

## SYLLABUS QUANTITATIVE DECISION ANALYSIS 5411 B12

Fall Semester 2012 -13 Quad B

2 Credit hours

Course Facilitator: John Bonie

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Office Hours:

M, W, F 11:00 am - 4:00 pm Please be sure to call first to arrange a time

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Introductory Comments: This is a course designed to help the students with mathematical modeling and using these models to aid in the decision making process. The work will be broken down into seven weeks and three modules. Module one will be statistics and forecasting, module two will be decision analysis, and module three will be linear programming. The method I like to use is called problem based learning, this requires each student to get involved and help solve the problem. Class participation is a part of the grade each of you will be receiving, and the rules or rubrics, and expectations will be laid out later. This is one of the difficult aspects of learning, building community. The first task will be introductions and each person's experience all to help build community and friendship. Some students may not have had any statistics or mathematics for some time, so I will make myself available for hand holding and extra help. I would also encourage all learners to get to know each other and help those in need of assistance.

Course Description and Participant Learning Objectives for Course: This course is designed to help students learn a logical, rational approach to the decision making process. The title of the course (Quantitative decision Analysis) suggests that mathematical modeling is used to aid us in the decisions process, as is the five step scientific approach. Statistics is a prerequisite for the course and will be used throughout to determine statistical significance, it's not enough just to come up with an answer you must prove that is significant. Many managerial problems revolve around quantitative factors such as production quantities, revenues, costs, and so on. By incorporating these quantitative factors into a mathematical model and then applying mathematical procedures to solve the model, this course provides a powerful way to analyze managerial problems. This course is concerned with the practical solutions of management, including taking into account qualitative factors, but its special contribution lies in this unique ability to deal with the quantitative factors.

Learning Objectives:

1. After the first week, the learner will be able to define the term management science. The task would be discussed in the virtual classroom and agreed upon by all learners. The definition then becomes part of the class and will be assessed during the semester.
2. After the first week the learner will be able to differentiate between qualitative and quantitative analysis. This must be performed over and over again during the semester. This task will be assessed in the course.

3. After the second week, the learner will be able to construct a mathematical model. The task will be performed using case studies. The students will be able to quantify a word problem, and this will be assessed and discussed among the classmates.
4. After two weeks the learner will be able to outline the steps in the forecasting process. This task will be quizzed and assessed by using problems and cases. The learner will be able to outline all forecasting problems. The results will be shared and presented.
5. After week three, the learners will be able to describe averaging techniques, trend and seasonal performed techniques, and regression analysis, and solve typical problems. These tasks will be through assignments and cases. The results will be shared with all students and assessed.
6. After four weeks, the learners will be able to identify the business decision making environment. This task will be a group project and the final result will be part of the data base.
7. After week four, the learners will be able to perform decision making computations including payoff tables and decision trees. This task will be performed by assigning cases and problems to the students. The answers will be shared and discussed and finally assessed.
8. After five weeks, the learners will be able to describe and use techniques that apply to the linear programming process. This task will be tested through the use of cases and problem sets. The answers will be shared with all students.
9. After week five, the learners will be able to construct an algebraic linear programming problem and they will graph the solution. The students will present their findings to all the other learners assess each other.
10. After week six the students will be able to formulate and run a linear programming problem. The results will be presented and shared. The other students will make comments and assess the results.

#### Required Texts:

Quantitative Analysis for Management Prentice Hall ISBN 0-13-603625-2, 10th Edition, by Render, Stair, and Hanna

Additional Readings: A statistics interactive software program will be provided in the textbook package (POM).

#### Course Teaching and Learning Methods:

Some of the course is static, assignments, quizzes and cases will be due on certain dates at specific times. Other deadlines or milestones will be dynamic. The group as a whole will determine how to go about solving problems and cases. This will involve problems and assignments posted by the facilitator two to three times a week. The problems and possible solutions should not necessarily be directed to the facilitator, but to the group as a whole to kick around and brainstorm with other students as well. The method used is called problem based learning. The facilitator expects that each student will provide constructive and timely feed back to other class members. The course facilitator may also provide feedback and even hints as needed to solve a problem. Grading will of course be given privately for each assignment and for term grades.

#### Course Schedule and Outline:

Week 1

Learning Objectives: After the first week the learner will be able to differentiate between qualitative and quantitative analysis, describe the use of modeling, use computers and spreadsheet models, understand the foundations of probability analysis, describe independent and dependent events, describe and explain the distributions, and calculate expected values and variances.

Readings: Chapters 1 and 2 in the textbook

Assignments: Define the term Management Science as it pertains to your organization. Post your definition on the Website for analysis and positive comments from all learners. Try to solve problems 2-14 Through 2-20 at the end of chapter two.

Distinguish between quantitative and qualitative decision analysis. Use the computer to help solve these problems. You will need to distinguish between dependent and independent events, discrete and continuous distributions, and calculate expected values and variances. These problems must be posted no later than 12:00 midnight on the Friday at the end of the first week.

