Republic of Iraq / Ministry of Higher Education and Scientific Research
University of Warith Al-Anbiyaa – College of Administration and Economics
Department of Accounting
Course Description Form
Course Description Form: Principles of Operations Research and QSB Applications (2025 / 2026)

Principles of Operations Research and QSB Applications Description(2026 /2025)		
Course Name	**Principles of Operations Research and QSB Applications**	**Module Delivery**
Module Type	Basic learning activity	×Theory × Theory Lecture Laboratory Tutorial × Practical Seminar
Module Code	AC2105	
ECTS Credits	6	
Student Workload (SWL):	150 hours/semester	
Department Code		
Head of Department	HIBATALLA ALSAID	
Module Leader	TALAL ALJAJAWY	tjajawy@yahoo.com
Module Leader Acad. Title	PROFESSOR	Ph.D.
Course Instructor	Asst. Prof. Dr. Iman Khalil	iman.khalil@uowa.edu.iq
Peer Reviewer		
Date of preparation of this description:	15\9\2025	

Course Aims	
1	Introduce students to the fundamental concepts of Operations Research and its role in decision-making.
2	Develop students' ability to formulate mathematical models for managerial and accounting problems.
3	Train students to use QSB software for solving quantitative models.
4	Enhance analytical and quantitative decision-making skills

Intended Learning Outcomes (ILOs)
Upon successful completion of this course, students will be able to:
Knowledge and Understanding:
Explain the principles and applications of Operations Research. Identify different types of mathematical models used in decision-making
Cognitive Skills:
Formulate linear programming models for real-life problems.

□ Analyze and interpret model results to support managerial decisions
Practical Skills
□ Solve transportation and assignment problems manually and using QSB. □ Apply CPM and PERT techniques using QSB software
Transferable Skills
□ Work effectively in teams to solve applied quantitative problems. □ Prepare analytical reports including results and recommendations

Student Workload (ECTS Distribution)	
Activity	**Hours**
Lectures (15 × 3 hrs)	45
Practical / Lab Sessions	15
Self-Study	60
Assignments & Reports	20
Exam Preparation	10
Total	**150 Hours**

Alignment of Learning Outcomes, Teaching & Assessment		
ILO	**Teaching Method**	**Assessment Method**
1–2	Interactive lectures	Quiz
3–4	Problem-solving sessions	Midterm Exam
5–6	Lab practice (QSB)	Practical Assignment
7	Group work	Project
8	Report writing guidance	Analytical Report

Material Covered		
Week	**Topic**	**Details**
1	Introduction to Operations Research	Definition, importance, stages, and applications in managerial and economic fields
2	Linear Programming (Concepts & Forms)	Definition, phases, general form, canonical form, and standard form
3	Model Formulation	Building the mathematical model: decision variables, objective function, constraints
4	Linear Programming Solution Methods (I)	Graphical Method
5	Linear Programming Solution Methods (II)	Big M Method and Two-Phase Method
6	Special Cases & Sensitivity Analysis	Degeneracy, infeasibility, unbounded solution,

		shadow prices, reduced costs
7	LP Applications Using QSB	Practical examples, result analysis, and managerial recommendations
8	Transportation Problem (Model & Initial Solutions)	General model, Northwest Corner, Least Cost, Vogel's Approximation Method
9	Transportation Problem (Optimality & QSB)	Stepping-Stone Method, MODI Method, QSB applications with analysis
10	Assignment Problem	General model, Hungarian Method, Unit Method
11	Assignment Applications Using QSB	Practical examples, interpretation of results, recommendations
12	Project Networks (CPM & PERT)	Network construction, critical path, time-risk analysis, time–cost trade-off
13	Project Network Applications Using QSB	Practical cases, analysis, decision-making recommendations
14	Game Theory	Definition, types of games, saddle point, dominance, algebraic and graphical solutions, QSB applications
15	Final Examination	Comprehensive assessment

.

Teaching and Learning Strategies	
1	Active Learning
2	Problem-Based Learning
3	Cooperative Learning
4	Practical Software Application
5	Case Study Discussions

Assessment Scheme (Continuous Assessment – Bologna Approach)

Quizzes (2)	20%
Assignments& Reports	10%
Report	10%
Midterm Exam	10%
Final Exam	50%
Total	100%

Grading Scale	
Percentage	**Grade**
90–100	A
80–89	B
70–79	C
60–69	D
50–59	E
Below 50	F

Learning Resources

Required Textbooks:
1. Introduction to Operations Research and its Applications using QSB (1st Edition, 2025). 2. Hillier & Lieberman, *Introduction to Operations Research*, 8th Edition.
Recommended References:
1- Applications of Quantitative Systems in Business Administration (2024). **2- Online academic resources and QSB software manuals**