Stevens Institute of Technology
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Syllabus

SYS660: Decision and Risk Analysis

Overview

Decision and Risk Analysis provides students insight into the decision making process. Students learn how to structure a decision, identify and manage bias, identify and select alternatives, and implement the chosen outcome. Additionally they examine and manage risk and its impact on decisions and the potential outcomes. The analysis process includes logical, statistical, and personal as methods for evaluating and selecting a final choice.

Learning Goals

After taking this course, the student will be able to:

- Define a decision
- Explain the basics of probability theory important to decision-making
- Recognize factors contributing to successful and unsuccessful decisions
- Apply a simple model for decision-making
- Discern the differences between a well-framed problem and a poorly-framed one
- Utilize at least two techniques for generating alternatives
- Apply at least three techniques for deciding a course of action
- Define risk and opportunity
- Set up a risk/opportunity management plan
- Define key risk issues
- Structure and solve decision problems

Pedagogy

The course will employ slide presentations, supplemental reading and additional resources, quizzes, online discussion, two term papers, individual and team assignments and a final team presentation.

Required Text(s)

The basic text for the course will be used to supplement the slide presentations given each week to introduce new materials. Specific chapter and page assignments will be made. This book is required starting with lesson 1.

- **Making Hard Decisions (second edition) – Robert T. Clemen (ISBN 0-534-26034-9)**

In order to complete the course, each student must read two books and submit a short term paper on each. The two books are:

- **Against the Gods – Peter L. Bernstein (ISBN 0-471-29563-9)**
- **Blink – Malcolm Gladwell (ISBN 0-316-17232-4)**

Both are readily available and quite reasonably priced. (Please note: from time to time, the publishers change the subtitles on paperbacks, so you might find an edition with a different date or a slightly different title. Any edition will be suitable.)

Required Readings

Required Readings will be assigned for each week. They may be from the course website, web links, or the book “Making Hard Decisions” by Robert T. Clemen (ISBN 0-531-26034-9). These readings will supplement the slide presentations as the basic course content.

Course Outline

The course is divided into thirteen modules that are completed over the same number of weeks. Students are required to complete an assignment, contribute to the discussion of the current materials, and take a quiz each week. There is no discussion or quiz following the assignment for the thirteenth week -- that assignment is to complete and post the final paper. To promote full team member participation, students are required to assess their own contributions and other members of their team about midway in the semester and then again towards the end of the semester, prior to the grading of the final team project.

Assignments

Specific details on the assignments are found on the course website. The assignments and their weights are as shown below:

1. Class Participation (discussions) 24%
2. Individual quizzes 24%
3. Weekly projects / exercises 22%
4. Two individual book reviews 12%
5. Final Team project/presentation 14%
6. Administrative requirements 4%

TOTAL **100%**

Please note that assignments in this class may be submitted to www.turnitin.com, a web-based anti-plagiarism system, for an evaluation of their originality.

Course Schedule

Week #	Topic
1	Introduction to decision analysis
2	Probability theory and statistics refresher
3	Framing the decision
4	Generate alternatives
5	Structure and analyze decisions
6	Cognitive bias
7	Introduction to risk
8	Risk planning and identification
9	Risk analysis, handling, and monitoring
10	Game theory
11	Choosing an Alternative / Engineering trade studies
12	Sensitivity analysis
13	Implement the decision