King Fahd University of Petroleum and Minerals
KFUPM Business School
Department of Information Systems and Operations Management

Course Syllabus for Management Science (OM 511)

First Semester 2025-2026 (251)

Instructor: **Dr. Igor Barahona**
Office No.: **24 / 291**
Office Phone No: 2639
Email: j.barahonatorres@kfupm.edu.sa

Section	**01**	**02**
Time	**UT 20:10-21:25**	**UT 17:20-18:35**
Location	**Building 24 Room 135**	**Building 24 Room 249**

Office Hours: **UT 10:00 am – 12:00 pm or by appointment**

Basic Text:

Practical Management Science by Winston and Albright, 6th edition.

Supplementary Book:

An Introduction to Management Science: Quantitative Approach to Decision Making by Anderson, Sweeney, Williams, Wisniewski and Pierron, 3rd edition.

Course Objective:

The purpose of the course is to provide students with a sound conceptual understanding of management science models and their role in analyzing the business and managerial decision making problems, and in determination of the best (optimum) course of action in any decision problem scenario, under limited resources.

The course is concerned with the wide variety of managerial decision-making models currently being used in the field of management science. Throughout the course, algebraic formulation and spreadsheets modeling will be used side-by-side to help develop conceptual thinking skills. Emphasis is placed not only on how these modeling approaches work, but also on how they can be applied and interpreted by the decision maker, using business, managerial, and industrial cases.

Several different application cases in each part of the course will be examined. Students are expected to use the spreadsheet modeling extensively throughout the semester to solve and to analyze the management science scenarios.

Course Format:

Example driven approach will be followed to convey the whole process of applying Management Science to analyze and decide upon business problems.

Students are expected to read the material in advance to be ready for discussion and presentation. Students might work in groups of 2-4 persons to prepare for the materials and make the presentations, assignments and required reports. All participants are expected to prepare well for the class discussion. Emphasis in the course will be on learning to apply Management Science techniques to address real world problems using a common purpose computer software packages, i.e. Excel Spreadsheet.

Course Outline:

Week	Topic/Chapter	Notes
1	Course introduction Introduction to Modeling	Ch.1 A&W
2	Introduction to graphical method and spreadsheet modeling	Ch.2 A&W
3	Introduction to Optimization Modelling (Linear Programming)	Ch.3 A&W + Handout
4	Introduction to Optimization Modelling (Linear Programming)	Handout
5	Linear Programming: Sensitivity Analysis and Interpretation of Solution	Handout
6	Linear Programming Applications: • Purchasing TV Ads Ex. • Employee Scheduling Ex. 4-2 • Worker and Production Planning at Sure-Step Ex. 4-3 • Blending at Chandler Oil Ex.4-4	Ch.4 A&W
7	Linear Programming Applications: • Drug Production at Repco Ex. 4-5 • Optimal Investment Strategy at Barney-Jones Ex.4-6 • Managing a Pension Fund Ex 4-7 • DEA in the Hospital Industry Ex. 4-8	Ch.4 A&W
8	Network Models: • Transportation Models: • Shipping Cars Ex. 5-1 • Production & Shipment of Automobiles at Varying Tax Rates Ex. 5-2 • Assignment Models: • Assigning School Buses to Routes Ex. 5-3 • Transshipment Models: • Producing & Shipping Tomato Products Ex. 5-4	Ch.5 A&W
9	**Mid-term Exam 21th October 2025**	
10	Network Models: • Shortest Path Model: • Shortest Walk across the States Ex. 5-5 • Equipment Replacement Ex. 5.6 • Network Models in Airline Industry: • Crew Scheduling at an Airlines Ex5.7 • Scheduling Flights at an Airlines Ex5-8	Ch.5 A&W
11	Optimizing Models with Integer Variables: • Capital Budgeting Models: • Selecting Types of Investments for a Company Ex.6-1	Ch.6 A&W

	• Fixed Cost Models: • Textile Manufacturing at Great Threads Ex. 6-2 • Manufacturing at Dorain Auto Ex. 6-3	
12	Set Covering and Location Assignment Models: • Bus Location at Western Airlines Ex. 6-4 • Locating & Assigning Service Centers Ex. 6-5 • Manufacturing & Distributing Fertilizer Ex. 6-6 • Cutting Stock Models: • Cutting Paper Rolls at Rheem Paper Ex.6-7	Ch.6 A&W
13	Goal Programming (GP) As a Multi-Objective Optimization Model	Handouts
14	Final Projects Presentations	
15	Final Projects Presentations	

Grade Policy

Grades should represent both the understanding of required concepts, and the ability to demonstrate competence in required skills. Grades represent both absolute and relative measures of student achievement in OM 511.

There are 9 components of the grade for this class. The distribution of the points for these components is as follows:

Evaluation

Attendance and participation	5%
Assignments	10%
Quizzes	10%
Mid Term written exam	20%
Phase I submission	10%
Final Exam written exam	25%
Phase II Final submission	20%

For the mid-term and final exams, make-ups will be arranged for students missing the exam ONLY for an excused reason. Please send your instructor an e-mail before exam so that the make-up can be arranged.

The questions in the exam will be related to the topics covered in the class lectures. The student should expect multiple-choice problems, true and false statements, essay questions or questions that require calculation.

Attendance:

The student is considered to be a responsible adult in a professional business setting. Formal attendance will be taken daily. A grade of "DN" will be given to students accumulating more than 1/5 of the total classes, i.e. six unexcused absences. Experience has indicated that those students who routinely attend and participate in class activities perform better on the exams in this course. If you must be absent, I appreciate if you can notify me by email.

How to study for the course:

- Spend some time on the course every day, whether you have class or not.
- Take good notes in class and review them frequently, comparing them to corresponding material in the text.
- As examples are worked in class, work them also on your own simultaneously.
- Read the chapter in the text prior to it's being covered in class.
- Study and review the examples in the text.
- Do all your homework and problem assignments.
- Do not miss classes, come late or sleep during the lectures.
- Pay attention and be alert to the topic being discussed.

I reserve the right to add or delete from this schedule and syllabus. Changes may be necessary to accommodate time constraints.