COURSE OBJECTIVES

This course is intended to:
1. Provide a problem analysis and system design experience similar to ISyE professional practice.
2. Provide an opportunity to practice and perfect the skills of technical report writing and oral presentation.

The skills you should sharpen in this course include:

Systems analysis and design: including the ability to
- define a problem properly,
- identify and analyze relevant factors,
- develop a model of the problem,
- generate and evaluate alternative approaches for accomplishing the desired objective, and
- DESIGN OPTIMALLY the needed system.

Technical Writing: You have chosen a field that demands effective written communication. Your skill in documenting the results of your work will determine to a large extent the value of that work.

Public Speaking: It is not enough to do good work, you must also convince others, who may be apathetic or even antagonistic, that the work is good. Your skill in clear, concise, and convincing presentation may make the difference between a successful project and fruitless effort.

In addition, this course is an opportunity for you to distinguish yourself from your classmates and other young industrial engineers. Use this opportunity to find out more about the kind of career you want and as a launch pad for that career. This is a chance for you to find out about a prospective occupation or even a future employer. This is also an opportunity for future employers, customers or clients to find out about you. Even if you do not later work for your project company, your experience with them can help you get a good job and might help you do a good job.

This course is an opportunity for you to learn about the business world. Keep your eyes and ears open to your company’s culture. Find out how the company has distinguished itself from its competitors, how it projects itself externally and how it views itself internally. To be successful in this course, your recommendations must be consistent with the company’s strategy and culture. More than that, to be successful in your career, you must be sensitive to your employer’s, your competitors’ and your customers’ corporate strategy and culture.
2 FACULTY ADVISORS

After your team has an acceptable project definition, you will be assigned a faculty advisor. You are responsible for keeping your advisor informed of your intentions and progress. He may additionally provide you with other requirements which will facilitate his effective interaction with your group. You may, however, call upon any of us or any other faculty for advice and assistance.

3 PROJECT TEAMS

You are free to form your own project teams. Remember that in joining a team you are committing to carry your share of the responsibility and in asking someone to join your team you are accepting responsibility for the quality of his or her work. In the interest of fairness, equity, and in order to minimize scheduling problems, NO STUDENTS WITH CLASS TIME CONFLICTS will be allowed to join groups without similar class time conflicts. Your advisor is not responsible for browbeating laggards into shape. If your team members do not carry their share of the load, you will have to carry it for them; this is however not recommended or acceptable practice.

4 SELECTING A COMPANY & PROJECT

Each team must identify an institution and a suitable project. Choose your institution and your project carefully and wisely. This is a strategic decision. Remember, this course is a valuable opportunity to distinguish yourself. Do not throw it away by choosing a project haphazardly. In choosing a project site take a number of realistic issues into consideration. Remember that you will spend a considerable portion of your time at the site. For example, distance, transportation and accessibility are important considerations in your choice.

Be creative in your search for projects. Consider less traditional areas of endeavor, e.g.

- Hospitals
- State and local governments
- Banks
- Airports and airline companies
- Law enforcement agencies
- Charitable or non-profit organizations

Once you have identified an organization, you need to contact an appropriate person within the organization. As a rule of thumb, it is better to reach too high into the management of the organization than too low. Higher level executives will have greater perspective, broader authority and easier access. Be extremely circumspect in all your communications. Initially, you will not know the corporate culture, so it is best to tread lightly and be extremely polite.

You are not under any obligation to accept a project, but be sure not to leave any loose ends. If you decide not to take a project be sure to thank – in writing – everyone you contacted and politely explain that you have found something else.

When you think you have found a suitable project, prepare a description of the firm and a definition of the proposed project and submit it for approval. You will be expected to present your problem definitions in class. As a guide, one of your group members may be chosen to make this presentation but all must be prepared to respond to any questions that may arise from the audience.

We expect each of you to spend at least 6 hours on this project each week for the next two semesters. That comes to about 200 hours for each team member or about 1,200 hours for each team. This represents about 40 to 50% of one full-time working year. A junior industrial engineer costs the employer approximately $60,000/year including benefits, etc. So, your efforts should add around $30,000 to the value of your company. This should give you some guidance as to the kind of project you are looking for.
5 PREPARING THE PROPOSAL

Your proposal will be regarded as a “contract”, and you will be expected to perform as promised both by your company and by your faculty advisor. This is a very important and valuable part of the training that you receive in this course because you will almost invariably be expected to write proposals for funding or permission to do work or projects in the real world.

6 RELATIONSHIPS WITH COMPANIES

The project will require considerable time and effort from employees of your company. This represents an expense. Nevertheless, companies participate in these projects for three reasons. They expect:

1. to receive valuable assistance,
2. to express good will toward Georgia Tech and its students, and
3. to promote your education so that industry may benefit from more capable young engineers.

ISyE project teams must behave professionally and reinforce that feeling of good will.

Students are not allowed to receive compensation for work done in ISyE 4104–5. Companies may provide assistance in the form of photocopying and typing services, and in some cases, supplies and travel expenses, including parking.

We recommend that you give your company a copy of this entire handout.

Once again, settle all contacts you make with prospective firms. Once you decide on your project, write the other firms you have contacted to inform them that you will be unable to work with them, and thank them for the cooperation and time they have given you. This is good professional practice. Further, we wish to maintain the good reputation of our school and university with these organizations.

