Syllabus

I. General Information

Course Title: Quantitative Methods for Decisions Making

II. Course 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. Course 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. Educational Resources

Textbook

Render, B., Stair Jr., R.M. & Hanna, M.E. (2003). **Quatitative 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.

VIII.   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)

IX. Special Notes
    Nota sobre servicios auxiliares o asistencia especial.
        Todo estudiante que requiera servicios auxiliares o asistencia especial deberá solicitar los mismos al inicio del curso o tan pronto como adquiera conocimiento de que los necesita, mediante el registro correspondiente en la oficina del consejero profesional José Rodríguez, Coordinador de Servicios a los Estudiantes con Impedimentos, ubicada en el programa de Orientación Universitaria.

        Advertencia en honradez, fraude y plagio, según se dispone en el Capitulo V, Articulo 1 del RGE.

El plagio, la falta de honradez, el fraude, la manipulación o falsificación de datos y cualquier otro comportamiento inapropiado relacionado con la labor académica son contrarios a los principios y normas institucionales y están sujetos a sanciones disciplinarias, según establece el Capitulo V, Articulo 1, Sección B.2 del RGE.