جامعة العلوم التطبيقية الخاصة
Applied Science Private University
Faculty of Engineering

**DEPARTMENT OF MECHANICAL AND INDUSTRAIL ENGINEERING**

# Course Syllabus

1. **Course number and name**
   IE439 Systems Modeling and Optimization Lab

2. **Credits and contact hours**
   (0+1) 1 credit hours, 3 contact hours

3. **Course type**
   Onsite learning course

4. **Instructor's or course coordinator's name**
   Dr. Nader A. Al Theeb

5. **Textbook information**
   Manual book of Systems Modeling and Optimization Lab.

   a. **Other supplemental materials**

- Hamdy A. Taha, Operations Research: An Introduction, 10th Edition, Pearson, 2017
- Instructor Handouts
-CPLEX tutorials

6. **Specific course information**
   a. **Catalog description**
   Use application Packages in the field of Operations Research to solve exercises related to the topics covered by these subjects. Such Packages are CPLEX, and Excel.

   b. **Prerequisites or co-requisites**

   **Prerequisite**: IE 331 Operations Research II

   c. **The course is:**
   Required in Industrial Engineering program.

7. **Specific goals for the course**
   a. **Course outcomes:**
   After completion of the course, students are expected to be able to:

1. Formulate LP problems and solve them by using CPLEX Interactive
2. Utilize CPLEX Studio IDE to solve some formulated problems
3. Solve some well-known examples by utilizing the CPLEX solver
4. Use excel as decision making tool

**b. The following student outcomes are addressed by the course:**

SO-(a) an ability to apply knowledge of mathematics, science, and engineering

SO-(e) an ability to identify, formulate, and solve engineering problems

SO-(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

**2. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:**

| Learning Outcomes | Program PEOs | Method of Delivery | Assessment Method |
|---|---|---|---|
| **Course Outcomes** | | | |
| CO-(1):Formulate LP problems and solve them by using CPLEX Interactive | - | Lectures (Theoretical and experimental) | Class works and weekly reports |
| CO-(2): Utilize CPLEX Studio IDE to solve some formulated problems | - | Lectures (Theoretical and experimental) | Class works and weekly reports |
| CO-(3): Solve some well-known examples by utilizing the CPLEX solver | - | Lectures (Theoretical and experimental) | Class works and weekly reports |
| CO-(4): Use excel as decision making tool | - | Lectures (Theoretical and experimental) | Class works and weekly reports |

| Student Outcomes | | | |
|---|---|---|---|
| SO-(a) an ability to apply knowledge of mathematics, science, and engineering | - | Lectures (Example and Problems) | Midterm Exam |
| SO-(e) an ability to identify, formulate, and solve engineering problems | - | Term Project | Class works and weekly reports |
| SO-(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice | - | Term Project | Final Exam |

### 3. Weekly Teaching Plan

| Week No. | Topic | Method of Delivery |
|---|---|---|
| 1 | Installing CPLEX and software Introduction | Lecture+ Demonstration examples |
| 2 | Formulate LP problems and solve them by using CPLEX Interactive – Part 1 | Lecture+ Demonstration examples |
| 3 | Introduction to use CPLEX studio IDE (OPL) – Part 1 | Lecture+ Demonstration examples |
| 4 | Introduction to use CPLEX studio IDE (OPL) – Part 2 | Lecture+ Demonstration examples |
| 5 | Use For-loop and Summations in CPLEX studio IDE (OPL) | Lecture+ Demonstration examples |
| 6 | Reading data from Excel Documents | Lecture+ Demonstration examples |
| 7 | Case Study 1: Assignment problem | Lecture+ Demonstration examples |

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|---|---|---|
| 8 | Case Study 2: Transportation Model | Lecture+ Demonstration examples |
| 9 | Using Excel in decision making – Part 1 | Lecture+ Demonstration examples |
| 10 | Utilizing pivoting tables | Lecture+ Demonstration examples |

## 4. Grade Distribution:

| Assessment | Grade | Week No. |
|---|---|---|
| - Midterm Exam | 30% | 6th Week |
| -Assignments (Reports /Quizzes/ Seminar / Tutorials/ Home works ….) | 30% | 1-15th Week |
| - Final Examination | 40% | 15th Week |

Note: Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.