

Subject: Decision Analysis**Number: EBG560****Course Title: Decision Analysis****Section:****Semester/year: Fall 2017****Instructor or Coordinator: Michael R. Walls****Contact information (Office/Phone/Email): mwalls@mines.edu****Office hours: Monday: 2:00 – 3:00 and Wednesday: 11:00 – 12:00 and by appointment****Class meeting days/times: Monday and Wednesday 9:30 – 10:45****Class meeting location: EH 211****Teaching Assistant (if applicable):****Contact information (Office/Phone/Email):****Instructional activity:** 3 hours lecture hours lab semester hours**Course designation:** Common Core Distributed Science or Engineering
 Major requirement Elective Other (please describe _____)**Course description from Bulletin:****Textbook and/or other requirement materials:****Required text:** Robert T. Clemen and Terence Reilly, *Making Hard Decisions*. Third Edition, South-Western, Cengage Learning, 2014**Other required supplemental information: Teaching note and case studies on Canvas****Student learning outcomes:**

This course focuses on the application of decision theory to the quantitative analysis of strategic decision problems. Strategic decision problems, in either the individual or firm-specific context, generally involve large amounts of resources that must be committed to alternatives in competitive, risky and uncertain environments. Examples would include corporate acquisition decisions, major capital investment decisions, new product decisions, and choices among alternate technologies. Many of these problems can be conceptualized and structured using the methodologies associated with decision analysis.

This course is designed for students with a general interest in the use of quantitative methods for aiding decision making. It would be an important component to those students interested in corporate and strategic planning, management consulting, and financial investment analysis. There is a particular emphasis in this course on applications of decision analysis in the petroleum sector. This course can also be used as a first course for doctoral students interested in research on theoretical and applied aspects of decision analysis and expected utility theory.

The class format will be primarily lecture. Case discussions will focus on why quantitative techniques are useful as well as how strategic problems can be modeled using the techniques available. Students are expected to participate in class discussions, prepare assigned cases, and complete a course project. Case studies will be done in groups of two (2), with a single report submitted by each group. Students will form their groups the first week of class, and group composition will remain the same throughout the semester. Case analyses should follow the form of a report by a management consultant to a client. Emphasis will be placed on both content and style; the analysis should be competent and well thought out, but it should also be presented in a professional manner.

An individual term project will be required at the end of the course. Suggested topics include: (a) A critical examination of an application of decision analysis to a problem or set of problems. (b) An actual application of decision analysis to a real-world problem. (c) Develop and/or critically evaluate some computer software intended to aid the application of decision analysis to real problems. (d) Investigate advanced topics related to some facet of decision analysis.

Brief list of topics covered: See outline of course topics below.

Policy on academic integrity/misconduct: The Colorado School of Mines affirms the principle that all individuals associated with the Mines academic community have a responsibility for establishing, maintaining and fostering an understanding and appreciation for academic integrity. In broad terms, this implies protecting the environment of mutual trust within which scholarly exchange occurs, supporting the ability of the faculty to fairly and effectively evaluate every student's academic achievements, and giving credence to the university's educational mission, its scholarly objectives and the substance of the degrees it awards. The protection of academic integrity requires there to be clear and consistent standards, as well as confrontation and sanctions when individuals violate those standards. The Colorado School of Mines desires an environment free of any and all forms of academic misconduct and expects students to act with integrity at all times.

Academic misconduct is the intentional act of fraud, in which an individual seeks to claim credit for the work and efforts of another without authorization, or uses unauthorized materials or fabricated information in any academic exercise. Student Academic Misconduct arises when a student violates the principle of academic integrity. Such behavior erodes mutual trust, distorts the fair evaluation of academic achievements, violates the ethical code of behavior upon which education and scholarship rest, and undermines the credibility of the university. Because of the serious institutional and individual ramifications, student misconduct arising from violations of academic integrity is not tolerated at Mines. If a student is found to have engaged in such misconduct sanctions such as change of a grade, loss of institutional privileges, or academic suspension or dismissal may be imposed.

The complete policy is [online](#).

Grading Procedures:

1. (20%) Case studies.
2. (45%) Exam.
3. (25%) Individual term project.
4. (10%) Class participation.

Coursework Return Policy: Generally, case studies and other assignments will be graded and returned within one week

Homework: Late assignments will not be accepted for grading.

DECISION ANALYSIS

COURSE OUTLINE

Week	TOPIC	READINGS/ASSIGNMENT
1	Course Introduction	Clemen, Chpt. 1
2	Modeling and Structuring Decisions Influence Diagrams/Decision Trees Decision Analysis Software – Precision Tree	Clemen, Chpt. 2 & 3
3	More on Influence Diagrams Applications of Decision Analysis	Clemen, Chpt. 4 & 5
4	Sensitivity Analysis Probability and Statistics	Clemen, Chpt. 5, 7 Case - “ <i>Freemark Abbey</i> ”, HBS
5	Bayesian Analysis Value of Information	Clemen, Chpt. 7 & 12 Case - “ <i>The SS Kuniang</i> ”, HBS
6	Probability Assessment Decision Heuristics/Biases	Value of Information Exercises, HBS Clemen, Chpt. 8
7	Simulation Direct Choice Methodologies	Chpt. 8, 11 Case – <i>Hawthorne Plastics</i>
8	Finance and Portfolio Theory Portfolio Management / Optimization	<i>Term Project Abstract</i>
9	Portfolio Applications in the Firm	Case - TBA
10	Open	
11	Expected Utility Theory Preference Assessment	Clemen, Chpt. 14
12	Modeling Preferences Risk-Sharing and EUT	Clemen, Chpt. 15
13	Measuring Corporate Risk Tolerance Risk Taking and Performance	Case - <i>The Stephen Douglas</i>
14	Exam	Case - <i>South Texas Energy</i>
15	Project Presentations	

