

CIS 478: Software Tools for Solving Industrial Problems

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1 Office Hours

Tuesday, 2:00 – 3:00, and Wednesday, 1:00 – 2:00, in my office. Also, I am in my office on most days (except Fridays), and you can see me there by appointment.

2 Textbook

The textbook for the class is *Spreadsheet Modeling and Decision Analysis: A Practical Introduction to Management Science, Second Edition*, by Cliff T. Ragsdale, South-Western College Publishing, 1998 (ISBN 0-538-88130-5). Also, you might find it useful to buy a book on Microsoft Excel.

3 Course Materials

Some materials related to the course will be posted on my CIS 478 homepage:
<http://www.cis.njit.edu/marvin/classes/cis478>.

4 Description of Course

This course will provide students an opportunity to directly interact with industry and solve some real problems using various information-systems software tools. At the beginning of the semester, company representatives will present actual problems they are facing, and the students will work in groups to develop a solution, which they will present at the end of the term. Presentation skills, working in groups, and using software tools for problem solving will be stressed. The course is intended for advanced undergraduates (juniors and seniors).

The basic idea of the class is as follows. At the beginning of the semester, company representatives will present actual problems they are facing; e.g., a company may want to determine how

to staff or route calls at its call center; or a manufacturing company may want to improve its productivity; or a delivery company may want to reduce the time required to distribute its goods; or a company may need to consolidate its various information systems. Working in groups, with each group assigned one problem for the semester, the students will work throughout the term using various information-systems and management-science software tools to develop solutions, which they will present at the end of the term. Each group will consist of approximately five students; the actual number will depend on the number of students and the number of projects arranged for the class.

This course will have an innovative mix of academia and industry, which will be a great benefit to both the students and the companies and organizations participating in the course. The students will profit from the exposure to real-world problems, which are typically initially ill-posed and vaguely stated, and they will learn the difficulties of identifying a problem's important underlying issues and will perhaps need to use nontraditional methods to derive a solution. This is in stark contrast to what students encounter in most university courses, in which problems are clearly stated and have a straightforward solution.

The new course will also stress collaboration and oral and written communication skills, which will be crucial for the students once they join the workforce. For example, the students will work in groups, and they will make several presentations and turn in a number of reports during the course of the semester. At the end of the semester, each group will present its solution to the corresponding company or organization representative and the entire class. In addition, each group will hand in an in-depth report providing all of the details and analysis that led to their recommendations.

Case studies will be discussed in class to show the students how certain problems might be attacked using various methodologies such as simulation and optimization techniques. The first few case studies will be led by the professor, whereas the latter ones will be presented by the groups.

5 Course Objectives

To integrate (and enhance) problem analysis, technical skills, interpersonal skills, group behavior, technical writing, public speaking, presentation skills, questioning skills, software usage, library usage, etc.

6 Prerequisites

Because the course will require a great deal of motivation, perseverance, and maturity from the students, the course is restricted to mature juniors and seniors. Also, students near graduation will have been exposed to wide variety of ideas and problem-solving techniques that will be helpful to work on their various industrial problems.

The students will not necessarily have any background in operations research, management

science, or statistics, but many will probably be adept at using computers. Thus, the types of problems they will be asked to solve should not require an extensive background in mathematics or statistics. However, the students will learn some basic techniques in these areas that they can use to solve their problems.

7 Course Organization

For the first part of the semester, the class will meet twice a week at the regularly scheduled time. In the latter part of the semester, the class will only meet once per week on Tuesdays (unless indicated otherwise). On Thursdays, each group will have weekly 30-minute meetings with the professor during the normal class time to discuss the progress of their project.

Each group will make three 30-minute oral presentations of their project during the semester. The first two will be oral intermediate progress reports, and the last will be the final presentation before the company representatives. In addition, for each oral intermediate progress report, a written progress report will also be handed in. Also, each group must turn in a project description. The dates for these are specified in Section 15.

8 Groups

Group formation will take place on a first-come-first-served basis using sheets posted on the professor's door starting at noon on Wednesday, January 28. The number of students allowed in each group will depend on the number of students enrolled in the course. Some projects may require a little background in certain areas (e.g., statistics). If you sign up for a particular project, make sure that you have the necessary background.

