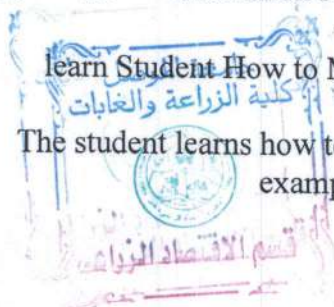


## Course Description Form

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Course name :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Operations Research</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2 Course code. Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>OPRE394</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3. Semester/Year :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Chapter 1 For my second study/third stage/2024-2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. Date this description was prepared :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>1/2/2025</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5. Available attendance forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>In-person + online</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6. Number of study hours (total) / Number of units (total):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Theoretical hours: 30 hours / Practical hours 45, number of units 3.5 online</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 7. Name of the course administrator (if more than one name is mentioned)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Name: Asst. Dr. Mona Abdel Qader Ahmed Email: <a href="mailto:munaalhamadani@uomosul.edu.iq">munaalhamadani@uomosul.edu.iq</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Name: M. Salah Fahmy Shaba Email: <a href="mailto:salahodesh@uomosul.edu.iq">salahodesh@uomosul.edu.iq</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Course objectives .1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p style="text-align: center;"><b>practical:</b></p> <p>The student learns how to Uses operations research models and stages</p> <p>How to formulation or construction Linear programming model</p> <p>How to formulation or construction Mathematical model</p> <p>How to solution Linear programming model using road the solution The graph</p> <p>The student learns graphically and mathematically. Special cases in linear programming</p> <p>Y to learn to For the student of the method transformation Linear Programming Model from Initial Forms to Standard Form</p> <p>Explain to the student Cases Special problems when solving using the simplex method</p> <p>How to solution The issue of balanced transportation Mathematically</p> <p>How to solution The issue of balanced transportation Northwest Method Mathematically</p> <p>How to solution The issue of balanced transportation In a less mathematically expensive way</p> <p>How to solution The issue of balanced transportation Vogel's mathematical method</p> <p>How to solution The issue of transportation by method Other balanced Mathematically</p> | <p style="text-align: center;"><b>theoretical:</b></p> <p>The student learns about concept Operations research and its historical development</p> <p>Shows the student The role and methods of operations research in decision making</p> <p>The student gets to know On the concept of linear programming</p> <p>Explain to the student requirements And assumptions and areas of use Linear programming</p> <p>How to installation Linear programming model</p> <p>Shows Steps to find the optimal solution in linear programming</p> <p>The student learns about the mechanism of simplex operation.</p> <p>Explain to the student Simplex solution procedures</p> <p>Explain to the student General framework for balanced transport problems</p> <p>Shows the student problem Balanced transport Northwest Method</p> <p>Shows the student problem Balanced transport The least expensive way</p> <p>Shows the student problem Balanced transport Vogel's method</p> <p>The student learns about The problem of unbalanced road transport</p> |

How to Solving transportation problems imbalance of supply and demand and Profit maximization case and presence more From the solution Ideal and State of dissolution Graphically and mathematically



learn Student How to Make Decisions in Uncertainty  
The student learns how to Solving practical examples of simulation

The student learns about Cases the Especially when solving transportation problems. imbalance of supply and demand and Profit maximization case and presence more From the solution Ideal and State of dissolution. Yto get to know the student on The most important problems in administrative decision-making  
learn Student How to Make Decisions in Uncertainty  
recognize For students On simulation and methods of studying it

## Teaching and learning strategies .2

### Strategy

- Interactive lecture: brainstorming, dialogue and discussion. Explaining the role of operations research in decision-making.
- Interactive lecture: Brainstorming, dialogue and discussion in the stages of quantitative analysis of operations research
- Interactive lecture, brainstorming, explaining linear programming and its uses
- Interactive lecture and brainstorming to formulate and build a linear programming model
- Interactive lecture, brainstorming, dialogue and participation in evaluating the steps to find the optimal solution
- Interactive lecture, brainstorming, dialogue and participation in How does the simplex method work?
- Interactive lecture, brainstorming, dialogue and discussion, assignment and report
- Interactive lecture, brainstorming, dialogue and discussion, assignment and report
- Interactive lecture, brainstorming, dialogue and discussion, assignment and report
- Interactive lecture, brainstorming and comparison between balanced and unbalanced transportation problems
- Interactive lecture, brainstorming, dialogue and discussion
- Interactive lecture, brainstorming, dialogue and discussion, assignment and report
- Interactive lecture, brainstorming, dialogue and discussion
- He is assigned a task to draw the optimal region for linear programming.
- You are assigned the task of solving exercises on various transportation problems using balanced and unbalanced methods.

