Course Specification
(Bachelor)

Course Title:	Operation Research for Software
Course Code:	SE1508
Program:	Bachelor of Software Engineering
Department:	Software Engineering
College:	Faculty of Computing and Information
Institution:	Al-Baha University
Version:	V1
Last Revision Date:	24/4/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐ University	☒ College	☐Department	☐Track	☐Others
B.	☐Required		☒ Elective		
3. Level/year at which this course is offered: (6/2)					
4. Course general Description:					
This course introduces students to operation research and its importance to decision making processes. It demonstrates the usefulness of optimization techniques as a tool for software engineering. Mainly it emphasizes the concepts of optimization using linear and nonlinear techniques and their application to solve complex real-world problems. Topics include linear models, simplex method, two phase simplex method, integer programming, transportation optimization, search methods and game theory.					
5. Pre-requirements for this course (if any)**:**					
6. Pre-requirements for this course (if any)**:**					
7. Course Main Objective(s):					
This course teaches students the most important concepts of optimization their application to solve real-world complex problems.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%

No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	33
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize the concepts of linear and nonlinear optimization	**K1**	Coop learning Lectures Problem sets	Exams Rubrics Course Exit Survey
1.2	Explain a variety of operation research methods and techniques	**K2**	Coop learning Lectures	Exams Rubrics Course Exit Survey
...				
2.0	**Skills**			
2.1	Formulate optimization model for real world problems	**S1**		Quizzes

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.2	Apply a set of operation research techniques to solve real-world problem	**S2**	Group Discussion Brainstorming	Midterm, Final Exam Rubrics Course Exit Survey
2.3	Evaluate used research techniques for a specific optimization problem	**S3**	Exercises set Mini project	Midterm, Final Exam Rubrics Course Exit Survey
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to operation research	4
2.	Linear programming: Simplex method	6
3.	Two-phase Simplex method, duality, shadow prices	4
4.	Linear integer programming: mixed and pure methods	6
5.	Transportation problems	3
6.	Networking problems	3
7.	Search methods: branch and bound algorithm	4
8.	Game theory	3

Total		**33**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Problem sets	Bi-Monthly	15%
2.	Online Quizzes	Each three weeks	15%
3.	Midterm Exam	6	20%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4	Mini project	10	10%
5	Final exam	12	40%

*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	**Operations Research: An Introduction, Hamdy Taha, 10th edition** https://www.amazon.com/Operations-
Supportive References	
Electronic Materials	**Al-Baha e-learning system containing teaching resources (Slides, assignment papers, etc.)**
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with: * at least 30 seats * sliding board
Technology equipment (projector, smart board, software)	* A data show projector connected to a PC preferably with Internet connection
Other equipment (depending on the nature of the specialty)	Lab on computer systems (matlab)

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Faculty • Peer Reviewers • Program Leader Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Course evaluation by Peer Reviewers (indirect). • Class visit by Program Leader Comprehensive Course report (where we can find information about teaching difficulties and action plan, …)
Effectiveness of	• Students	• Surveys (indirect).

Assessment Areas/Issues	Assessor	Assessment Methods
Students assessment	• Faculty • Peer Reviewers • Course Coordinator • Exam Evaluation Committee Course Coordinator	• Direct feedback from students (interview between Program leader and students). • Assessment results (direct) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about assessment difficulties and action plan, …) Exam evaluation by the Exam Evaluation Committee (indirect)
Quality of learning resources	• Students • Faculty • Peer Reviewers Course Coordinator	• Surveys (indirect) • Course evaluation by Peer Reviewers (indirect). Comprehensive Course report (where we can find information about difficulties and challenges about learning resources as well as consequences and action plan, …)
The extent to which CLOs have been achieved	• Faculty • Program Leader Course Coordinator	• Student Results (direct) Comprehensive Course report (where we can find the CLO assessment results)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Curriculum Committee**
REFERENCE NO.	
DATE	**28 April 2024**