9 Group Meetings

After the groups have been established, all groups must meet with the professor each week for 30 minutes. During the first part of the semester (when the class meets twice a week), this will be at a mutually convenient time. In the latter part of the semester (when the regular class meets only once per week), this will be on Thursday during the regular scheduled class time. In preparation for each meeting, the team must submit a one- or two-page statement 48 hours before the scheduled meeting. This statement should contain:

- A summary of the key points discussed, resolved, etc., in the previous meeting;
- A review of work accomplished since the previous meeting;
- A discussion of what work will be done next; and
- A list of questions and issues to be discussed at the meeting.

The group must decide what to discuss with the professor during the weekly group meeting; this may include

- feedback on progress
- a “reality check” that their project is appropriate and on-track
- assistance with technical difficulties
- guidance regarding client relations
- assistance with group dynamics
- advice regarding increasing or decreasing the size or scope of the project
- suggestions on acquiring and checking data
- etc.

10 Guidelines for Project Description

Each group will have to turn in a Project Description. The due date is given in Section 15. The purpose of the Project Description is to indicate what your group will be doing, how you plan to do it, and you expect your results to be. The primary goal is to let the professor (and the organization) know what you are planning to do. Be sure to include a timetable that maps out exactly what steps you will be taking during the progress of the project. The Project Description should also serve to organize your work. The main text of the description (i.e., not including the appendix) must be no more than 3 pages long (typewritten, double-spaced, 12-point font, with 1-inch margins).

The following sections should be included:

1. Statement of problem (name and description of organization; details of problem)
2. Proposed approach (steps to be taken in investigating and evaluating the problem)
3. Data requirements (anticipated information needed to analyze the problem)
4. Data sources (specific references)
5. Anticipated results (Make sure that you understand all aspects of the problem so that you can realistically predict the kinds of results you will be getting. Show that you have really thought about the project.)
6. Schedule of work (detailed timetable)

11 Progress Reports and Final Project Reports

There are three reports on the project that are to be turned in during the semester. The due dates are given in Section 15. The first two are Progress Reports and the last is the final report. The progress reports are meant to be drafts of the final report that discuss the progress to date. Each group is to hand in a single report each time.

The progress reports and final reports must consist of a single-page Executive Summary, and a main body not to exceed 8 pages. The report must be double-spaced, with 1-inch margins and 12 point or larger font.

To encourage you to communicate your thoughts in a clear and concise manner, the page limit will be strictly enforced; and text in excess of the page limit will not be read. In addition, part of the grade will be based on the clarity/conciseness of your writing; hence, any attempts to squeeze in extra verbiage by using small fonts, tweaking the margins, etc., will serve to diminish your grade.

The appendix must contain a copy of your thank-you letter to the organization (only for the final report), and a printout of your model. If your model is large, you need only include a representative portion of your model. Any other material that you choose to append (such as exhibits, tables, spreadsheets, or numerical examples of calculations) must be referred to and discussed in the body of the text. Naturally, exhibits and tables that are well laid out, with clear headings and explanatory comments, require much less in the way of discussion. The appendix does not count toward the page limit; thus, do not expect the professor to read any textual material in the appendix.

Groups must forward a copy of the report to the firm, along with a cover letter thanking them for their participation.

11.1 Report Format

- **Title Page**

Indicate the following:

- Name of Organization
- Topic
- Course Number: CIS 478, NJIT
- Names of students, in alphabetical order

- **Executive Summary**

Summarize the main findings of the report in plain English.

- **Problem and Decision Statement**

Present a cogent description of the problem you will investigate. Clearly state the decision that will be supported by your project, and why this decision is important.

- **Data**

List the data required for your analysis. In some cases, data will be provided to you by the organization or otherwise be readily available. If data is not readily available, devise a means to acquire it (e.g., by direct observation, or by estimating it). It is sufficient for this investigation to use sample data or “representative” data.

- **Analysis**

Describe how you analyzed the problem. Clearly describe your model, and any tool (e.g., linear programming, Excel functions, etc.) that you used. Describe any “runs” of your model. Indicate any assumptions you needed to make. Describe any sensitivity analysis that you performed.

