

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING
THE UNIVERSITY OF UTAH



CVEEN 6530 Quantitative Methods in Transportation

Syllabus
Spring 2012

Maximum Campus Enrollment: 20

Time: **Tuesday, 6:00PM-9:00PM (Mountain)**

Dates: **January 10, 2012 to April 24, 2012**

Room: Online, through the Web (Adobe Connect)

Required Course Text

The course will adhere closely to the following text: Spreadsheet Modeling & Decision Analysis, 6th Edition, author Cliff T. Ragsdale, ISBN-13: 978-0-538-74631-1.

Registration: Course Fee: \$950, Go to:

<https://continue.utah.edu/contracts/CVEEN/1124>

Course Description

The course provides an introduction to the most commonly used Operational Research techniques with an application through MS Excel. The problem-scenario approach introduces quantitative procedures through situations that include both problem formulation and technique application. The linear programming coverage includes problem formulation, computer solution, and practical application. The text covers transportation, assignment, and the integer programming extension of linear programming, as well as advanced topics like waiting line models, simulation, and decision analysis.

Instructor:

Dr. Peter T. Martin

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Virtual office hours: Tuesdays before class

Course Objectives

Transportation studies encompass a wide variety of disciplines. This course has been designed to

provide you with an insight into a variety of techniques of quantitative analysis. The syllabus matter comes from both the fields of Operational Research and Management Science. Many of the methods you will learn have application beyond the Transportation field. The learning should provide you with a sound understanding of the role of applied mathematical techniques plays in the decision making process

Course Goal

Transportation managers have to make decisions. These decisions are based on qualitative and quantitative information. This course addresses the management techniques that help in quantifying decisions.

Course Outcome

By the end of this course, providing you have participated, studied, and read, you should have a broad based understanding of the background to the quantitative techniques that help managers make decisions. You should be able to formulate simple managerial problems. "Formulate" is the process of converting measurable variables into simply mathematical relationships. You will not be an expert and you will not be able to address highly complex problems, such as:

"How best to integrate a new Light Rail System with and Existing Bus System so that revenue is increased by 75%, ridership is doubled, and the quality of service is improved by 35%"

You will, however, be able to:

- Formulate simpler problems
- Know of a variety of tools for the manager
- Be able to solve a wide range of problems
- Understand the limitation of each new tool
- Apply one or more of these methods as a case study

Workload

This is a 3-credit course. This means that you should be spending about 3 times the credit time in private study. Some parts of the syllabus will be more demanding than others; so don't be too rigid in your assessment. To earn a good grade, therefore, you'll need to be spending about 9 to 12 hours per week in private study. The lectures have one purpose: to facilitate your private study.

Attendance Requirements

All of the homework assignments will be posted. The class sessions will be seminar style and will help you with the homework assignments.

Schedule

Week	Class	Chapter
1	10-Jan-12	Introduction to Modeling & Decision Analysis
2	17-Jan-12	Introduction to Optimization & Linear Programming
3	24-Jan-12	Modeling & Solving LP Problems in a Spreadsheet
4	31-Jan-12	Sensitivity Analysis & the Simplex Methods
5	7-Feb-12	Network Modeling
6	14-Feb-12	Integer Linear Programming
7	21-Feb-12	Goal Programming & Multiple Objective Optimization
8	28-Feb-12	Nonlinear Programming & Evolutionary Optimization
9	6-Mar-12	Regression Analysis
	<i>13-Mar-12</i>	<i>Spring Break</i>
10	20-Mar-12	Discriminant Analysis
11	27-Mar-12	Time Series Forecasting
12	3-Apr-12	Introduction to Simulation Using Risk Solver Platform
13	10-Apr-12	Queuing Theory
14	17-Apr-12	Decision Analysis
15	24-Apr-12	Reading

Course Assessment Policy

Element	Value (%)	Purpose & Comments
Homework Assignments	45	<ul style="list-style-type: none"> Problems will resemble those discussed during the course Multiple choice Calculations Open book On-line
End Term Test	40	<ul style="list-style-type: none"> Problems will resemble those at chapter end Calculations & written Open book On-line 3 hours
Participation	15	<ul style="list-style-type: none"> attendance, assignments submitted

Grading Method

A	95	to	100
A-	90	to	95
B+	85	to	90
B	80	to	85

B-	75	to	80
C+	70	to	75
C	65	to	70
C-	60	to	65
D	55	to	60

Instructions for loading "Solver" to MS Excel

1. Go to www.solver.com/student
2. Fill out the form, the Textbook Code found at the front or back of your text book, and CVEEN6530 for the Course Code. Be sure to include a first and last name in the Name field.
3. Click the button Download Now. The download should start within 30 seconds.
4. You should see a dialog "Do you want to run or save this file?" Click Save to save the file, and run it later by double-clicking the filename Solversetup.exe.
5. The Solversetup.exe Setup program *may* prompt for a password and license activation code, which will be emailed to you. Just enter this password in the dialog.

Peter T. Martin, Last updated: January 3, 2012