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**Syllabus of QUA 515 - Decision Models and Analysis**

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| **Batch: Semester II, 1441** | **Section: 358 & 4190** |
| **Number of Sessions: (15 weeks)** | **Credit hours: 2 Credit Hours** |
| **Course Instructor: Prof. Dr. Mahmoud M. ElSherbiny** | **E-mail: msherbiny@ksu.edu.sa** |
| **Office: Building 67, 2nd Floor, Office No. S246** | **Website: ………………….** |
| **Office Hours: …………...…** | **Lecture Time: 1:00 – 2:50** |

**Course Objectives:**

This course introduces the basic principles and techniques of applied mathematical modeling for managerial decision-making. Students learn to use some of the more important analytic methods (e.g. spreadsheet modeling, optimization, Monte Carlo simulation), to recognize their assumptions and limitations, and to employ them in decision-making

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| Weeks | Content |
| 1-2 | An Introduction to Decision Making |
| 3-5 | Problem Formulation and Modeling with LP |
| 6-7 | Graphical Solution of LP |
| 8-9 | Sensitivity Analysis and Computer Solution (QM) |
| 10 | Midterm Exam (30 % of total points) |
| 11 | Linear Programming: Modeling Examples |
| 12-13 | Transportation and Assignment Problems |
| 14-15 | Decision Analysis |

**Text Books Recommended:**

**1-**Bernard W. Taylor**, Introduction to Management Science.** Global Edition 13/E, Pearson 2019.

* For students to buy the book, please visit this website <https://www.amazon.co.uk/Introduction-Management-Science-Global-Bernard/dp/1292263040/ref=tmm_pap_swatch_0?_encoding=UTF8&qid=&sr=>
* To download the QM and other students resources, please visit this link <https://media.pearsoncmg.com/intl/ge/2019/cws/ge_taylor_13e/student_resources.html>

**2.** Hamdy A. Taha **, Operations Research: an introduction,** Education Limited . Tenth Edition , Pearson 2017.

**Schedule of Assessment Tasks for Students During the Semester**

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| Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| Midterm | 10 | 30% |
| Assignments and Case Studies |  | 30% |
| Final Exam |  | 40% |

**Course learning outcomes:**

1. **Knowledge**

❖ Define basic concepts of linear programming (LP) and its applications.

1. **2. Cognitive Skills**

❖ Explain the steps involved in formulation of LP model.

❖ Explain the steps involved in formulation of Transportation Problem.

❖ Explain the steps involved in solving the LP problem graphically.

❖ Explain the concepts of Sensitivity Analysis and Duality.

1. **Interpersonal Skills & Responsibility**

**❖** Demonstrate the application of the LP models in solving management problems.

1. **Communication, Information Technology, Numerical**

**❖** Demonstrate the application using computer software.