# 10 .Course structure

| Evaluation method                  | Learning method                                                                                | Name of unit or topic                                                                                                                                                   | Required learning outcomes                                                                                                                                                    | watches       | week           |
|------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | Definition of operations research<br>Historical development of operations research<br>The role of operations research in decision making<br>Operations research methods | A1 The student learns about concept Operations research and its historical development<br>B1 shows the student The role and methods of operations research in decision making | 2 theoretical | First week     |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | Operations research models<br>Stages of quantitative analysis                                                                                                           | C1 The student learns how to Uses operations research models and stages                                                                                                       | 3 practical   |                |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | The concept of linear programming<br>Requirements and assumptions of the linear programming model<br>Journals using linear programming                                  | A2 The student recognizes On the concept of linear programming<br>B2 explains to the student requirements And assumptions and areas of use Linear programming                 | 2 theoretical | Second week    |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | Formulate or build a linear programming model<br>Formulating the mathematical model                                                                                     | D1 How to formulate or construction Linear programming model<br>D2 How to formulate or construction Mathematical model                                                        | 3 practical   |                |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style                          | Linear programming model installation                                                                                                                                   | B3 How to install Linear programming model                                                                                                                                    | 2 theoretical | The third week |

| short exams<br>Duty<br>discussions | Assignment and report                                                                          | Certainty cases in linear programming                                      |                                                                                                                       |                   |
|------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------|
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | solutionLinear programming model using road the graph                      | D3How to solutionLinear programming model using road the graph                                                        | 3<br>practica     |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | stepsFinding the optimal solution                                          | B4ShowsSteps to find the optimal solution in linear programming                                                       | 2<br>theoreti cal |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | CasesEspecially in the graphic solution                                    | C2 The student learns graphically and mathematically.Special cases in linear programming                              | 3<br>practica 1   |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | How does the simplex method work?                                          | A2The student learns about the mechanism of simplex operation.                                                        | 2<br>theoreti cal |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | transformationLinear Programming Model from Initial Forms to Standard Form | B5Yto learn toFor the student of the methodtransformationLinear Programming Model from Initial Forms to Standard Form | 3<br>practica 1   |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment of tasks   | proceduresSimplex solution                                                 | B6Explain to the studentSimplex solution procedures                                                                   | 2<br>theoreti cal |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style                          | CasesSpecial problems when solving using the simplex method                | C3Explain to the studentCasesSpecial problems                                                                         | 3<br>practica 1   |

| short exams<br>Duty<br>discussions | Assignment of tasks                                                                                    | frameworkGeneral problem of<br>balanced transport     | when solving using the<br>simplex method<br>B7 explains to the<br>studentGeneral framework for<br>balanced transport problems | 2<br>theoreti<br>cal | Week 7  |
|------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment of tasksAnd report | solutionThe issue of balanced<br>transportation       | D4 How tosolutionThe issue of<br>balanced<br>transportationMathematically                                                     | 3<br>practica<br>1   |         |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report         | roadNorthern cornerWestern                            | C4Shows the student<br>problemBalanced<br>transportNorthwest Method                                                           | 2<br>theoreti<br>cal | Week 8  |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report         | Mathematical solution<br>toroadNorthern cornerWestern | D5 How tosolutionThe issue of<br>balanced<br>transportationNorthwest<br>Method Mathematically                                 | 3<br>practica<br>1   |         |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report         | roadLower costs                                       | C5Shows the student<br>problemBalanced transportThe<br>least expensive way                                                    | 2<br>theoreti<br>cal | Week 9  |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report         | Mathematical solution in a less<br>expensive way      | D6 How tosolutionThe issue of<br>balanced transportationFor a<br>less expensive mathematical<br>method                        | 3<br>practica<br>1   |         |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment of tasks           | roadVogel                                             | C6Shows the student<br>problemBalanced<br>transport Vogel's method                                                            | 2<br>theoreti<br>cal | Week 10 |