Week 2:

Learning Objectives: After the second week, the learner will be able to construct a mathematical model. The task will be performed using case studies. The students will be able to quantify a word problem, and this will be assessed and discussed among the classmates. Additionally, students will be able to outline the steps in the decision making process, make decisions under uncertainty, use probability to make decisions under risk, use your computer to help solve decision-making problems.

Reading: Chapter three in the textbook.

Assignment: Post problems you are experiencing. Why would anyone want to know this kind of material? How would you explain the results to a group of managers? Is there other qualitative data you might want to know? How did you set up your mathematical model? Why did you set it up this way? Does this make sense to you? What help can your peers or I give to you? By the end of week two each student must try to solve problems 3-16 and 3-17 at the end of chapter three. As a part of these problems the students must decide the type of decision, the criterion, and which alternative is best.

Week 3:

Learning Objectives: After week three, the learners will be able to describe averaging techniques, trend and seasonal techniques, and regression analysis, and solve typical problems. These tasks will be performed through personal experience and a real world problem. The results will be shared with all students and assessed.

Reading: Chapter four in the textbook.

Assignment: Use a company or organization that you are familiar with to construct a forecasting problem and solve using regression as the model. Be sure you include F-ratios and t-tests to prove significance. Explain the alpha or intercept, as well as the beta or regression coefficient. How will you use this to forecast? Is there a homo or heteroscedastic condition present?

Please post all this data on the website for all learners to read and discuss. A grade will be assigned for all the work presented up to this date. The final forecast is due on the Friday of the third week at 12:00 midnight.

Week 4:

Learning Objective: After four weeks, the learners will be able to understand and know when to use various families of forecasting models, compare moving averages, exponential smoothing, and trend time series models, and seasonally adjusted data.

Reading: Read chapter 5 in your text.

Assignments: Please use the data from week three to forecast using smoothing or seasonal techniques. Use the same organization previously used to come up with a forecast. Students must be able to prove whether the model is significant or not at the 5% level of significance, this means using the F-test, and t-test. Each student must decide which model is best and how the results are explained.

Week 5:

Learning Objectives: After five weeks, the learners will be able to describe and use techniques that apply to the linear programming process. Students will be able to graphically solve any linear programming problem that has two variables, understand special issues in LP such as infeasibility, unboundedness, redundancy, and alternate optimal solutions. Learners will be able to construct an algebraic linear programming problem and graph the solution. The students will present their findings to all the other learners and they will assess each other.

Reading: Chapter seven in the textbook.

Week 6:

Learning Objectives: After week six the students will be able to formulate and run a linear programming problem. This task will be performed using problems the students see at work or in their organizations. The results will be presented and shared. Each student will be able to understand major application areas, including marketing, production, transportation, and finance. Students will use one of these areas to solve a real world problem. The POM software should be used to help solve these problems. The other students will make comments and assess the results.

Reading: Chapters eight and nine in the textbook.

Assignment: Each student should use a real world organization and create a linear programming problem that would be of service to the organization. Hopefully this would be the same organization used in the forecasting module and decision making module, but may be different with the permission of the facilitator. This may require a great deal of hand-holding, and I would encourage all students to help each other for a start. I promise not to let you get too frustrated, so I will monitor the discussion. I would like to see the algebraic model by Friday at midnight at the end of the sixth week.

Week 7:

Final Assignment: The optimal solution and all explanations for the linear programming that the students created in week six are due at the end of week seven (Friday Midnight). The paper should be no longer than 10 pages in length. The papers should be posted for all students to see. Every student will look over all fellow students' assignments. Pick two

students to assess and grade; do not pick ones that already have two assessments posted. The assessments are due by the following Monday at midnight. I will look at all the comments and assign a grade for the project.

Assignments:

A final grade for this course will be computed according to your successful completion of the following assignments:

- 1. Blackboard Discussion Forum                    21 maximum points
- 2. Skill Building Assignments                    300 maximum points
- 3. Written Assignments                            12 maximum points
- 1. Week 1: Definition and examples, due Friday Midnight. Maximum 6 pts.
- 2. Week 2: Post problems and forecasts, due Friday Midnight. Maximum 6 pts.
- 3. Week 3: Forecast a real world problem using regression analysis as the quantitative technique. 100 pts max (due midnight Friday) Plus 3 points
- 4. Week 4 Use time-series analysis to forecast the data from week three. 100 pts max (due midnight Friday) plus 3points
- 5. Week 5 Start the linear programming module and enter results from the practice case in the text. 6 pts max. (due midnight Friday).
- 6. Week 6 State the objective and put into an equation a real world problem using the ongoing organization you are familiar with. 6 pts (due midnight Friday)
- 7. Week 7 Post the final paper with the results and explanation of the linear programming problem continued from week six. 100 pts max (due midnight the following Friday after the seventh week )plus 3 points

Please be aware that your instructor will not accept late submissions of any papers, projects, assignments, or other forms of assessment. If you have an emergency or circumstances beyond your control, please be sure to call to see if any arrangements can be made.