7 ACT AS PROFESSIONALS

You should function as if you were an employee reporting to your faculty advisor and to your corporate contact. Some guidelines are:

- Your client’s best interests should be your paramount concern.
- You should, at all times, apply the technical methods of ISyE thoroughly, accurately, honestly and in a manner appropriate for the task at hand.
- You should dress neatly and appropriately for the occasion.
- You should always be prompt and punctual.
- You should write clearly, type all reports, and bind them as professionally as possible.
- Long reports should include a title page, a letter of transmittal, table of contents and page numbers and appendices.
- Your drawings should be neat, clean, properly titled as well as labelled, and scaled. You may use legends as necessary.
- You should keep a copy of everything you give your faculty advisor or client.
- You should keep well organized records of all your work. A log book may help you accomplish some of the foregoing.
- You should date all your reports and correspondence.
- You should appropriately acknowledge everyone who assisted you in your efforts including reference sources.
- You should be honest in your dealings with colleagues and clients.
8  THE CHALLENGE OF DESIGN

The Senior Design sequence is probably the most valuable course in the curriculum. It is also one of the most difficult and perhaps time consuming. Your problems will not be clearly defined, relevant data will be unavailable or hard to obtain, the proper analysis techniques may not be apparent, solutions will not be exact, and you will disagree about the right course of action. After working two months on a project you may discover you are on the wrong track and that the real problem lies elsewhere.

This is your challenge. You will face situations unlike those presented in textbook examples. You will need to recall material from the many courses you have taken at Tech and your faculty advisor will expect you to demonstrate competence in all of them. On top of this, you will have to learn new material not covered in your courses.

Above all, you will be evaluated on how effectively you work, not simply how hard you work. Your contribution will be measured in terms of the value it adds to the project, not in terms of the hours you spend on it. So, you must not only work hard, you must also work smart.

You must also conform with other senior design etiquette such as attending scheduled class and client meetings, being attentive to all presentations and paying your colleagues requisite courtesies.

9  GRADING

Your faculty advisor will grade your team on the following elements:

a. The value your project has added and the professional level of your results. Your faculty advisor should elicit your corporate contact’s opinions of this. 50%

b. The quality of your presentations. 20%

c. The quality of written reports. 20%

c. Your overall professional conduct including class participation. 10%.

Remember that senior design is not just a project course involving your project alone. You are expected to additionally be attentive to the other groups projects and presentations so that you can learn from one another. This knowledge may come in handy when you leave school and find yourself either in graduate school or the work environment. Please note that attendance and attention at all regularly scheduled presentations is mandatory. All of the foregoing issues, in conjunction with the degree to which you have conducted yourself as a professional as stipulated earlier, will be factored into the determination of your individual grade.

Note that 40% of your grade is based on the quality of your reports and presentations. So, spend the time and effort to do these well. We anticipate you will invest nearly one third of your time preparing reports and presentations.

Your INDIVIDUAL GRADE in the course will be determined by the team grade and your advisor’s evaluation of your individual contribution. Both the team grade and your individual grade will be influenced by the independence and initiative you demonstrate. Your faculty advisor will also consider the degree of professionalism that you have shown in the course including the degree to which you have participated in all facets of the course.

10  INFORMATION FOR SPONSORS

10.1  The Senior Design Sequence

For many years, all senior students in the School of Industrial and Systems Engineering have culminated their undergraduate educational experience with the six-month sequence of senior design courses ISyE 4104—5. Now that we have entered a semester plan, you have the opportunity to spend more time to gain an enriched experience as well as produce a high quality result.
Many enterprises in the Atlanta area have cases that can be successfully studied and solved by a small group of industrial engineering students working for experience and academic credit instead of money. Our hundreds of ‘satisfied customers’ include a majority of the well-known businesses such as some Fortune 500 and medium sized firms in the Atlanta area, and other enterprises such as hospitals and various local city and county government departments.

Student groups work as unpaid outside consultants satisfying their interest in a real world design experience. They work on well-defined, specific design activities. Each group spends typically at least 1000 hours on the project over the course of nine months. This effort is focused on resolving a specific problem or completing a specific project and is not intended for carrying out day-to-day and routine operations.

10.2 What the Sponsor Does

The first step is for the sponsor to identify a need or opportunity. For example, one year Rich’s felt that its delivery truck fleet could have better maintenance scheduling; the downtown Marriott felt the need for a more consistent, fair and profitable parking policy; Selig Chemical saw the need to organize its warehouse more efficiently; the Atlanta Journal and Constitution felt its wastage of newsprint paper could be reduced by a few tons per year; the Baistow Distributing Company realized it needed to computerize its inventory system; and Rollins Security found its service people could travel a lot less if their trips were better scheduled; and Avis Rent A Car felt that it could improve both the productivity of its personnel while cutting down costs through more efficient layouts and other quality improvements. When students contacted these enterprises, they found enthusiastic potential sponsors. ISyE students are well prepared to design maintenance schedules, routing and delivery systems, warehouse layouts and materials handling systems, waste control programs, and requirements and specifications for information systems. They can apply operations research, simulation, statistics and quality control, and other technical tools to a wide variety of problems, and they can back up their design choices with thorough technical and economic analysis. Finally, they can recommend and postulate some cost-effective procedures for the implementation of their recommended and accepted solutions.

The steps in participating are:

- Meet with the student group to explore possibilities, and determine, loosely, what kind of beneficial project could reasonably be performed by a neophyte consulting group of industrial and systems engineers — about six students working for about 360 hours, each, over nine months.

- Assign a responsible technical or managerial person to give the group guidance, operations and economic information, and plant access. During the six months, this person will probably spend two or three hours a week interacting with group members.

- Arrange for an appropriate management level to receive and consider the group’s formal proposal (2 months), interim report (3.5 months), tentative results and conclusions (5.5 months) months) and final design (7.5 months). In general, but particularly for final design, it is helpful to have in the audience during our presentations as many key members of your organization as possible who can affect or are directly affected by this study.

- Participate in evaluating the students’ work.