هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title:	Operational Research
Course Code:	553MATH-3
Program:	Bachelor of Science in Computer Science
Department:	Department of Computer Science
College:	Computer Science and Information Systems
Institution:	Najran University
Version:	2.0
Last Revision Date:	August 2022

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
3 (3, 0, 1) [Theory, Lab, Tutorial]					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 10/Year 5)					
4. Course General Description:					
This course can be further improved by providing practical knowledge of operation research. It is also important to provide up-to-date reference material.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
This course provides an introduction to the key aspects of operations research methodology. Students will model and solve a variety of problems using deterministic and stochastic operations research techniques. It provides an overview of the entire suite of techniques and some idea of how the elements fit together.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize the importance and value of Operations Research and mathematical modelling in solving practical problems in industry;	K1	• Showing and delivering PPT presentations in the class. • Class exercise to analyze problems and propose solutions	Quiz 1, Midterm 1, and Final Exam
1.2	Understand Operations Research models and apply them to real-life problems;	K1, K3	• Writing the algorithm for given scenario, • Practical exercises. • Assignments • Mini-Project on various topics related to The artificial intelligence. • Classroom discussions and solving the problems in group • Making students alert about class attendance, timing, cleanliness and manner inside the class. • Assigning class responsibilities to the students	Quiz 2, Midterm 2, and Final Exam, assignment 1

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			• Encourage to search the latest advancements or updated information during their free time. • Discuss personally the course contents with the problematic students. • Guide and discuss with the student regarding the assignment.	
1.3				
2.0	**Skills**			
2.1	Contribute to the approximation problem whatsoever to reality.	S1	• Most of the cognitive skills will be achieved by lectures and explaining and highlighting the concepts. • Ask students at the end of each lecture to bring some materials or applications related to the lecture's subject. • Explaining the difficult topics by giving extra tutorials to students. • Helping students to describe effective strategies for new situations. • To develop creative thinking. • To discuss new topics and make the session interactive	Quiz 1, Midterm 1, and Final Exam
2.2	Use computer tools to solve a mathematical model for a practical problem.	S4, S5		Quiz 2, Midterm 2, and Final Exam assignment-2
2.3	Formulate a managerial decision problem into a mathematical model;	S2, S3		Final exam
2.4	Apply of these models in the future when we face a similar problem;	S4		Final exam
3.0	**Values, autonomy, and responsibility**			
3.1	Formulate a managerial decision problem into a mathematical model;		• Explaining the difficult topics by taking extra tutorial to students. • Helping students to describe effective strategies to new situations. • To develop creative thinking.	Final exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			• To discuss new topics and make the session interactive.	
3.2				

C. Course Content

No	List of Topics	Contact Hours
1.	Operations Research: Introduction	4
2.	Linear and Integer Programming Models	8
3.	Decision Analysis	4
4.	Introduction to Quantitative Research	8
5.	Introduction to Qualitative Research	8
6.	Sequencing	4
7.	Operation Research Models	8
8.	Scheduling of Jobs	4
9.	Network Optimization Models	4
10.	Decision Analysis	4
11.	Queuing Theory	4
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Theory Assignment	2, 4, 7 & 11	15%
2.	Quizzes	4 & 8	15%
3.	Midterm Exam	9th week	20%
4.	Final Examination	16th or 17th week	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1. Hillier and Lieberman. Introduction to Operations Research. 8th ed. 2005. ISBN 13-9780073211145. 2. P. Sankara Iyer. Operations Research. Tata McGraw-Hill, 2008.
Supportive References	1. Wayne L. Winston. Operations Research: Applications and Algorithms, fourth Edition. ISBN-13: 9780534380588 2. Sydney Allandale Urry. An introduction to operational research: the best of everything. Last edition. Longman Scientific & Technical. 1991, ISBN 0582013496, 9780582013490 3. Wayne L Winston. Operations Research: Applications and Algorithms. Indian University. 4th edition. 2004 4. A.M. Natarajan, P. Balasubramani, A. Tamilarasi.Operations Research. Pearson Education. 2005. 5. J K Sharma. Operations Research Theory & Applications. 3e, Macmillan India Ltd,
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms to accommodate 50 students per classroom with desks and chairs
Technology equipment (projector, smart board, software)	Projector and smart board
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Collecting students' suggestions to facilitate more during the class.	Students	Verbal discussion
Student's questionnaire once during the semester about course learning outcomes.	Students	Indirect Survey
Achievement percentage of course learning outcomes, direct evaluation using CLO assessment sheet	Course Instructor	Direct evaluation using CLO achievement calculation
Teaching strategies	Quality unit	Indirect
Assessment methods	Quality unit	Indirect

Assessment Areas/Issues	Assessor	Assessment Methods
Instructor performance	Quality unit	Indirect
Course content	Quality unit	Indirect

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Computer Science Departmental Council
REFERENCE NO.	14440203-0185-00002
DATE	1st Sep, 2022