences.
- Formatting techniques (e.g. headings, bullet list, italics and bold fonts) help the reader navigate the report. Be careful not to overdo it.
- Eliminate spelling and grammatical errors—they reflect poorly on the group (not to mention their effect on your grade).

- **Read this syllabus and remember its contents!!**

## 10 The Challenge of Senior Design

Senior design is one of the most valuable, rewarding and difficult courses in the curriculum. Here are some of the challenges before you:

- You will face situations unlike those presented in class or in textbooks.
- Not only will you need to use material learned in classes, but you will have to learn new material.
- Your problems will not be clearly defined.
- Relevant data will be unavailable or hard to obtain and, consequently, solutions will not be exact.
- The proper techniques may not be apparent.
- Group members may disagree about the right course of action.
- You may discover you are on the wrong track.

**Accept and deal with these challenges.** You will not be alone—your faculty advisor will mentor you through this process.