- **Results and Managerial Discussion**

Discuss the results of your analysis. What are the implications of your analysis for the organization in terms of costs, revenues, customer service, etc? Are your results consistent with your observations of the organization? Make recommendations for improving the organization’s operations, and for improving the analysis. Use illustrations, graphs and diagrams (which belong in an appendix and need to be discussed in the main body) as appropriate to support your discussion.

- **Appendices**

- Thank-you letter to the firm.
- A printout of your model, including a copy of representative cell formulas.
- Others as appropriate.

12 Oral Presentations

Each group will make three oral presentations on their project during the semester. The first two will be progress reports and the last is the final oral presentation. The dates of these are given in Section 15.

The purpose of the presentation is for you to clearly and understandably communicate to your classmates, instructor, and company representative, the essence of your analysis. You should

1. Describe the background and operations of the organization.
2. Discuss the problem you have chosen to address and your analysis.
3. discuss the managerial implications of your investigation.

Each group will receive a single grade for the presentation.

Clarity of communication, including good organization, careful selection of material to include and exclude from the presentation, a professional approach, and effective use of visual aids will be important to the success of this presentation. Any number of individuals in the group may speak during the presentation. A 30-minute time limit will be enforced.

An overhead projector and an IBM-compatible PC, connected to a computer display device, with PowerPoint 97 and Excel 97 installed will be available for use during the presentation. If you choose to use the computer, you must arrive before class and load your files. Make sure that your files will fit on a floppy disk so they can be loaded.

Oral presentations will be given during scheduled time of the final exam for the course. Attendance is required by all class members on the dates of the oral presentations.

13 Peer Evaluation

Each student is required to turn in a confidential evaluation of the performance of the members in his or her group. A Peer Evaluation form is included in Section 16. The form is due by noon the day after the oral presentations.

14 Grading

Your final grade will be based on the following breakdown:

Class Participation	20%
Written Assignments	40%
Oral Presentations	40%

Homework is to be turned in at the beginning of class the day it is due. *Late homework will not be accepted.* Thus, punctuality and attendance is mandatory. If you cannot attend some class, you must contact me beforehand.

As a general rule, I do not give makeup exams or allow students to take exams (or make presentations) on alternate dates. Of course, if someone has a legitimate reason (e.g., jury duty, serious medical problem, conflict with a religious holiday), I will make allowances. I will not accept excuses such as having too heavy a workload or having too many exams the same week.

15 Important Dates

January 22	Presentations by Company Representatives
January 27	Presentations by Company Representatives
January 28	Group signups begin at noon
February 17	Submit (in class) Project Description
March 10	Oral presentations and progress reports due
March 12	Oral presentations and progress reports due
April 7	Oral presentations and progress reports due
April 9	Oral presentations and progress reports due
April 30	Last class meeting
Two days before final exam	Final reports due at professor's office by noon
Final exam day	Final oral presentations
Day after final exam	Peer evaluation due at professor's office by noon

16 Peer Evaluation of Group Members Term Project

Purpose: To assist the instructor in determining the “group component” of each individual’s grade as fairly as possible. This form is confidential. Do not show or discuss your evaluation with anyone.

Assumption: Although all group members are expected to share equally in the project work, it sometimes happens that a group member contributes substantially more or less than others. The intention of this evaluation is: (1) to recognize those students who did substantially more than their share; and (2) to ensure that those students who did substantially less than their share do not receive the same mark as the group.

When a member has, in total, contributed to the overall work of the team about the same as the average team member, he/she should receive 100% of the “overall group grade” for the team component of the course. When a member has contributed more than average to the work of the team (e.g., analytical, organizational, written, investigative, verbal), he/she should receive more than 100% of the team grade (e.g., 110%, 120%, etc.). Similarly, when a member has contributed less than average, he/she should receive less than 100% of the team grade (e.g., 90%, 80%, etc.). (There is no requirement that the overall percentage average 100%.)

- A. came to meetings at least 90% of the time.
- B. comments worthwhile.
- C. work was of good quality.
- D. took a leadership role in the group.
- E. did their fair share.
- F. you would like to have this person in your group again.
- G. Should this person get less, more, or the same grade as everyone else in the group?
- H. What should this person get as a percentage of the overall grade?

	A	B	C	D	E	F	G	H	Explanations/Comments
NAME	(Y = yes, N = no)						(percentage)	(continue on the back)	
1. (yourself)									
2.									
3.									
4.									
5.									
6.									