



كلية الحاسبات و المعلومات



## Operations Research Course Specifications

<b>Program(s) on which the course is given</b>	:	Bachelor in Computer and Information Sciences
<b>Major or Minor element of programs</b>	:	all majors
<b>Department offering the program</b>	:	Computer Science
<b>Department offering the course</b>	:	Scientific Computing
<b>Academic year / Level</b>	:	second Year./B.Sc.
<b>Date of specification approval</b>	:	

### A. Basic Information

**Title:** Operations Research

**Code:** SCC 231

**Lecture:** 3 hrs/week

**Tutorial:** 2 hrs/week

**Practical:** ---

**Credit Hours:** ---

**Total:** 5 hrs/week

### B. Professional Information

#### 1. Overall Aims of Course:

The aim of the course is to introduce the students to the fundamental methods used in operations research. Topics covered will include linear programming, network flows, dynamic programming, and transportation programming. The course will also discuss the underlying theory, but the emphasis will be on modeling and applications in various settings.



كلية الحاسبات و المعلومات



## 2. Intended Learning Outcomes of Course (ILOs):

### a. Knowledge and Understanding:

- a1- Knowledge of informal and formal modeling skills.
- a2- Knowledge of the different models and algorithms used in operations research
- a3- Understand and appreciate the capabilities and limitations of deterministic models in operations research.

### b. Intellectual Skills:

- b1- Build, analyze, and reason logically with mathematical models;
- b2- Propose and integrate with large-scale models;
- b3- Integrate skills to design and analyze algorithms, and to distinguish good algorithms from not-so good ones

### c. Professional and Practical Skills:

- c1- Inject knowledge of the varied applications of operations research
- c2- Problem solving skills using appropriate modeling techniques

### d. General and Transferable Skills:

- d1- Presenting knowledge of various modeling methods in different settings and applications and present them

### e. Attitude:

- e1. Relationship Emphasis a successful with other students.
- e2. Learn how to make relation with other, and the limit of this relation.
- e3. A knowledge and respect of ethics and ethical standards in relation to a major area of study.



### 3. Contents:

Topic	No. of hours	Lecture	Tutorial/ Practical
Modeling; Introduction to Optimization Models Linear programming: Formulations and graphical solution.. (Part I)	5	3	2
Modeling; Introduction to Optimization Models Linear programming: Formulations and graphical solution.. (Part II)	5	3	2
Modeling; Introduction to Optimization Models Linear programming: Formulations and graphical solution.. (Part III)	5	3	2
Algebraic solution: the simplex method and dual-simplex method. Sensitivity analysis. Transportation and assignment problems(Part I)	5	3	2
Algebraic solution: the simplex method and dual-simplex method. Sensitivity analysis. Transportation and assignment problems(Part II)	5	3	2
Algebraic solution: the simplex method and dual-simplex method. Sensitivity analysis. Transportation and assignment problems(Part III)	5	3	2
Network models: transportation, assignment, matching(Part I)	5	3	2
Network models: transportation, assignment, matching(Part II)	5	3	2
Integer programming: cutting-plane algorithms, branch and bound method. (Part I)	5	3	2
Integer programming: cutting-plane algorithms, branch and bound method. (Part II)	5	3	2
Dynamic programming: Examples of the dynamic programming. Models and computations, solution of linear programs by dynamic programs.(Part I)	5	3	2
Dynamic programming: Examples of the dynamic programming. Models and computations, solution of linear programs by dynamic programs.(Part II)	5	3	2
Project scheduling by PERT-CPM. Methods(Part I)	5	3	2
Project scheduling by PERT-CPM. Methods(Part II)	5	3	2