Faculty of Economies and Administrative Sciences
Business Administration Department
Module Outline/Quantitative Analysis (1)

Course Title	Quantitative Analysis (1)	Course Code	BA 230

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Course Description

The objective of management science is to solve the decision-making problems that confront and confound managers in both the public and the private sector by developing mathematical models of those problems. These models have traditionally been solved with various mathematical techniques, all of which lend themselves to specific types of problems. Thus, management science as a field of study has always been inherently mathematical in nature, and as a result sometimes complex and rigorous.

The modelling techniques presented in this course are, in fact, used extensively in the business world, and their use is increasing rapidly because of computer and information technology. Therefore, the chances that students will use the modelling techniques that they learn from this text in a future job are very great indeed.

This course is a basic course of management science, the course covers decision making theory, decision making trees, and many linear programming subjects; Model formulation, graphical method, simplex method, transportation problems, Trans-shipment problems, and Assignment problems.

Course Objectives

The modelling techniques presented in this course are, in fact, used extensively in the business world, and their use is increasing rapidly because of computer and information technology. Therefore, the chances that students will use the modelling techniques that they learn from this course in a future job are very great indeed. As a result, the main objective of this course is to make these mathematical topics seem less complex and thus more palatable to undergraduate business students. In order to achieve this goal this course provides simple, straightforward explanations of often difficult mathematical topics by using lots of examples that demonstrate in detail the fundamental mathematical steps of the modelling and solution techniques.

Management science consists of more than just a collection of mathematical modelling techniques; it embodies a philosophy of approaching a problem in a logical manner, as does any science. Thus, this course not only teaches students specific techniques but also provides a very useful method for approaching problems.

Course Learning Outcomes

By the end of the course it is expected that students will be able to :

- Develop decision making tables and decision trees for business various situations.
- Determine the best decision by using the chosen decision-making criterion both with and without probabilities decision situations.
- Formulate the transportation, Trans-shipment, Assignment problems mathematical models and develop the initial related tableau.
- Solve the problem according to transportation, Trans-shipment, Assignment methods.
- Formulate business profit maximization and cost minimization problems according to linear programing (LP) principles.
- Solve LP mathematical models using the graphical method in order to find the optimal solution.
- Conduct the sensitivity analysis for the outcomes of LP graphical method results.
- Develop an initial simplex tableau for LP problems with three of more decision variables.
- Solve Simplex method problems for optimal solution in order to make the best possible decision.
- Conduct the sensitivity analysis for the outcomes of the final simplex tableau.

Course Content

1-Introduction to Management Science (Chapter 1 in the textbook)

- The Management Science Approach to Problem Solving
- Model Building: Break-Even Analysis
- Management Science Modelling Techniques
- Business Usage of Management Science Techniques
- Management Science Models in Decision Support

2- Decision Analysis (Chapter 12 in the textbook)

- Components of Decision Making
- Decision Making Without Probabilities
- Decision Making with Probabilities
- Decision Analysis with Additional Information

3- Transportation, Transshipment, and Assignment Problems (Chapter 6 in the textbook)

- The Transportation Model
- Computer Solution of a Transportation Problem
- The Transshipment Model
- The Assignment Model
- Computer Solution of an Assignment Problem

4- Module B: Transportation and Assignment Solution Methods (Supplemental material)

- Solution of the Transportation Model
- Solution of the Assignment Model

5- First Mid-term Exam (on Sat. 17/03/2018 at 11:00 a.m.), All sections together.

Course Content

6- Linear Programming: Model Formulation and Graphical Solution (Chapter 2 in the textbook)

- Model Formulation
- A Maximization Model Example
- Graphical Solutions of Linear Programming Models
- A Minimization Model Example
- Irregular Types of Linear Programming Problems
- Characteristics of Linear Programming Problems

7- Linear Programming: Computer Solution and Sensitivity Analysis(Chapter 3 in the textbook)

- Computer Solution
- Sensitivity Analysis

8- Linear Programming: Modelling Examples (Chapter 4 in the textbook)

- A Product Mix Example
- A Diet Example
- An Investment Example
- A Marketing Example
- A Transportation Example
- A Blend Example
- A Multi-period Scheduling Example

9- Second Mid-term Exam (on Sat. 21/04/2018 at 11:00 a.m.), All sections together.

10- Module A: The Simplex Solution Method (Supplemental material)

- Converting the Model into Standard Form
- The Simplex Method
- Simplex Solution of a Maximization Problem
- Simplex Solution of a Minimization Problem
- A Mixed Constraint Problem
- Irregular Types of Linear Programming Problems
- Sensitivity Analysis

11- Final Exam (to be arranged later), All sections included.

Teaching Methodology

The lecturer presents the course topics through direct teaching methodology, this will repeated in each class session, and this methodology will cover about 80% of class time. After presenting a topic, Group discussion methodology will be adopted to analyse cases related to the topics covered, the focus is on discussing the related topics and solve problems through applying techniques discussed in the lecture, or any issue the lecturer could present for discussion, this methodology will cover the rest 20% of the class time, as a part of lifelong learning students will be asked to access websites of telecommunication companies, operations and telecommunication associations, and societies to learn from real business experiences.

General Guidelines

Classroom Expectations, Rules, Procedures and Consequences

The expectations, rules, procedures and consequences of my classroom are intended to keep the classroom environment safe, orderly, and productive. Please respect the rules so that we can maximize learning time together. The rules are not hard to follow, nor are any of them "out of the ordinary." They are simply expected behaviours for university students in this classroom. If you have any questions about any of these rules, or why they are in place, you have the right to find out – please ask me as soon as possible. There should never be a rule that does not have a purpose! Thank you for your cooperation!

Class Expectations

1. Respect yourself, your instructor and others at all times.
2. Put forth your best effort at all times.
3. Be prepared for class each day: Come prepared with all materials necessary.
4. Preserve a positive learning environment: Student actions that interfere with teaching or learning in the classroom will NOT be tolerated.
5. Minimize classroom interruptions by arriving to class on time and not leaving the classroom during the hour.
6. You are able to absent 15% of classes, which equals 6 classes of (Sun., Tue, Th.) or 4 of (Mon, Wed), those who exceed the maximum limit will not be allowed to enter the final exam.
7. Take responsibility for your actions: if you are confronted about a rule infraction, own up to it. Don't deny it, lie about it, or blame someone else.

Class Rules

1. Turn off cell phones & electronic devices
2. No food or drink, except water allowed. You may drink bottled of water in the classroom.
3. Arrive to class on time & ready to learn: Be "physically" and "mentally" present in the classroom
4. Do not cheat, plagiarize, or copy work: Cheating is completely unacceptable. If I see you cheating on any assignment I will give you a zero and report the incident to the school deanship.

Textbook and Resources

- **Main Textbook**

  Taylor, Bernard W., *Introduction to Management Science*. 11th edition. Pearson Education, 2013.

- **Additional resources**

1- Render and others, Quantitative Analysis for Management. 11th edition. Pearson Education, 2012.

2- Anderson and others, Quantitative Methods for Business*. 12th edition. Cengage Learning, 2013*.