

Inter American University of Puerto Rico
Metropolitan Campus
Faculty of Economics and Administrative Sciences

MBA PROGRAM

Syllabus

I. General Information

Course Title: Quantitative Methods for Decision Making

Code and Number: BADM 5010

Credits: 3 Credits

Academic Term: Trimester August- October 2009 (2010-13)

Professor: Dr. Milly Varas

Office Hours: Tuesdays and Thursdays 1:30-2:30 pm

Phone Number: (787) 250-1912 ext. 2321 and 2493

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II. Description:

Study of the quantitative methods for decision making, in particular the application of mathematical and statistical models in the analysis of problems related to economic and administrative sciences. The main topic includes probability and decision making analysis, game theory, analysis under uncertain conditions, and network analysis. Includes simulations.

III. Objectives:

At the end of the course the student will be able to:

- 1) Identify and diagnosed problems.
- 2) Select the quantitative technique or model appropriate in problem solving and decision making situations.
- 3) Apply various quantitative models in decision making situations.
- 4) Interpret results and the impacts they have upon the problems being studied.
- 5) Decide the appropriate course of action based on the quantitative analysis performed.
- 6) Integrate the quantitative methods learned for making decisions within an organization.
- 7) Explain decisions based on quantitative elements.

IV. Course Content

- A) Basic principles of quantitative analysis:
 - 1. Define the problem
 - 2. Develop the model
 - 3. Obtain data
 - 4. Develop a solution
 - 5. Proof of solution
 - 6. Analysis of results
 - 7. Analysis of sensitivity
 - 8. Implement

- B) Development of a quantitative model:
 - 1) Steps in the development of quantitative models
 - 2) Advantages and disadvantages of quantitative models
 - 3) Categorize the models according to their risk factors

- C) Concepts of applied probability:
 - 1) Types of probability
 - 2) Mutually exclusive events
 - 3) Statistically independent events
 - 4) Statistically dependent events
 - 5) General form for Bayes theorem
 - 6) Random variables
 - 7) Probability distribution models such as: binomial, normal, exponential, and Poisson.

- D) Fundamentals for decision making models
 - 1) Types of interest such as: simple, compound, and continued compound.
 - 2) Risk based decision making
 - Expected monetary value(Future value, present value, periodic payments)
 - Expected value of perfect information
 - Opportunity losses
 - Sensitivity analysis
 - 3) Decision making under uncertain risk conditions
 - Limits: concepts applied to visualization of graphs
 - Derivative rules
 - Maximum
 - Hurwicz criteria
 - Minimum
 - 4) Marginal analysis with multiple alternatives

- Discrete distribution
- Normal distribution
- 5) Tree diagram for decision making
 - Deterministic analysis
 - Probabilistic analysis
- 6) Utility theory
- E) Linear programming
 - 1) Construction of a linear model
 - 2) Function
 - 3) Variables
 - 4) Restrictions
 - 5) Maximizing
 - 6) Minimizing
 - 7) Graphic solution
 - 8) 4 special cases for linear programming
 - 9) Sensitivity analysis
- F) Networking models
 - 1) Minimal spanning tree technique
 - 2) Maximum flow technique
 - 3) Shortest route technique
- G) Simulation
 - 1) Monte Carlo simulation
 - 2) Problems with rows simulations
 - 3) System simulation
 - 4) Operational games
 - 5) Verifying and validating
- H) Gaming theory
 - 1) Minimum criteria
 - 2) Pure strategy games
 - 3) Mix strategy games

V. Activities

- A) The course should provide the maximum number of computer applications available for problem solving. Showing your work is necessary in solving exercises and problems for the course.
- B) The course should use the applications CD use in problem solving that accompanies the textbook to solve assigned cases studies.
- C) The student is responsible to read the assigned materials.

VI. Evaluation criteria

- a. On-line quizzes-----100 pts (25%)
- b. Case studies-----100 pts (25%)
- c. Applied exercises-----100 pts (25%)

d. Discussion forums-----	100 pts (25%)
Total-----	400 pts (100%)

VII. Special Notes

A. Special Accommodations

Students who require special accommodations must request these services at the beginning of the course as soon as they notice that they need help. Students can access this service with Professor Jose Rodriguez, Coordinator of Students with Special Needs at the Guidance and Counseling Office on the first floor at Metro's Student Center.

B. Plagiarism

Plagiarism, dishonesty, fraud and any other type of manipulation or inappropriate behavior related with academic performance are unacceptable in our institution. Disciplinary actions will be taken on students found guilty of such practice as established in Chapter V, Article 1, Section B.2 of the Student's Rules and Regulations handbook.

<http://metro.inter.edu/servicios/documentos/reglamentosestudiantes2006.pdf>

Inter American University has very strict regulations regarding plagiarism (using the ideas or words of others without giving proper credit), so it is important that you specifically read Chapter 5, Article 1, Section B.2c of the Student's Rules and Regulations Handbook. This section clearly explains what plagiarism is. In addition, it explains the types of sanctions students are exposed to when they commit it.

C. Use of Electronic Devices

Cellular (mobile) telephones and any other electronic device that could interrupt the teaching-learning process or disrupt a milieu favorable for academic excellence will be deactivated. Critical situations will be dealt with in an appropriate manner. The use of electronic devices that permit the accessing, storing or sending of data during tests or examinations is prohibited.

VIII. Educational Resources

Textbook

Render, B., Stair Jr., R.M. & Hanna, M.E. (2003). **Quantitative Analysis for Management.** (10th. Ed.). Prentice Hall.

Case Studies

Chapter 1: “Food and Beverages at Southwestern University Football Games”

Chapter 3: “Starting Right Corporation”

Chapter 7: “The Mexican wire Works”

Chapter 15: “Alabama Airlines”

Supplementary readings

Douglas A. Lind, William G. Marchal, and Samuel A. Wathen (2005) **Statistical Techniques in Business and Economics,**(12th Ed.). McGraw-Hill

Lowery and Stover (2001). **Managing Projects with Microsoft Project 2000.** New York: John Wiley and Sons.

Mantel, Meredith, Shafer and Sutton (2001). **Core Concepts of Project Management.** New York: John Wiley and Sons.

Powel Stephen G. & Baker, Kenneth R. (2004). **The Art of Modeling with Spreadsheets.** John Wiley and Sons.

Reid, R. Dan & Sanders, Nada R. (2005). **Operations Management and Integrated Approach.** (2nd. Ed.) New York: John Wiley and Sons.

Wren, D. (1994). **The Evolution of the Management Thought.** (4th. Ed.). New York: Wiley and Sons.

IX. Bibliography

Douglas A. Lind, William G. Marchal, and Samuel A. Wathen (2005) **Statistical Techniques in Business and Economics**, (12th Ed.). McGraw-Hill

Online resources:

- Operations Research/Management Science Today (<http://lionhrtpub.com/ORMS.shtml>)
- INTERFACES Online
(http://pubsonline.informs.org/main/browse.php?action=issues&user=ZlanGMk=&journal_id=1)
- Course Related Online Resources (<http://www.csulb.edu/~obenli/resources.html>)

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