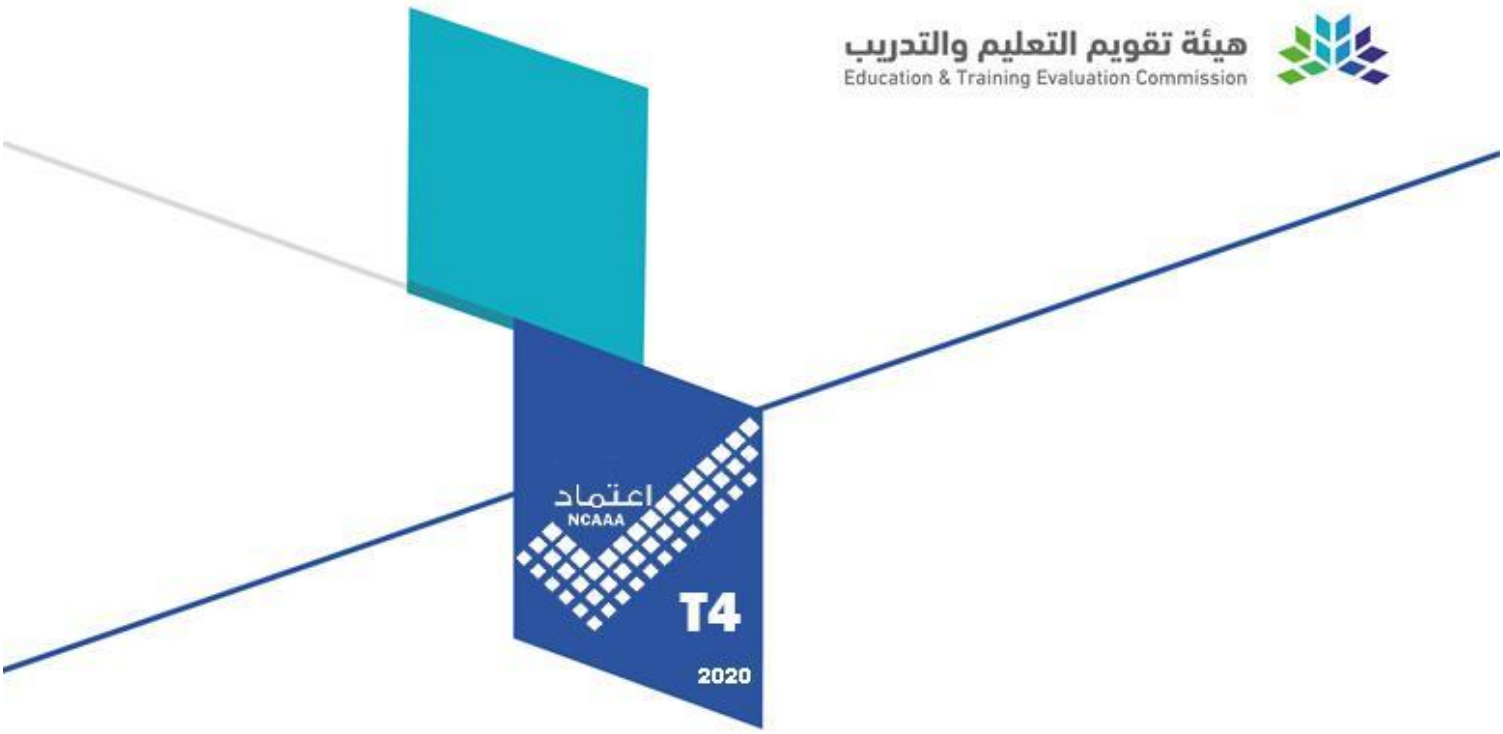
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Introduction to operation research
Course Code:	Math 340
Program:	Bachelor of Science in Mathematics
Department:	Mathematics
College:	Science
Institution:	University of Tabuk

Table of Contents

A. Course Identification

1. Credit hours:	**02 Hours/Week**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	**L5/Y3**
4. Pre-requisites for this course (if any)**: Math 203**	
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**	**30**	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**30**
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description: The course is designed to study modeling with linear programming.

