

Course Specifications

Course Title:	Linear Programming
Course Code:	23044326-3
Program:	Bachelor of Mathematics
Department:	Mathematics Department
College:	Jamoum University College
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification.....	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes.....	3
1. Course Description	3
2. Course Main Objective.....	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	6
F. Learning Resources and Facilities.....	6
1.Learning Resources	6
2. Facilities Required.....	6
G. Course Quality Evaluation	7
H. Specification Approval Data	7

A. Course Identification

1. Credit hours:	3
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	The Fifth level
4. Pre-requisites for this course (if any):	Linear Algebra (1)
5. Co-requisites for this course (if any):	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	✓	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (Exams & Quizzes)	8
	Total	53
Other Learning Hours*		
1	Study	70
2	Assignments	20
3	Library	-
4	Projects/Research Essays/Theses	-
5	Others (Exams & Quizzes)	20
	Total	110

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description
2. Course Main Objective
Gain experience in modeling, solving and analyzing problems using linear programming.
Recognize different methods for solving linear programming problems (LPP).
Reveal the fundamental concepts and theories related to linear programming problems.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Recognize how to model the real problem in the form of linear programming problems.	1
1.2	Describe the problem and solve it graphically.	2
1.3	Identify different terminology, concepts and theories of linear programming problems.	3
1.4	Recognize different methods and their related definition and theories for solving linear programming problems.	
2	Skills :	
2.1	Modeling real situations in the form of linear programming problems	1
2.2	Analyzing real problems and solve them graphically.	2,3
2.3	Utilizing appropriate method to solve a given linear programming problems.	2, 3
2.4	Develop connections within branches of Operation research and between linear programming and other disciplines	4
2.5	Solve problems using a range of formats and approaches in basic science	
2.6	show the ability to work independently and within groups.	
2.7	Develop connections within branches of Operation research and between linear programming and other disciplines	
3	Competence:	
3.1	Apply scientific models and tools effectively.	
3.2	Use the internet to write reports about basic linear programming principles.	
3.3	Apply knowledge gained during the course using computer applications	
3.4	Work both independently and in a coordination role with multiple groups.	
3.5	Express a personal view in the context of an understanding of solving problems knowledge	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to operations research and linear programming problem (LPP)	3
2	Convex sets, Convex function, vertex points, and optimization theory	3
3	Graphical method for solving LPP	3
4	Simplex methods,	6
5	Special cases of simplex method Duality Problem, sensitivity analysis	9
6	Special cases of simplex method Two Phase Method	6
7	applications of the linear programming problem (Transportation problems, Game Theory, Network)	6
8	Use software application to solve LPP	6
9	Revision	3
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

CLOs		Teaching Strategies	Assessment Methods
1	Knowledge:		
1.1	Recognize how to model the real problem in the form of linear programming problems.	Lectures Discussion Problem Solving	Exams Assignments Quizzes
1.2	Describe the problem and solve it graphically.		
1.3	Identify different terminology, concepts and theories of linear programming problems.		
1.4	Recognize different methods and their related definition and theories for solving linear programming problems.		
2	Skills :		
2.1	Modeling real situations in the form of linear programming problems	Lectures Discussion Problem Solving Brain Storming	Assignments. Reports. Quizzes. Discussion
2.2	Analyzing real problems and solve them graphically.		
2.3	Utilizing appropriate method to solve a given linear programming problems.		
2.4	Develop connections within branches of Operation research and between linear programming and other disciplines		
2.5	Solve problems using a range of formats and approaches in basic science		
2.6	show the ability to work independently and within groups.		
2.7	Develop connections within branches of Operation research and between linear programming and other disciplines		
3	Competence:		
3.1	Show the ability to identify and use appropriate statistical models.	Lectures Brain storming Tasks to measure students' Personal skills.	Assignments. Reports. Discussion
3.2	The student should illustrate the ability to work independently and within groups.		
3.3	Illustrate how to use the internet and using software programs to deal with problems and to write reports about mathematical statistics.		
3.4	Apply statistical knowledge gained during the course using computer packages		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	6 th week	20 %
2	Midterm 2	12 th week	20%
3	Homework + reports + Quizzes	During the semester	10%
4	Final exam	End of semester	50 %

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- 1- There are student advisor committee for the students,
- 2- The office hours for the teaching staff is depicted on their office.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	H.A.Taha, Introduction Operations Research 6th edition, London, Macmillan Publishing Company, Inc. V. Chvatal: Linear Programming, San Francisco: McGraw-Hill University, W.H. Freeman and Company,
Essential References Materials	G. Hadley, linear programming, Addison-Wesley, 1969 P.K.Gupta and D.S.Hira, Problems in Operations research, Ram Nagar, 1998. Michel Sakarovitch, Linear Programming, Springer-Verlag, 1983 Gerald Brickman, Mathematical Introduction to Linear Programming, Springer Verlag, New York, 1989.
Electronic Materials	http://www.freetechbooks.com http://tutorial.math.lamar.edu/sitemap.aspx
Other Learning Materials	http://www.freetechbooks.com http://tutorial.math.lamar.edu/sitemap.aspx http://mathforum.org/advanced/numerical.htm/

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	-Classroom with capacity of 30-students. - Library
Technology Resources (AV, data show, Smart Board, software, etc.)	all classrooms are equipped by data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	deanship of registration and acceptance	Student feedback through electronic survey
Quality of learning resources	Program Leaders	Student feedback through electronic survey
Evaluation of the teachers by internal & external faculty members	Program Leaders	Course Reports, evaluation of random grading report
Program Quality	Peer Reviewer	Peer evaluation and feedback

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, , etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	