

MBA 504
Decision and Risk Analysis
Spring 2009

Lectures:

DR1: MW 13:00-14:20 in 3039 BIF

DR2: MW 14:40-16:00 in 3039 BIF

Instructor: H. Dharma Kwon, *Assistant Professor of Business Administration, University of Illinois*

Office: 365 Wohlers Hall

Email: dhkwon@illinois.edu

Phone: 217-333-3522

Office Hours: R 16:00-18:00

Note: When you send email to the instructor, **your subject line must contain the word “504DRA”**.

Course Objectives: This course is about using numbers to make better decisions. The focus will be on “hands-on” use of quantitative tools for solution of management problems involving risk and competing objectives. Specific course objectives: (1) Introduce you to practical yet sophisticated tools suitable for solving complex managerial problems with risky outcomes and conflicting objectives, (2) consider challenges that executives and organizations encounter when implementing analytical approaches for decision making, (3) provide insight into when and how quantitative decision models can improve on “seat of the pants” methods for decision making.

Pedagogy: The class sessions will rely primarily on case analyses and discussions supplemented by in-class problem solving sessions and lectures. You are expected to complete the assigned pre-class readings and assignment questions and be prepared to join in the discussion and problem solving in class. The questions will typically suggest analyses to be performed. During class, you will be cold-called to discuss your analyses and consider alternative approaches. If you do not prepare before class, you will get much less benefit from the course.

Prerequisite: This course builds upon some rudimentary knowledge of probability and statistics, and it requires basic proficiency with Excel.

Required textbooks and software:

(1) Custom-published textbook: It is comprised of selected chapters and cases from Bodily, Samuel E., Carraway, Robert L., Frey, Sherwood C., Jr., & Pfeifer, Phillip E. Quantitative Business Analysis: Text

& Cases. Irwin McGraw-Hill, 1998. ISBN 0-256-14713-2. You can buy either the custom textbook or the original textbook.

(2) Course packet.

(3) Decision Toolworks software (a set of three Excel add-ins): RiskSim, SensIt, and TreePlan.

Evaluation Methods:

Class Participation: 25%

Midterm Exam: 25%

Final Exam: 50%

Class Participation: (1) Each class, one designated team will be called upon to discuss their analyses of cases. There should be 10 teams, and each team should have 4 to 5 members. (2) In addition to the designated team members, randomly selected students will be called upon during a class session to discuss case analyses or assigned problem sets, and they will be evaluated based on evidence of preparation to participate in the class discussion. (3) Attendance will be checked and recorded.

Problem Sets: In order to learn this material effectively, you must apply it, which means you must work problems. Short problems and/or very small cases will be regularly assigned. These problems are designed to help you learn the mechanics of the methods covered in class and to give you an opportunity to apply the concepts in simple and illustrative contexts. These problem sets will not be turned in and will not be graded, but they will help you prepare for the midterm and final exams. Solution sets will be distributed for your reference.

Midterm/Final Exams: The midterm exam will be an in-class 1.5-hour long open-book and open-notes exam. The final exam will be an in-class 3-hour long open-book and open-notes exam on all of the topics of this course. You are strongly encouraged to bring a pocket calculator.

Emergencies: If you have to miss an exam for a university-authorized reason, you need to talk to the instructor beforehand. Otherwise you will receive a zero for the portion that you missed unless there were unforeseen circumstances.

Laptop and Electronic Communications Policy: You need to bring a laptop with Microsoft Excel to each class. However, you are not allowed to check e-mail or send text messages using your cell phone or laptop. Set your cell phone to silent mode.

Course Schedule:

ID	Date	Topics	Readings	Cases	Problem set
1	3/16	Introduction to the Course	Syllabus; Notes (1)	NSA Conference	
2	3/18	Modeling Decision Problems	QBA Ch.1 & 2	QBA Case 4	
3	3/30	Decision Trees	Notes (2); QBA Ch. 3	QBA Case 21	
4	4/1	Linked Decisions	QBA Ch. 4 & 5	QBA Case 27	HW Set 1
5	4/6	Value of Information	QBA Ch. 6	QBA Case 24	
6	4/8	Uncertain Quantities	QBA Ch. 4 & 11	QBA Cases 22 & 23	HW Set 2
7	4/13	Midterm Exam			
8	4/15	Risk Management	QBA Ch. 6	QBA Case 25	
9	4/20	Probability Assessment	QBA Ch. 11; Notes (3)	QBA Case 10, 11	
10	4/22	Simulation Analysis	Notes (4), (5)	QBA Case 12	
11	4/27	Simulation and Real Options	Notes (6)	Chance Encounters	HW Set 3
12	4/29	Multiattribute Value Models	QBA Ch. 8; Notes (7)	Dave Armstrong (A); Dave Armstrong (B)	
13	5/4	Multiobjective Risk Analysis		CBA Associates	HW Set 4
14	5/6	Course wrap-up; Q&A			

Notes: (1) Learning by the Case Method (HBS 9-376-241).

(2) Decision Trees Using TreePlan.

(3) Sensitivity Analysis Using SensIt.

(4) Analyzing Uncertainty: Probability Distributions and Simulation (UVA-QA-0660).

(5) Monte Carlo Simulation Using RiskSim.

