



Course Specifications

Course Title:	Mathematical Programming
Course Code:	MATH 3260
Program:	Bachelor of Science in Mathematics
Department:	Mathematics
College:	College of Science and Humanities Alkharj
Institution:	PRINCE SATTAM BIN ABDUALZIZ UNIVERSITY

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A. Course Identification

1. Credit hours:	4(4,0,0)
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered:	Level: Elective
4. Pre-requisites for this course (if any):	MAT 2250
5. Co-requisites for this course (if any):	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	04	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	48
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	60
	Total	108

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>Polyhedral – Extreme Points – Optimality Conditions- The Simplex Method - Separating Hyperplanes and Duality - Sensitivity Analysis – Parametric Programming - Interior Point Methods – Affine Scaling – Network Problems and the Simplex Method - Duality in Networks - Shortest Path Problem – Integer Programming Formulations</p>
<p>2. Course Main Objective</p> <p>The primary objective is to make the students gain knowledge about mathematical techniques in solving Linear programming models, Familiarity with formulating the mathematical model of real life problems, Apply simplex method to solve LP problems, deal with Integer Programming Formulations.</p>

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Understand and know the scientific Meaning polyhedral and hyperplanes.	K1
1.2	Know the methods solving linear programming., simplex method, integer programming	K4
2	Skills :	
2.1	Conduct a logical discussions, decisions and problem concerning linear programming formulation, classify hyper plane, halfspace	S3
2.3	Select and apply appropriate mathematical method to solve LP problem.	S2
3	Values:	
3.1	appreciate the contribution of mathematics to the society in various fields	V1
3.2	Interpret results	V2

C. Course Content

No	List of Topics	Contact Hours
1	Polyhedral – Extreme Points – Optimality Conditions	5
2	The Simplex Method	8
3	Separating Hyperplanes and Duality	8
4	Sensitivity Analysis – Parametric Programming	7
5	Interior Point Methods – Affine Scaling – Network Problems and the Simplex Method	8
6	Duality in Networks	5
7	Shortest Path Problem – Integer Programming Formulations	7
Total		48

D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Understand and know the scientific Meaning polyhedral and hyperplanes.	Acquisition of knowledge is achieved mainly through lectures, tutorials, assignments, exercises, internet research work and independent study.	1. Two Internal Exams
1.2	Know the methods solving linear programming., simplex method, integer programming		2. Atleast two Quiz 3. End Semester Exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	Skills		
2.1	Conduct a logical discussions, decisions and problem concerning linear programming formulation, hyperplanes and halfspace	1. Application oriented exercises during tutorial session.	1. Homework 2. Assignments 3. Quiz
2.2	Select and apply appropriate mathematical method to solve LP problem.	2. Homework to improve the analytical skills	
3.0	Values		
3.1	appreciate the contribution of mathematics to the society in various fields	Group Discussion during lectures and Interactive Session	Homework to be given so that the students discuss among themselves or refer materials from textbook to find solution
3.2	Interpret results		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid Term Exam I	6	20%
2	Quiz	4 & 10	5%
3	Mid Term Exam II	13	20%
4	Continuous Assessment – Homework, Assignment, Attendance etc.	--	5%
5	End Semester Exam	15	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. Exclusive Office Hours – 4 Hours per week
2. Academic Advising for Students – 1 Hour per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Shaum's outline series : operation research
Essential References Materials	Operation research, an introduction. By hamdytaha
Electronic Materials	Nil
Other Learning Materials	Nil

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms with Smart boards with seating facilities for atleast 30 students
Technology Resources (AV, data show, Smart Board, software, etc.)	Smartboard, Internet Connection for Blackboard Computer Lab with software packages such as Excel etc.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Nil

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course Evaluation	Quality Assurance Committee of the Department	Review all the course documents and course report
Peer Review	Senior Faculty Members / HoD	Attend the lecture and fill in a form
End Semester online survey	students	online survey

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

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	