



**Republic of Iraq / Ministry of Higher
Education and Scientific Research
University of Fallujah - College of
Administration and Economics
Statistics Department
Course Description Form**

**Description Form Principles of Operations Research and QSB Applications
(2025 / 2026)**

Material Name	Principles of Operations Research and QSB Applications		Module Delivery
Unit Type	Basic Learning activity		× Theory ☐ Lecture ☐ laboratory ☐ Tutorial × practical
Unit Code	AC2105		
Number of hours according to the ECTS system	6		
SWL Hour/Semester	150		
Unit level	2	Delivery Semester	1
Scientific Department Code		College Code	
Head of Department		e-mail	
Scientific title of the head of the department		Unit Commander Qualifications	
Subject Teacher		e-mail	
Name of peer references		e-mail	
Date of approval of the Scientific Committee		Version number	

Relationship with other subjects

Prerequisites Unit	None	Semester	
Common Requirements Unit		Semester	



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Course objectives, learning outcomes and instructional contents

Course Objectives

- 1.Introduce the student to the concepts and tools of Operations Research and their role in solving managerial, accounting, and economic problems.
- 2.Enable the student to formulate mathematical models for managerial, accounting, and economic problems.
- 3.Train the student to use the QSB program for solution and analysis.
- 3.Develop decision-making skills based on quantitative analysis.

Learning outcomes of the course

- 1.Formulate mathematical models for problems in management, accounting, and economics.
- 2.Solve the models using both manual and software-based methods.
- 3.Interpret and analyze the results to make scientific decisions based on a quantitative foundation.
- 4.Use the QSB program efficiently in Operations Research application

Indicative Contents

1. Introduction to Operations Research and its role in different fields.
2. Understanding mathematical and non-mathematical models in Operations Research.
3. Linear programming models and their applications.
4. Transportation models and their implementation mechanism.
5. Assignment models and how to work with them.
6. Project networks, including:



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- * General introduction to project networks.
 - * How to construct a project network.
 - * Critical path calculation.
 - * Time risk analysis.
 - * Using the Critical Path Method (CPM) and PERT.
 - * Cost-time trade-off analysis.
7. Competition and game problems and their applications in both the private and public sectors.

Learning and Teaching Strategies

Strategies

1. ****Active Learning**:**

- * Classroom discussions after dividing students into groups and conducting competitions among them on the material covered in class.

2. ****Real-World Applications**:**

- * Discussing real cases and problems in public and private sector organizations and presenting them to explore students' ideas in this regard.

3. ****Practical Activities**:**

- * Discussing real solutions to the problems addressed and the extent of improvement achieved after the intervention.

4. ****Problem-Based Learning**:**

- * ****Scenario Presentation**:** Providing students with real-world scenarios that require problem analysis.
- * ****Guided Discovery**:** Guiding students through the process of identifying relevant concepts and Operations Research techniques.



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5. **Technology Integration:**

*** **Online Resources**:** Utilizing online resources for interactive exercises and simulations.

6. **Assessment and Feedback:**

*** **Variety of Assessments**:** Using a mix of assessments, including quizzes, exams, projects, and presentations.

*** **Feedback**:** Providing constructive and timely feedback on students' work.

Learning Strategies for Students

1. **Active Participation:** Engage in classroom discussions, group work, and practical activities.

2. **Regular Practice:** Solve problems and practical exercises to reinforce understanding.

3. **Use of Resources:** Make use of textbooks and online resources.

4. **Seeking Help:** Do not hesitate to ask questions or seek help from the instructor or classmates.

The student's academic load is calculated for 15 weeks

Structured SWL (h/sem) Regular academic load of the student during the semester	48	Structured SWL (h/w) Regular student load per week	3.2
Unstructured SWL (h/sem) Irregular academic load of the student during the semester	102	Unstructured SWL (h/w) Irregular student academic load per week	6.8
Total SWL (h/sem)	200		
The student's total academic load			



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during the semester

Course Evaluation

		Time/N umber	Weight (marks)	Week due	Related learning outcomes
evalua tions	auditions		20% (20)		LO #2 and #14
	Tasks		10% (10)		LO #3 and #13
	Projects/Laboratory.		0% (0)		All
	Report		10% (10)		LO #5 and #10
auditi ons	Mid-term Exam		10% (10)		LO #1 - #6
	Final Exam		50% (50)		All
Final Assessment		100%(100 MARKS)			



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Theoretical Weekly Curriculum

	Material Covered
First week	Introduction to Operations Research, including the definition, importance, stages, and applications of Operations Research
Second week	Linear Programming, including the definition, stages, general form, canonical form, and standard form
Third week	Building the mathematical model for a linear programming problem
Fourth week	Methods for Solving a Linear Programming Problem, including the Graphical Method, the Big-M Method, and the Two-Phase Method
Fifth week	Special Cases and Sensitivity Analysis in Linear Programming, including Shadow Prices and Reduced Costs
Week Six	Applications and Examples of Linear Programming in the QSB Program, with Results Analysis and Recommendations
Week seven	he Transportation Problem, including the general definition, the general model, and solution methods such as the North-West Corner Method, the Least Cost Method, and Vogel's Approximation Method, as well as optimal solution methods such as the Stepping Stone Method and the MODI (Modified Distribution) Method
Week eight	Applications and Examples of Transportation Problems in the QSB Program, with Results Analysis and Recommendations
Week Nine	The Assignment Problem, including the general definition, the general model, and solution methods such as the Hungarian Method and the Unit Method
Week Ten	Applications and Examples of Assignment Problems in the QSB Program, with Results Analysis and Recommendations
Week Eleven	Project Networks, including the general definition of project networks; how to construct a project network; critical path calculation; time-risk analysis; using the Critical Path Method (CPM) and PERT; and cost-time trade-off.
Twelfth week	Applications and Examples of Project Networks in the QSB Program, with Results Analysis and Recommendations
Thirteenth week	**Game Theory** , including the general definition, types of games, and solution methods such as Saddle Point, Dominance, Algebraic Solution, and Graphical Solution.
Fourteenth week	Applications and Examples of Game Theory in the QSB Program, with Results Analysis and Recommendations
Fifteenth week	Midterm Examination

Learning and Teaching Resources

	Text	Available in the Library?



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Required Texts	1. مقدمة في بحوث العمليات وتطبيقاتها ببرنامج QSB: الطبعة الاولى: ا.م.د. عمر محمد ناصر واخرون 2. Introduction to Operations Reserch: Eighth Edition: Hillie Lieberman: 2005	
Recommended Texts	1. تطبيقات وتحليلات النظام الكمي للاعمال :أ.د. مروان: الطبعة الثانية عبد الحميد عاشور : ا.م.د. عمر محمد ناصر العشاري، ا.د. خالد ضاري عباس: 2024	
Websites		

Grading chart				
Group	Appreciation	Grade	Marks %	Definition
Success Group (50 - 100)	privilege	A – Excellent	90 – 100	Outstanding Performance
	Very good	B - Very Good	80 – 89	Above average with some errors
	Good	C – Good	70 – 79	Sound work with notable errors
	medium	D – Satisfactory	60 – 69	Fair but with major shortcomings
	Acceptable	E – Sufficient	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	Deposit (in processing)	FX – Fail	(45-49)	More work required but credit awarded
	Failure	F – Fail	(0-44)	Considerable amount of work
Decimal points greater or less than 0.5 will be rounded to the highest or lowest full mark (for example, a 54.5 mark will be rounded to 55, while a 54.4 mark will be rounded to 54). The university has a policy of not tolerating "near scroll failure" so the only modification of the tags granted by the original tag(s) will be the auto rounding shown above.				