Criteria for Grading Blackboard Discussion Forum Participation

Your postings should be thorough and thoughtful. Just posting an “I agree/disagree with your comment” or an “I think the same” to someone else’s thoughts is not considered to be an adequate response. Your posts will be graded on a weekly basis according to the following criteria:

There are a total of three points possible each week.

Category	3 pts- Meets Standards	2 pts -Approaching Standards	1 pt- Below Standards	Score
Discussion Board Forums	Each student has entered into the board forum three times and left attachments.	The learners have entered the forum but only entered into the weekly discussion two	The students have entered into discussions once or never.	

		times.		

Rubric for grading written assignments:

3 points possible each week

Category	3pts meets standards	2 pts approaching standards	1 pts below standards	Score
Problem setup	The student set up the problem correctly, solved it correctly, and explained all the numbers.	The student set up the problem correctly, got an incorrect answer, but explained all the numbers.	The problem was set up incorrectly, the answer is wrong, and not all the numbers are explained.	
Report	The question is answered, proved to be significant, and reliable.	The question is answered but no proof of significance or not reliable.	The main question is not answered, there is no proof of significance, and not shown to be reliable.	
Language	The student used correct English, the report is concise and summary is correct.	The student used correct English, the report wandered and did not zero in on the solution, and the summary was not totally correct.	The student did not use correct grammatical skills, the solution was off and the summary was not correct.	

Rubrics for the projects:

90-100 points Projects are scientifically defined, appropriate models used, solved properly and, well defined.

80-89 points Projects are defined, appropriate models used, solved properly, and explained.

70-79 points Projects are defined, models used, solved, and explained.

69 and less Projects are not well defined, wrong models used, and not well explained.

Total Points Earned:	Final Grade
323-333	A+
307-323	A
300-306	A-
296-299	B+
290-295	B
266-289	B-
257-265	C+
250-256	C
233-249	C-
Below 233	F

#### Participant Responsibilities:

1. Attendance, presence, and full participation are required for this class. You cannot successfully complete this course without completing the weekly readings and assignments.
2. Some assignments will be posted on-line for others to see. You will be asked to comment and provide feedback to one another on your work.
3. Although I strongly suggest that all issues, questions, and problems be dealt with online, you can feel free to call or e-mail me regarding these issues at any time, noting the office hours I am available.
4. Use proper "netiquette" (see A Guide to Netiquette in Course Information folder on Blackboard).
5. I normally advise participants to plan on spending [80] hours total on course responsibilities (e.g. reading, assignments, online discussion). (Usually 10-12 hours a week for a 2 credit hours course is the expectation.)

#### Course Facilitator Responsibilities:

1. The course facilitator will design the course and learning modules in such a way that students have every opportunity to achieve the learning objectives.
2. The course facilitator will provide reactions to student responses and discussion as appropriate in order to clarify important ideas and concepts.
3. The course facilitator will provide opportunities for group work that will include discussion as well as hands-on exercises.

4. The course facilitator will provide updated information on relevant resources for the various topics of interest.

5. The course facilitator will read and critically assess students' assignments and provide feedback within 3 days of receipt.

6. The course facilitator will respond to all student e-mails within 48 hours of receipt. The course facilitator will respond to all student phone calls within 48 hours.

#### Computer Requirements:

In order to effectively participate in and successfully complete this course, each participant will need to have access to a computer and a high-speed internet connection. Apple computers will not work with the software from the text! Please visit <http://www.northpark.edu/cs/support/minreq.aspx> for information on computer requirements and <https://www.northpark.edu/cs/support/config.aspx> for network access.

#### Academic Honesty:

In keeping with our Christian heritage and commitment, North Park University is committed to the highest possible ethical and moral standards. Just as we will constantly strive to live up to these high standards, we expect our students to do the same. To that end, cheating of any sort will not be tolerated. Students who are discovered cheating are subject to discipline up to and including failure of a course and expulsion.

Our definition of cheating includes but is not limited to:

1. Plagiarism – the use of another's work as one's own without giving credit to the individual. This includes using materials from the internet.
2. Copying another's answers on an examination.
3. Deliberately allowing another to copy one's answers or work.
4. Signing an attendance roster for another who is not present.

In the special instance of group work, the instructor will make clear his/her expectations with respect to individual vs. collaborative work. A violation of these expectations may be considered cheating as well.

For further information on this subject you may refer to the Academic Dishonesty section of the university's online catalog.

#### Support Services:

Please see the Course Information button in your course in Blackboard for the Student Support document if you need assistance during your course.

#### Disabilities Accommodations:

Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the program's office. Please do so as soon as possible to better ensure that such accommodations are implemented in a timely manner. For further information please review the following website: <http://www.northpark.edu/ada>