(6) Real Options (UVA-QA-0639)

(7) Exercises on Tradeoffs and Conflicting Objectives (HBS 9-396-307)

Cases:

Chance Encounters (UVA-QA-0601)

Dave Armstrong (A) (HBS 9-396-300)

William Taylor and Associates (A) (UVA-QA-0241)

Dave Armstrong (B) (HBS 9-396-301)

The NSA Conference (UVA-QA-0492)

CBA Associates (UIUC Case)

Case Questions

Class 1

Prepare *The NSA Conference* case. Specifically, perform appropriate analyses (as far as you can do) and make a recommendation to Ms. Poteat regarding the location for the NSA Conference. Make sure to consider (a) the uncertainties described in the case, and (b) the full range of NSA's objectives. (In other words, this problem is not only about maximizing NSA's profit from the conference.) Make sure to include any insights or advice you think might help her to "sell her decision to management." (Don't worry about getting all the analyses right; you haven't learned all the tools yet!)

Class 2

Read and analyze the case *Athens Glass Works* (Case 4 in the Quantitative Business Analysis book). The assignment question for you to prepare is: Focusing only on the two prices discussed by Christina Matthews and Robert Alexander, which price would you recommend: \$2.15 or \$2.35? Be prepared to discuss and defend your analysis.

Class 3

Prior to this class, you will need to read and analyze the case *Freemark Abbey Winery* (QBA Case 21). In preparing your analysis, address the following questions:

- Describe the various strategies available to Jaeger and evaluate the consequences of each.
- What would you recommend to Jaeger?
- To Jaeger's surprise, the current edition of *Vintner's Monthly* contained an article on botrytis mold. Upon reading this article, his belief regarding the formation of the mold after a storm was reduced to only a 20 percent chance. Does this change your recommendation? How important is this probability to your recommendation?
- You can never be sure about the weather. In this situation, what would it be worth to you to know for certain whether or not the storm would hit?

Class 4

This session will focus on QBA Case 27, *International Guidance and Controls*. Your assignment question is:

- What would you recommend to Mr. Stearns? Explain the basis for your recommendations.
- Note: This is a deceptively short case. You may quickly discover that the analysis is more complex than you first thought. In developing your analysis and recommendation, I strongly

suggest that you ignore the time value of money. Issues surrounding the timing of cash flows tend to cloud the discussion of the critical decision issues. You can always go back and refine your analysis if you think that time value makes a difference.

Class 5

Read Case 24, *George's T-Shirts*, and address the following questions:

- What are the possible financial outcomes if George orders 5,000 t-shirts? 7,500? 10,000?
- How many t-shirts should George order?
- What is the most George should be willing to pay to find out what attendance will be prior to making a decision?
- What is the most George should be willing to pay to find out about the popularity of the t-shirt prior to making a decision?

Class 6

Prepare *Galaxy Micro Systems & Supplement* (QBA Cases 22 & 23).

- Using the probability information provided in the main Galaxy case (but not the supplement), perform an analysis. What would you recommend to Jansen about how she should respond to the pricing alternatives proposed by the service franchiser?
- The Galaxy Micro Systems Supplement includes some refined forecasts. Suggest ways to incorporate this new information into the analysis.

Class 7: Midterm exam.

Class 8

Prepare QBA Case 25, *Harimann International*. In preparing your analysis, address the following questions:

- What is your appraisal of Dhawan's preliminary evaluation of the Pioneer order?
- What would you recommend to Dhawan regarding the Pioneer order?
- Are there means by which he can reduce the risks of accepting the order? Which appear to be most promising?

Class 9

Read and analyze *CyberLab (A)* and *CyberLab Supplement* (QBA Cases 10 & 11). I will also post a spreadsheet (CyberlabA.xls) to help you get your analysis started. Make sure your analysis addresses the following questions.

- Appraise the CyberLab proposal from the PRICO point-of-view. What are the appropriate measures of performance for valuing the CyberLab manufacturing company? Be prepared to discuss the assumptions that went into development of the income statement.
- Would you recommend that PRICO accept the proposal? If not, how might you structure a counter-offer to Friedlander? Make changes to the CyberLab spreadsheet that you feel are necessary to carry out your analysis.
- What are the key uncertainties that will affect the performance of the investment/marketing venture?
- Use the information in the Supplement to determine probability distributions for the uncertain quantities. Think about how you might go about using these probabilities to determine the best course of action. Note: This question is not asking you to actually compute expected values. We will return to this case and use the information you have developed here next class, when we analyze CyberLab (B).

Class 10

Read *CyberLab (B)* (QBA Case 12). You will certainly also need to refer back to our earlier analysis of the (A) case and the Supplement.

- In light of the facts of the (B) case, evaluate the investment/marketing opportunity from the point of view of PRICO. Should PRICO accept the opportunity?
- Propose and evaluate counter-offers that you might wish to carry into any negotiation with CyberLab.

Class 11

For this class, we will analyze the *Chance Encounters* case. Assume the role of David Fitzhugh, the respected movie-industry analyst. In the interests of simplicity, ignore taxes. Assume that Fitzhugh's client will go ahead with the sequel only if rental revenues from the original exceeds \$160 million. What would you recommend with respect to purchasing the sequel rights for \$2 million? Is the result sensitive to your assumptions?

For your information, Fitzhugh's forecast of rental revenues for *Chance Encounters* is following:

Forecast (\$millions)	Fractile
12	Minimum
15	0.05
29	0.25
50	0.50
100	0.75
160	0.95
350	Maximum

Class 12

- Read the *Dave Armstrong (A)* case. Describe the decision that Dave faces. What advice would you give him that would help him to make a sound decision?
- Read *Dave Armstrong (B)*. Review Exhibit 1. Are the numbers consistent with Dave's goals and objectives? What additional analysis, if any, should Dave perform?
- Prepare Questions 1 through 3 in *Exercises on Tradeoffs and Conflicting Objectives* (Question 4 is optional).

Class 13

Read the CBA Associates case. Perform analyses to address the questions at the end of the case.