

THE ART OF MODELING FOR INSIGHT

"All models are wrong; some are useful."
- W. Edwards Deming

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In any problem-solving challenge, the decision-maker must balance the *usefulness* of the solution (for example, the power and credibility of insight) with the *tractability* of the approach (that is, the analysis must be completed within time and resource constraints). The **art of modeling** is the art of structuring and analyzing a decision problem within the given constraints -- arriving at compelling insights and recommendations that help build organizational commitment to action.

This art is an increasingly vital skill for decision-makers to master. The fast pace of change demands that leaders in both private and public sectors make quality decisions despite a high degree of uncertainty. Well-constructed models facilitate these decisions by capturing and clearly illustrating the impact of the most critical factors, and facilitating high-quality discussion focused on the most important risks and tradeoffs.

Practical experience in this art is essential -- whether you expect to create your own models, or coach an analyst to create models for you. In either case, improving problem-solving skills through modeling experience will improve your ability to lead an organization through a wide variety of decision-making challenges -- from rapid-fire problems requiring 'quick and dirty' analysis to strategic conundrums requiring extensive risk vs. return investigation. In both cases, a skilled practitioner will conceive efficient paths to the solution, and effectively communicate how to get there.

This course is based on the premise that since developing insights through modeling is an art, it should be taught like an art. Rather than focusing on modeling theory and tools, the course challenges students with practical exercises in model building and analysis. Their efforts are assisted and critiqued by the instructors and other students. The course provides a forum for experiencing the difficulties one encounters in modeling for decision-making, and for exploring strategies to overcome these problems. Creativity is a prime ingredient in good modeling, as it is in effective management. While creativity cannot be taught, it can be cultivated through experience. An important aspect of this course is the cultivation (or uncovering) of the student's creativity through attacking unstructured problems and through group exercises.

Course Objectives

The primary objective of this course is to enable the student to develop facility in generating insights via modeling in a wide range of realistic situations. The skills needed to be a successful modeler include the ability to recognize the key problem(s) in a situation, the skill to develop a structure for analyzing the problem, the ability to carry out a cogent analysis, and the mental flexibility to present the analysis and insights to interested parties in a convincing, non-technical manner. The course is designed to be useful for any student, regardless of career plans. The skills developed here are vital to anyone helping today's organizations to navigate a course through uncertain and uncharted territory.

Through a series of practical exercises the student will develop these analytic and presentation skills. The course will also reinforce the quantitative analysis skills acquired in the first year. This is

not, however, a course in formal quantitative modeling techniques. It builds on first year quantitative analysis methods but its focus is on tailoring the analysis to the problem at hand and the available time and resources.

Course Content

The first three weeks of the course are devoted to skill building. Through a mixture of lectures and exercises, students build skills in problem formulation, prototyping, and insight generation. The middle four weeks of the term are devoted to case analysis: each week, students work in randomly assigned teams of two to develop a modeling assignment from initial problem formulation through to presentation of recommendations. The last two weeks are organized around a modeling project, based on one extended case. Students work in teams of four with structured coaching from the instructors and present their team's final analysis and recommendations as the culmination of the course.

The one-week modeling cases are the heart of the course. Each represents a realistic decision situation. Each requires the student to structure the problem, build and analyze a model, and present recommendations for action. These cases are drawn from a wide range of contexts. For each case a brief outline of the situation is provided along with some factual background. The student is challenged to carry out a complete analysis, from problem definition to recommendations, at whatever level of detail is appropriate, applying whatever tools are useful. Students will work in randomly assigned teams of two. *Attendance at office hours with the instructors early in these weeks is required.* The Wednesday class will be cancelled during these weeks. The Thursday class period will be devoted to presentations of insights and recommendations, followed by a critique and discussion of alternative approaches.

The final two weeks of the course will be devoted to the modeling project. Students will work on this extended case in assigned teams of four. During this period, teams will meet periodically with the instructors to discuss their work. The project will culminate in a presentation of insights and recommendations to a panel of outside reviewers.

Evaluation

Students will receive grades on several exercises during the first three weeks of the course. This portion of the course will account for 20% of the grade. The four weeklong modeling cases will account for 40% of the grade (10% each). The final project will account for 25% of the grade. The remaining 15% of the total grade will be based on the overall level of participation in the course. Course participation includes participation in class, the contribution the student makes to his or her case teams, and the effort devoted to the course as a whole.

Modeling exercises	20%
Modeling cases (4)	40%
Final Project	25%
Course participation	15%

Honor Principle

Each student is expected to work independently of other class members and other students on the modeling cases, except where small teams are specifically assigned. Students are encouraged to seek outside assistance for gathering *facts* relevant to the cases, but not to use assistance in the process of modeling and analysis. The instructors will be available to work with students on the modeling and analysis aspects of the cases. Students are *encouraged* to discuss their work with the instructors.

Attendance

Each student is expected to attend every class. If an absence is unavoidable, the instructors should be notified well in advance and appropriate arrangements made jointly by the student and instructors.

Course Materials

There is no text for this course. Modeling cases will be made available one week prior to their due date. Modeling and creativity exercises will be made available in class as needed.

DAILY PLAN
Winter 2003

Date	Topic	Preparation
1/8	Introduction to the Art of Modeling	Read course syllabus
1/9	Generating Insights	<i>Retirement Planning (A)</i>
1/15	Problem Formulation and Influence Diagrams	<i>Retirement Planning (B)</i>
1/16	From Influence Diagram to Prototype	<i>None</i>
1/22	Iterative Analysis	<i>Technology Option</i>
1/23	Generating and Communicating Insights	<i>Retirement Planning (C)</i>
1/29	Office hours required; class cancelled	
1/30	Modeling Case	<i>Colby College Skiway</i>
2/5	Office hours required; class cancelled	
2/6	Modeling Case	<i>Mega versus Micro</i>
2/12	Office hours required; class cancelled	
2/13	Modeling Case	<i>Invivo Diagnostics</i>
2/19	Office hours required; class cancelled	
2/20	Modeling Case	<i>eGrocer</i>
2/26	Modeling Project: Kick-off	<i>National Leasing</i>
2/27	Modeling Project: Influence Diagrams	
3/5	Modeling Project: Models and Insights	
3/6	Office hours required; class cancelled	
3/7	Project Presentations and Wrap-up	