



## **Course Description: Operations Research**

**1. Basic Information:**

<b>Course Name</b>	Operations Research
<b>Course ID</b>	BQM202
<b>Contact Hours (Registered Sessions)</b>	18
<b>Contact Hours (Synchronized Sessions)</b>	18
<b>Mid Term Exam</b>	-
<b>Exam</b>	75 min
<b>Registered Sessions Work Load</b>	18
<b>Synchronized Session Work Load</b>	18
<b>Credit Hours</b>	4

**2. Pre-Requisites:**

<b>Course</b>	<b>ID</b>
<b>Mathematical Algebra</b>	GMA101
<b>Mathematical Analysis</b>	GMA102

**3. Course General Objectives:**

The purpose of the course is to provide students with the concepts and tools to help them understand the operations research and mathematical modeling methods. These methods will help the students to solve economic issues, which help to make a decision. The main goal is to find the lowest cost or the greatest profit in many linear programming in the economic field issues. The model was used to resolve the issue of transport. There are many of the problems regarding the transfer of goods within a minimum of expenses or the distribution of goods to obtain the maximum profit. It was used as a matter of allocation of activating the role of the distribution functions optimally to get the desired goal as costs or profits.

**4. Intended Learning Outcomes (ILO):**

Code	Intended Learning Outcomes
<b>ILO1</b>	Understand the meaning of Operations Research and how to use it. How to write linear program in the event of minimum cost or maximum profit.
<b>ILO2</b>	Linear program resolved in a manner graph.
<b>ILO3</b>	Linear program resolved in a way simplex.
<b>ILO4</b>	Linear Programming: Duality.
<b>ILO5</b>	How to solve Integer Programming.
<b>ILO6</b>	Methods of writing and resolving the issue of transport.
<b>ILO7</b>	The Assignment Problems, and methods to solve.

**5. Course Syllabus:** (18 hours of total synchronized sessions;18 hours of total Recorded Sessions)

- **RS:** Recorded Sessions; **SS:** Synchronized Sessions;

ILO	Course Syllabus	RS	SS	Type	Additional Notes
ILO1	<ul style="list-style-type: none"> <li>● Introduction to operations research.</li> <li>● Introduction.</li> <li>● The concept of operations Research.</li> <li>● The concept of linear programming.</li> <li>● The best solution problems.</li> <li>● linear mathematical form of the program in the case of Maximum.</li> <li>● linear mathematical form of the program in the case of Minmum.</li> <li>● The problems of Linear programming.</li> <li>● Build of Linear Programming.</li> </ul>	3	3	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	
ILO2	<ul style="list-style-type: none"> <li>● Solve the linear program graphically</li> <li>● Introduction.</li> <li>● Solve the linear program graphically in the case of Maximum.</li> <li>● solve the linear program graphically in the case of Minimum.</li> </ul>	1.5	1.5	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	
ILO3	<ul style="list-style-type: none"> <li>● Simplex.</li> <li>● Introduction.</li> <li>● Solve the linear program by Simplex in the case of Maximum.</li> <li>● Solve the linear program by Simplex in the case of Minimum.</li> </ul>	4.5	4.5	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	

<p><b>ILO4</b></p>	<ul style="list-style-type: none"> <li>● Linear Programming :Duality</li> <li>● Symmetric Duals.</li> <li>● Unsymmetric Duals.</li> </ul>	<p>1.5</p>	<p>1.5</p>	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	
<p><b>ILO5</b></p>	<ul style="list-style-type: none"> <li>● Integer Programming.</li> </ul>	<p>1.5</p>	<p>1.5</p>	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	
<p><b>ILO6</b></p>	<ul style="list-style-type: none"> <li>● Integer Programming – Transport Algorithm.</li> <li>● The Transportation Algorithm for Least Cost.</li> <li>● North– West corner Starting Solution and (Stepping Stone or and MODI).</li> <li>● Least–Cost Starting Solution and (Stepping Stone or and MODI).</li> <li>● Vogel's Starting Solution and (Stepping Stone or and MODI).</li> <li>● The Transportation Algorithm for increasing Profit.</li> </ul>	<p>4.5</p>	<p>4.5</p>	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	
<p><b>ILO7</b></p>	<ul style="list-style-type: none"> <li>● Assignment problems.</li> <li>● Assignment problems for least cost.</li> <li>● Assignment problems for increasing Profit.</li> </ul>	<p>1.5</p>	<p>1.5</p>	<ul style="list-style-type: none"> <li>■ Exercises</li> <li>■ Assignments</li> <li>■ Seminars</li> <li>■ Projects</li> <li>■ Practices</li> <li>■ Others</li> </ul>	

## 6. Assessment Criteria (Related to ILOs):

ISC	Interactive Synchronized Collaboration	Ex	Exams		Rpt	Reports
PF2F	Presentations and Face-to-Face Assessments	PW	Practice Work			

ILO Code	ILO	Intended Results	Assessment Type				
			ISC	PW	Ex	PF2F	Rpt
ILO1	Being able to understand the basics of Operations Research and the way of writing mathematical model correctly for the real the problem.		X		X		
ILO2	Use methods of the graph in solving linear program and to find the optimal solution.		X		X		
ILO3	A simplex way is used to find the optimal solution of the linear program in the event of the maximum or minimum.		X	X	X		
ILO4	Write the Linear programming: Duality and methods of solving the Duality program.		X	X	X		
ILO5	Introduce of Integer Programming and how to solve it.		X	X	X		
ILO6	The basic concepts of the issue of transport and distribution methods. make sure that solution is the optimal solution.		X	X	X		
ILO7	Concepts and uses the Assignment problems in the economic and the modalities for resolving the Assignment problems.		X	X	X		

## 7. Practice Tools:

Tool Name	Description

## 8. Main References:

- العيسى موفق، 1999، بحوث العمليات تطبيقات وخوارزميات. دار الحامد.
- راتول محمد، 2006، بحوث العمليات. ديوان المطبوعات الجامعية - الجزائر.
- كعبور محمد، 1992، اساسيات بحوث العمليات - نماذج وتطبيقات. منشورات كلية المحاسبة، غريان.

## 9. Additional References

- C. West Churchman, Russell L. Ackoff & E. L. Arnoff, Introduction to Operations Research, New York: J. Wiley and Sons, 1957.
- C. H. Waddington, O. R. in World War 2: Operational Research Against the U-boat, London, Elek Science, 1973.