

Kuwait University
Department of Statistics and Operations Research

Course: Stat 250: Operations Research I

Course Type: 3 h of lecture + 1 h of lab

Credits: 3:0:3

Prerequisites: Math 111

Description: Introduction to deterministic models in operations research. Topics include linear programming, transportation, linear integer programming, network models, project management, dynamic programming, game theory.

Textbook: H.A. Taha, Operations Research: An Introduction, 10th edition.

Course Assessment

Assignments and quizzes

Mid terms

Final Exam

Topics to be covered

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| 1. Introduction to Operations Research | 1h |
| 2. Introduction to Linear Programming (LP) | 8h |
| • Formulation and applications | |
| • Solving LP problems graphically and using software | |
| • Interpreting the output of an LP problem (optimal solution and sensitivity analysis) | |
| 3. Transportation and assignment problems | 6h |
| • Definitions and applications | |
| • The transportation algorithm | |
| • The Hungarian method | |
| 4. Introduction to Linear Integer Programming (ILP) | 6h |
| • Formulation and applications | |
| • Solving ILP problems using software | |
| • Branch and bound solution method | |
| 5. Network Models | 6h |
| • Network Definitions | |
| • Shortest path problem | |
| • Minimal spanning tree | |
| • Maximum flow problem | |
| 6. Project Management | 6h |
| • PERT | |
| • CPM | |
| 7. Dynamic Programming | 6h |
| • Principle of Optimality | |
| • Forward/backward recursion | |
| • Deterministic dynamic programming (Traveling salesman problem) | |
| 8. Game Theory | 6h |
| • Formulation of a two-player zero sum game | |
| • Solving simple examples | |
| • Games with mixed strategies | |
| • Graphical solution procedures | |

Lab Component

During the lab sessions, students will use TORA, Excel, and/or GAMS to solve linear programming problems (including transportation, assignment, and network problems), to interpret the software output, and to draw appropriate conclusions. Students will also simulate the optimal solutions of some models and comment on their applicability.

Lectures will take place in the lab where an OR package will be used and students will be taught how to analyze the obtained results.