QMTS5309 Quantitative Analysis and Decision Theory for Business
Sul Ross State University – Rio Grande College
Dr. Wayne E. Smith

Course description:

A study of decision-making under uncertainty, decision-making under risk, decision trees, utility theory, linear regression, time series forecasting models, linear programming (graphical method and simplex method), and project management (PERT/CPM).

Course Objectives:

1. Knowledge: Students will obtain the knowledge of decision-making under uncertainty, decision-making under risk, decision trees, utility theory, linear regression, time series forecasting models, linear programming (graphical method and simplex method), and project management (PERT/CPM).
2. Comprehension: Students will be able to understand and explain the theories, principles, and concepts of the above topics.
3. Skills: Students will possess the mathematical and computer skills concerning the above topics.
4. Analysis: Students will be able to analyze a linear programming problem, probability distribution of returns, decision trees, and utilities.
5. Prediction: Students will be able to do a forecast (of sales, profits, etc.) using the methods of linear regression, moving average, and exponential smoothing.
6. Evaluation: Students will be able to evaluate a distribution of returns and a decision tree in terms of monetary values and utilities. In addition, students will be able to evaluate the completion time and cost of a project using PERT/CPM.
7. Decision Making: Students will be able to apply the appropriate decision methods to various situations.

Assignments:

Week beginning	Module Topics	Readings	Assignments (found in the Discussion Questions and Problems (DQ&P) at the end of each chapter)
08/24/15	Quantitative Analysis	Chapter 1	DQ&P 1-14, 1-16, 1-18
08/31/15	Probability Concepts	Chapter 2	DQ&P 2-36, 2-38, 2-50, 2-51

Date	Topic	Chapter	Assignments
09/07/15	Decision Analysis	Chapter 3	DQ&P 3-21, 3-29, 3-43
			Submit final project topic for approval – See final project section below
09/14/15	Regression Models	Chapter 4	DQ&P 4-20, 4-21, 4-22, 4-25, 4-26
09/21/15	Forecasting	Chapter 5	DQ&P 5-14, 5-15, 5-16, 5-28, 5-34
09/28/15	Inventory Control Models	Chapter 6	DQ&P 6-20, 6-31, 6-45
10/05/15	Linear Programming Models o Graphical methods o Computer methods	Chapter 7	DQ&P 7-17, 7-29, 7-38
			Submit copies of articles for final project – See final project section below
10/12/15	Linear Programming Applications	Chapter 8	DQ&P 8-19, 8-20
10/19/15	Transportation & Assignment Models Network Models	Chapter 9	DQ&P 9-42, 9-43
10/26/15	Integer Programming Goal Programming	Chapter 10	DQ&P 10-21
			Submit draft of final project – See final project section below
11/02/15	Project Management	Chapter 11	DQ&P 11-19, 11-34
11/09/15	Waiting Lines Queuing Theory	Chapter 12	DQ&P 12-9, 12-30
11/16/15	Simulation	Chapter 13	DQ&P 13-13
11/23/15	Markov Analysis	Chapter 14	DQ&P 14-13, 14-15
11/30/15	Statistical Quality Control	Chapter 15	DQ&P 15-20
			Submit final project
12/07/15			Final Exam

Final Project:

Find three academic articles dealing with an application of one of the Quantitative Methods studied in this course to a real world problem. All the articles should relate to the same, or at least very similar, problems. (See the examples below.)

Summarize the articles, in your own words.

Discuss the limitations of the quantitative methods in the context of the problem(s) that are the subject of the articles. Are these limitations inherent? Are the limitations in the information? Or in the analysis? Could they be overcome with more sophisticated methods?

Describe how the quantitative methods might be extended to analyze even more complex situations.

Explain the advantage of applying the quantitative method to the problem(s) described in the articles. How would the management of the situation be different if there were no such quantitative analysis?

> **Additional Issues**

Other questions you might try to answer include:

1. Are the problems in the articles identical? If not, how do they differ?
2. Are the techniques used to solve the problems identical? If not, how do they differ? Do they differ because the problems are different? or because there are alternative approaches to the same problem?
3. What assumptions are made in each of the articles? How do the assumptions in each of the articles differ from the assumptions in the others?
4. How do the quantitative analysis techniques used in the articles compare to any of the techniques in the textbook?
5. Could a simplified version of the problems be solved using any of the techniques in the textbook? How would the problem need to be simplified?

> **Topic Selection**

The three academic papers might all deal with the location of distribution warehouses relative to the location of retail outlets; simulating vehicular traffic at an airport; forecasting demand for hospital beds; forecasting semiconductor demand; inventory planning and control for a new product launch; balancing risk and return in a personal investment portfolio, depending on the age and other characteristics of the investor; pricing strategy for rooms in a motel chain;

creating school timetables; allocation of personnel and equipment for a freight-only airline; managing projects with no margin for error (e.g. Olympic Games); the application of queuing theory to providing data over a computer network; simulating effects of, and response to, natural disasters; quality control in automobile manufacturing.

Because the articles will all address the same (or very similar) problems, it is likely that they will also use the same (or very similar) techniques of quantitative analysis. For example, if all the articles are about motel room pricing strategy, it is likely that all the articles will be about linear programming. If they are all about planning for events with unalterable deadlines, they will likely all be about project management techniques. But this is incidental. You could choose three articles about national park access management, one of which uses goal programming, one uses linear programming, and one uses queuing theory. The important thing is that the articles all be about the same problem - not necessarily about the same type of mathematical model.

> Format
Your final project paper should be 2,000-3,000 words and follow APA 6th edition format. It must be submitted to BlackBoard and e-mailed to the instructor in MS Office Word format.

Grades:

Weekly Discussion Questions and Problems - 5% each week x 15 =	75%
Final Project	12%
Final Exam	13%
Total	100%

Text:

The required text for this course is *Quantitative Analysis for Management, 12th edition,* by Render, Stair, Hanna, & Hale. Pearson Education, Inc. © 2015.
ISBN-10: 0133507394
ISBN-13: 9780133507393

Contact Information:

Dr. Wayne E. Smith

Wayne.Smith@sulross.edu
469.955.2194 cell & text

Office Hours:

By appointment

Distance Education Statement:

Students enrolled in distance education courses have equal access to the university's academic support services, library resources, and instructional technology support. For more information about accessing these services, visit the SRSU website. Students should submit assignments through Blackboard or SRSU email, which requires secure login information to verify students' identities and to protect students' information. Students enrolled in distance education courses at SRSU are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the need and requirements of the course as outlined in on the SRSU website.