Students will learn simplex method, M-method and two phase method. Transportation model and iterative computations of the transportation algorithm

2**. Course Main Objective:**

By the end of this course, the student will be able to recognize the importance of the operation research in practical life problems. Acquire knowledge by learning, algorithms, and methods of solution in mathematical programming and learn the methods of solving linear programming and transportation model.

3. Course Learning Outcomes

CLOs	Aligned PLOs

1	**Knowledge and Understanding**	
1.1	Students will be able to define the LPP from a given problem using	K1
1.2	Students will be able to recognize the steps to solve a LPP using simplex method and big M-method, also two phase method graphical and simplex methods to find optimal solutions.	K2
2	**Skills :**	
2.1	Students will be able to calculate the optimal solution using graphical and simplex methods.	S3
2.2	Students will be able to solve sensitivity analysis and dual problems to find optimal solutions.	S3
2.3	Students will be able to differentiate between maximization and minimization problems in the course.	S1
2.4	Students will be able to communicate mathematical concepts effectively and clearly.	S5
3	**Values:**	
3.1	Students will develop enhanced self-learning.	V1
3.2	Students will be able to work independently and in groups.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Modeling with Linear Programming.	2 Hrs
2,3	Graphical LP solution	4 Hrs
4,5	The Simplex method	4 Hrs
6	**Mid-Exam 1**	
6,7	M-method	4 Hrs
8,9	Two phase methods	4 Hrs
10	Special case in the simplex method	2 Hrs
11	Definition of the dual Problem-Optimal Dual solution	2 Hrs
11	**Mid-Exam 2**	
12	Sensitivity Analysis	2 Hrs
13	Transportation Model	2 Hrs
14	Iterative computations of the Transportation Algorithm and applications	2 Hrs
15	**Revision & Final Exam**	2 Hrs
	Total	**30 Hrs**

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	Students will be able to define the LPP from a given problem using	Introducing new ideas through case study Lectures Class Discussions	Quizzes I II Midterm Exams Final Exams homework assignments.
1.2	Students will be able to recognize the steps to solve a LPP using simplex method and big M-method, also two phase method graphical and simplex methods to find optimal solutions.		
1.3			
2.0	**Skills**		
2.1	Students will be able to calculate the optimal solution using graphical and simplex methods.	- Lectures - Case Study - Brainstorming	- Quizzes -Assignments -Midterm exams - Final exam
2.2	Students will be able to solve sensitivity analysis and dual problems to find optimal solutions.		
2.3	Students will be able to differentiate between maximization and minimization problems in the course.		
2.4	Students will be able to communicate mathematical concepts effectively and clearly.		
3.0	**Values**		
3.1	Students will develop enhanced self-learning.	Cooperative learning and Teamwork	- Quizzes -Assignments -projects -Class participation
3.2	Students will be able to work independently and in groups.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home works and Assignments	Weekly basis	10%
2	First mid-term exam	5th week	25%
3	Second mid-term exam	15th week	25%
4	Final Exam	At End of Semester	40%

***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 :
Six office hours per week in the lecturer schedule.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Linear Programming and its Applications (2007), H. A. Eiselt, C.–L. Sandblom, Springer-Verlag.
Essential References Materials	• FREDERICK S. HILLIER and GERALD J. LIEBERMAN, Introduction to Operations Research, 11th Edition (2021), Mc Graw-Hill Education.

Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1.Lecture Room with max capacity of 30 students and equipped with White Board, Overhead projector and internet connection. 2.Library
Technology Resources (AV, data show, Smart Board, software, etc.)	Projectors
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct and Indirect
Extent of achievement of course learning outcomes	Teachers	Direct
Quality of learning resources	Students	Indirect

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	Program and study plan committee
Reference No.	
Date	25/08/2021