Syrian Arab Republic		الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالـــي
Syrian Virtual University		الجامعة الافتراضية السورية

Course Description: Operations Research

1- Basic Information:

Course Name	Operations Research
Course ID	BQM502
Contact Hours (Registered Sessions)	24
Contact Hours (Synchronized Sessions)	24
Mid Term Exam	-
Exam	75 min
Registered Sessions Work Load	54
Synchronized Session Work Load	24
Credit Hours	6
Course Level	5

2- Pre-Requisites:

Course	ID
Operations Management	BQM501

3- Course General Objectives:

The course deals with the basic concepts of a set of methods of quantitative analysis in management through the application of them in the economic and administrative field. The aim of the course is to provide students with concepts and tools that help them to understand operations research and mathematical modeling methods. These methods help the student to solve economic issues, which helps him in making the appropriate decision. The course also aims mainly to find the minimum cost and search for the greatest profit in many issues of linear programming in the economic field. The transportation issue model was also used to solve many problems related to transporting goods within the minimum expenses or distributing goods to obtain the maximum profit. The issue of allocation has also been used to optimize the role of job distribution to obtain the desired goal as costs or profits

4- Intended Learning Outcomes (ILO):

Code	Intended Learning Outcomes
ILO1	Understands the meaning of operations research, where to use it, and how to write a linear program in case of minimization and in case of maximization
ILO2	Solve the linear program model by graph method
ILO3	Solve the linear program model by the simplex method
ILO4	Solving the linear program in the case of the accompanying model, knowing the shadow prices and determining the productive capacity and wasted resources
ILO5	Learn the methods of writing and solving the transportation issue and improving its solution
ILO6	Understands the allocation issue and applies its uses and methods for solving it
ILO7	solving business-network algorithms model

5- Course Syllabus (24 hours of total Recorded Sessions , 24hours of total synchronized sessions)

- **RS:** Recorded Sessions**; SS:** Synchronized Sessions**;**

ILO	Course Syllabus	RS	SS	Type	Additional Notes
1	**Introduction to quantitative methods and stages of quantitative analysis** • The concept of quantitative methods • Historical development of quantitative methods • Reasons for the emergence of quantitative methods and their functions • Conditions for applying quantitative methods • The applied fields of quantitative methods • Stages of quantitative analysis	2	2	☐ Exercises ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
2	**Linear programming and graphical solution method** • The concept of linear programming • Requirements for using linear programming	4	4	☐ **Exercises** ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	Exercises and states to enable the student to build the mathematical model of the problem studied

	• Assumptions of the linear programming model • Fields of using linear programming • Formulating a linear programming model • Steps to find the perfect solution • Solve a linear programming model using the graphical solution method • Steps to find the perfect solution • Special cases in the graphic solution • Solved exercises				
3	**Linear Programming and Simplex** • The mechanism of the simplex method • Convert linear programming model from initial formulas to prototype • Prepare the preliminary solution schedule • Simplex solution procedures • Max and Mine case • Solved exercises	4	4	☐ **Exercises** ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
4	**Corresponding model or binary programming** • Features of the corresponding model (dual) • Steps to convert the prototype into a counter or dual • Formulation of the corresponding problem (bilateral) • Mixed binary formats • Scientific-economic interpretation of the binary model • The corresponding simplex method	2	2	☐ **Exercises** ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	

	• Solved exercises				
5	**Transport models** • The general framework of the transportation problem • Solve the issue of transportation • Finding the initial basic solution • North-West corner method • Lower cost method • Vogel Method • Finding the optimal solution (testing the initial basic solution) • The mobile stone method • Modified distribution method • Special cases when solving transportation problems • Solved exercises	8	8	☐ **Exercises** ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
6	**Allocation and assignment forms** • The concept and terms of the allocation problem • Ways to solve allocation (assignment) problems • Different combinations method (full count) • The direct (abbreviated) method or the Hungarian method • Special cases of allocation problems • Solved exercises	2	2	☐ **Exercises** ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
7	**Network analysis** • Minimum network issue (shortest network) • The issue of finding the optimum path for a network that does not allow rotation • The issue of finding the optimal path for a network that allows circulation	2	2	☐ **Exercises** ☐ **Assignments** ☐ Seminars ☐ Projects ☐ Practices ☐ Others	

6- Assessment Criteria (Related to ILOs)

ISC	Interactive Synchronized Collaboration		Ex	Exams		Rpt	Reports
PF2F	Presentations and Face-to-Face Assessments		PW	Practice Work			

ILO Code	ILO	Intended Results	Assessment Type				
			ISC	PW	Ex	PF2F	Rpt
ILO1	Understands the meaning of operations research, where to use it, and how to write a linear program in case of minimization and in case of maximization	Choose the appropriate quantitative method for the problem in question.	x		x		
ILO2	Solve the linear program model by graph method	Master the skill of converting the problem that is the subject of the decision from a construction problem to a mathematical problem.	x		x		
ILO3	Solve the linear program model by the simplex method	Know the steps to use for each quantitative method to solve the problem	x		x		
ILO4	Solving the linear program in the case of the accompanying model, knowing the shadow prices and determining the productive capacity and wasted resources	Determine the exact problem the company is exposed to to know the method that best suits it for the solution.	x		x		
ILO5	Learn the methods of writing and solving the transportation issue and improving its solution possible transportation cost	Use the ideal solution test for each of the methods of quantitative analysis in decision-making to ensure the correctness of the solution	x		x		

ILO6	Understands the allocation issue and applies its uses and methods for solving it	Use the transfer method to reach the best transport network for the products, in order to reduce the transportation costs to a minimum	x		x		
ILO7	solving business-network algorithms model	Learn about different types of network analysis of some issues and solve them easily					

7- Practice Tools:

Tool Name	Description
	The course deals with the basic concepts of a set of methods of quantitative analysis in management through their application in the economic and administrative field

8- Main References

1- راتول، محمد، (2006)،*بحوث العمليات* ، ديوان المطبوعات الجامعية، الجزائر، الجزائر.

2- مرزة، موفق ، (2011)،*أساسيات الأساليب الكمية في القرارات الادارية* ، دار مجدلاوي للنشر والتوزيع، عمان، الأردن.

3- غنيم , أحمد , (2010), الأساليب الكمية , المكتبة العصرية للنشر و التوزيع, القاهرة, مصر

4- Operations Research/ An Introduction, Eighth Edition/H. A. Taha, Pearson, Prentice Hall.2016

5- Introduction to Operations Research, Seventh Edition/ F.S. Hillier/G. J. Lieberman,

Mc Graw-Hill.2014

6- *Operations Research/ D. T. Phillips, A. Ravindra, J.J. Solber,John Wiley and Sons. Inc.2016*

9- Additional References

1-*Quantitative Methods for Decision Makers. Fourth Edition Mik Wisniewski.2018*