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

Course Description: Operation Research

1- Basic Information:

Course Name	**Operation Research**
Course ID	**OR**
Contact Hours (Registered Sessions)	**16**
Contact Hours (Synchronized Sessions)	**16**
Mid Term Exam	**-**
Exam	**75 min**
Registered Sessions Work Load	**16**
Synchronized Session Work Load	**16**
Credit Hours	**3**

2- Pre-Requisites:

Course	ID
Linear Algebra	LA

3- Course General Objectives:

4- Intended Learning Outcomes (ILO):

Code	Intended Learning Outcomes
ILO1	Formulation of linear programs, Theoretical representation of linear programs
ILO2	Solving linear programs(Graphical method, Enumeration method of basic solutions, Simplex algorithm, Big *M*- method and two-phase method)
ILO3	Duality in linear programming, The relationship between primal and dual programs, Dual-Simplex algorithm, Artificial constraint method
ILO4	Parametric linear programming(Parameterization of the objective function, Parameterization of the right hand side values)
ILO5	Integer linear programming(Gomory' s cut for linear programs in integer variables, Gomory' s algorithm for linear programs in integer variables)
ILO6	Graphs and networks- Shortest path in directed networks (Moore-Dijkstra's algorithm, Ford's algorithm, Bellman-Kalaba's algorithm)
ILO7	Graphs and networks- Maximum flow problem in directed networks(Ford-Fulkerson's

	algorithm)
ILO8	Graphs and networks- Minimum cost flow problem in directed networks
ILO9	Graphs and networks- Spanning tree constructing problem in non-directed graphs(Greedy algorithm), Minimum -weight spanning tree problem in non-directed graphs(Kruskal algorithm)

5- Course Syllabus (18 hours of total synchronized sessions;18 hours of total Recorded Sessions)

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

ILO	Course Syllabus	RS	SS	Type	Additional Notes
ILO1	Formulation of linear programs, Theoretical representation of linear programs	1.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO2	Solving linear programs(Graphical method, Enumeration method of basic solutions, Simplex algorithm, Big *M*- method and two-phase method)	6.0		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO3	Duality in linear programming, The relationship between primal and dual programs, Dual-Simplex algorithm, Artificial constraint method	4.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO4	Parametric linear programming(Parameterization of the objective function, Parameterization of the right hand side values)	1.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	

ILO5	Integer linear programming(Gomory' s cut for linear programs in integer variables, Gomory' s algorithm for linear programs in integer variables)	1.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO6	Graphs and networks- Shortest path in directed networks (Moore-Dijkstra's algorithm, Ford's algorithm, Bellman-Kalaba's algorithm)	1.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO7	Graphs and networks- Maximum flow problem in directed networks(Ford-Fulkerson's algorithm)	1.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO8	Graphs and networks- Minimum cost flow problem in directed networks	1.5		☑ Exercises ☑ Assignments ☐ Seminars ☐ Projects ☐ Practices ☐ Others	
ILO9	Graphs and networks- Spanning tree constructing problem in non-directed graphs(Greedy algorithm), Minimum - weight spanning tree problem in non-directed graphs(Kruskal algorithm)	1.5		☑ 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	Formulation of linear programs, Theoretical representation of linear programs		☑		☑		☐
ILO2	Solving linear programs(Graphical method, Enumeration method of basic solutions, Simplex algorithm, Big *M*- method and two-phase method)		☑		☑		☐
ILO3	Duality in linear programming, The relationship between primal and dual programs, Dual-Simplex algorithm, Artificial constraint method		☑		☑		☐
ILO4	Parametric linear programming(Parameterization of the objective function, Parameterization of the right hand side values)		☑		☑		☐
ILO5	Integer linear programming(Gomory' s cut for linear programs in integer variables, Gomory' s algorithm for linear programs in integer variables)		☑		☑		☐
ILO6	Graphs and networks- Shortest path in directed networks (Moore-Dijkstra's algorithm, Ford's algorithm, Bellman-Kalaba's		☑		☑		☐

	algorithm)						
ILO7	Graphs and networks- Maximum flow problem in directed networks(Ford-Fulkerson's algorithm)		☑		☑		☐
ILO8	Graphs and networks- Minimum cost flow problem in directed networks		☑		☑		☐
ILO9	Graphs and networks- Spanning tree constructing problem in non-directed graphs(Greedy algorithm), Minimum -weight spanning tree problem in non-directed graphs(Kruskal algorithm)		☑		☑		☐

7-Practice Tools:

Tool Name	Description
Course Name	

8-Main References

Owner detailed and expanded course syllabus written by Dr. M. Tlas

9-Additional References

1. *Introduction to Operations Research, Seventh Edition/ F.S. Hillier/G. J. Lieberman, Mc Graw-Hill*
2. *Operations Research/ An Introduction, Eighth Edition/H. A. Taha, Pearson, Prentice Hall*
3. *Operations Research/ D. T. Phillips, A. Ravindra, J.J. Solber,John Wiley and Sons. Inc*