Decision Analysis
Sample Course Syllabus

Core Faculty: Ron Howard

This course is taught by the Socratic method – guided, but unfettered by an instruction plan. Important concepts are introduced when they arise in the discourse and therefore at the peak of interest. This open format allows pursuit of a topic to an appropriately satisfying conclusion rather than cutting off discussion summarily at the end of a session.

Decision Concepts
What is a good decision? Professor Howard explains the fundamental but rarely applied concepts underlying any decision. He describes the critical difference between decisions and outcomes, what makes decisions difficult, and the elements of high-quality decisions. Participants experience some all-too-common fallacies of thought and decision-making through an interactive demonstration.

Characterizing Decisions
Before you can make a good choice, you must be able to describe the alternatives and their consequences. Professor Howard presents a precise language that enables you to characterize decisions and their alternatives, complex and uncertain outcomes, and preferences for those outcomes.

Relevance, Measures, and Distributions
Professor Howard explains how to use the language of probability and relevance diagrams to represent information about the possible outcomes of choices we make. In addition, he discusses measuring those outcomes (e.g., profit from an investment) and the distribution of possible uncertain outcomes. With eye-opening examples, he illustrates how we often make erroneous inferences from available information and misuse data when making decisions. He then discusses how the concepts taught in this section will help to avoid such pitfalls.

Making Choices: The Rules of Actional Thought and Their Implications
Ordinary rules of logic do not apply when there is uncertainty. Professor Howard extends logic to deal with the uncertain world we always confront. He presents and engages the class in thorough discussion of the rules of logic that should guide decision-making. He then demonstrates how we routinely violate one or more rules, even in situations where, as Professor Howard says, “The rule is so transparent that if you announced you were violating it, people would think you were joking.”
Value of Clairvoyance and Risk Preference
Seismic tests, clinical trials, market research… Companies spend millions of dollars conducting tests and gathering information. They generally spend more money gathering information than it is worth. In addition, people usually shy away from risk and uncertainty, especially in high-stakes situations. In this session, Professor Howard explains how to value information in economic terms so that you can compare the benefit of information with its cost. He also shows how to represent your attitude toward risk, giving you the tools to know which risks to take and which to avoid.

Sensitivity Analysis and Information Gathering
Professor Howard demonstrates how sensitivity analysis shows how the best choices change as the input numbers – our decision basis – change. Insights from sensitivity analysis tell us which elements of the problem to focus on and which to refine through further information gathering and analysis.

Assessing Uncertainty
The key to thinking and communicating clearly about uncertainty is the use of probabilities to describe uncertainty. Probabilities represent our knowledge about how likely an event is to occur. Professor Howard demonstrates how to quantify this judgmental knowledge in a form suitable for analysis.

How Well Do We Assess Uncertainty?
A surprising number of biases, mostly unconscious, can prevent us from adequately expressing our state of knowledge. Professor Howard describes how to avoid these pitfalls in representing uncertainty, which are created by external filters surrounding us and by our own imperfect thought processes.

Decision Engineering
Professor Howard describes methods for expanding our analysis to professional-level problems. He introduces the tools typically applied by decision consultants. He also illustrates the pitfalls of “weight and rate” approaches, which attempt to shortcut the steps in decision analysis and often lead to illogical choices.

Life and Death Decisions
As an illustration of using decision analysis in our everyday lives, Professor Howard explains how to apply the concepts covered in this course to deal with decisions that may put us or others at risk.