

**ASIA PACIFIC COLLEGE**

**School of Management**

(SOM)

**Bachelor of Science in Business Administration**

(BSBA)

**COURSE SYLLABUS**

**Code**

Quamet2

**Title**

Operations Research

**Credit Units**

3.0

**Description**

Operations research is a discipline that deals with the application of advanced analytical methods to help make better decisions. Considered to be a sub-field of applied mathematics, the terms management science and decision science are sometimes used as synonyms. Employing techniques from other mathematical sciences, such as mathematical modeling, statistical analysis, and mathematical optimization, operations research arrives at optimal or near-optimal solutions to complex decision-making problems. Because of its emphasis on human-technology interaction and because of its focus on practical applications, operations research has overlap with other disciplines, notably industrial engineering and operations management, and draws on psychology and organization science.

**Objective**

At the end of the course, the student must have utilized operational research (OR) in a wide range of problem-solving techniques and methods applied in the pursuit of improved decision-making and efficiency, such as simulation, mathematical optimization, queuing theory and other stochastic-process models, Markov decision processes, econometric methods, data envelopment analysis, neural networks, expert systems, decision analysis, or the analytic hierarchy process. Nearly all of these techniques involve the construction of mathematical models that attempt to describe the system. Because of the computational and statistical nature of most of these fields, OR also has strong ties to computer science and analytics.

**OUTLINE**

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| --- | --- | --- |
| **Week** | **Topic/s** | **Activities** |
| 1 | **Introduction** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 2 | **Introduction to Probability**  **Probability Distributions** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 3 | **Decision Analysis**  **Utility and Game Theory** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 4 | **Time Series Analysis and Forecasting** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 5 | **Introduction to Linear Programming**  **Linear Programming: Sensitivity Analysis and Interpretation of Solution** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 6 | **Linear Programming Applications in Marketing, Finance, and Operations Management** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 7 | Midterm Assessment and Project | Research Paper  Written Examination  Oral Presentation |
| 8 | **Distribution and Network Models** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 9 | **Integer Linear Programming**  **Advanced Optimization Applications** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 10 | **Project Scheduling: PERT/CPM** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 11 | **Inventory Models**  **Waiting Line Models** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 12 | **Simulation** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 13 | **Markov Processes** | Class Discussion  Group Activity  Spreadsheet Exercises |
| 14 | Final Assessment and Project | Research Paper  Written Examination  Oral Presentation |

**REFERENCES**

|  |  |  |
| --- | --- | --- |
| **Title** | **Author/s** | **Year Published** |
| Quantitative Methods for Business, 13th Edition  Cengage Learning | David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, et.al. | 2016 |
| Practical Management Science, 5th Edition  Cengage Learning | Wayne L. Winston & S. Christian Albright | 2016 |
| Quantitative Analysis for Management, 12th Edition  Pearson Education | Barry Render, Ralph M. Stair, Jr.,  Michael E. Hanna, Trevor S. Hale | 2015 |
| Introduction to Operations Research, 10th Edition  McGraw-Hill | Frederick Hillier | 2015 |
| Introduction to Management Science, 12th Edition  Pearson Education International | Bernard W. Taylor, III | 2016 |

**INSTRUCTIONAL TOOLS**

|  |  |  |
| --- | --- | --- |
| **System** | **Function** | **URL** |
| Microsoft Excel | Data Analysis ToolPak for complex statistical or engineering analyses | http://office.microsoft.com/en-us/excel-help/about-statistical-analysis-tools.aspx |
| Neo LMS | Free cloud-hosted LMS+ with nothing to download or install | http://apc.edu20.org/  Registration code: apcstudent  Subject password: (c/o instructor) |
| Cengage Online | Companion website | http://www.cengage.com/professional |

**ASSESSMENT**

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| --- | --- |
| **Factor** | **Weight** |
| Activities   * Problem solving and class discussion | 30% |
| Exams   * Written and online assessment | 20% |
| Exercises   * Modeling and spreadsheet workshop | 30% |
| Project   * Research paper and oral presentation | 20% |
| **Total** | **100%** |

**GRADING SYSTEM**

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade Point** | **Description** | **Letter Rating** | **Percentage Grade** |
| 4.0 | Excellent | A | 97-100 |
| 3.5 | Superior | B+ | 93-96 |
| 3.0 | Very Good | B | 89-92 |
| 2.5 | Good | B- | 85-88 |
| 2.0 | Satisfactory | C+ | 80-84 |
| 1.5 | Fair | C | 75-79 |
| 1.0 | Pass | D | 70-74 |
| R | Repeat |  | <70 |
| 0.0 | Fail | F | Excessive Absences |