|                                    |                                                                                                |                                                                                                                                              |                                                                                                                                                  |                  |                    |
|------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment of tasks   | Vogel's mathematical solution                                                                                                                | D7 How to solve the issue of balanced transportation Vogel's method mathematically                                                               | 3<br>practical   | Week<br>eleven     |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | framework The general problem of unbalanced transportation                                                                                   | B8 The student learns about the problem of unbalanced road transport                                                                             | 2<br>theoretical |                    |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | solution The issue of transportation in an unbalanced way                                                                                    | D8 How to solve the issue of transportation by other methods Mathematically                                                                      | 3<br>practical   |                    |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | Special cases when solving transportation problems<br>imbalance of supply and demand<br>Profit maximization case                             | B9 The student learns about cases especially when solving transportation problems.<br>imbalance of supply and demand<br>Profit maximization case | 2<br>theoretical | Twelfth<br>week    |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | Exercises and charts<br>For special cases when solving transportation problems<br>imbalance of supply and demand<br>Profit maximization case | D9 How to solve transportation problems<br>imbalance of supply and demand<br>Profit maximization case<br>Graphically and mathematically          | 3<br>practical   |                    |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report | Special cases when solving transportation problems<br>There is more than one optimal solution<br>State of dissolution                        | B10 The student learns about the cases especially when solving transportation problems.                                                          | 2<br>theoretical | thirteenth<br>week |

|                                    |                                                                                                   |                                                                                                                                               |                                                                                                                              |                  |
|------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------|
|                                    |                                                                                                   |                                                                                                                                               | There is more than one optimal solution                                                                                      |                  |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report    | Exercises and charts<br>Special cases when solving transportation problems<br>There is more than one optimal solution<br>State of dissolution | D10 How to Solving transportation problems<br>There is more than one optimal solution<br>State of dissolution mathematically | 3<br>practical   |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report    | Administrative decision-making problems<br>Decision-making situations<br>Cases of non-Verify                                                  | B11 To get to know the student on the most important problems in administrative decision-making                              | 2<br>theoretical |
| short exams<br>Duty<br>discussions | Auditory methods<br>Blackboard writing style<br>Direct dialogue style<br>Assignment and report    | Decision-making models under uncertainty                                                                                                      | C7 learn The student How to make decisions in situations of uncertainty                                                      | 3<br>practical   |
| short exams<br>Duty<br>discussions | Auditory methods<br>Writing style on blackboard<br>Direct dialogue style<br>Assignment and report | Simulation:<br>Methods Q Simulation study                                                                                                     | B12 recognize For students On simulation and methods of studying it                                                          | 2<br>theoretical |
| short exams<br>Duty<br>discussions | Auditory methods<br>Writing style on blackboard<br>Direct dialogue style<br>Assignment and report | Simulation:<br>Methods Q Study/Applied Examples                                                                                               | C8 The student learns how to Solving practical examples of simulation                                                        | 3<br>practical   |

Fourteenth week

Week 15

| 11 Course evaluation |         |                             |                                        |   |
|----------------------|---------|-----------------------------|----------------------------------------|---|
| Relative weight %    | degree  | Calendar appointment - week | Evaluation methods                     | T |
| 5                    | 5       | My theory week 1-15         | Final theoretical report +             | 1 |
| 10                   | 5<br>5  | Week 3                      | Short Test 1 Quiz                      | 2 |
| 15                   | 10<br>5 | Week 9                      | Midterm exam Theoretical and practical | 3 |
| 10                   | 5<br>5  | Week 12                     | Short Test 2 Quiz                      | 4 |
| 20                   | 20      | Practical exam week         | Final practical exam                   | 5 |
| 40                   | 40      | Theoretical exam week       | Final theoretical exam                 |   |
| 100                  | 100     |                             | the total                              |   |

| 12- Learning and teaching resources                                                                                                              |                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Introduction to Operations Research / Adnan Shamkhi / Dhuya Salman<br>Operations Research and Decision Making, Dr. Afif Ali Hassan Al-Dash, 2012 | 1- Required textbooks                                              |
| Modern books in quantitative methods/decision making.                                                                                            | 2- Main references (sources)                                       |
| Building Mathematical Models // Local and international journals specialized in the field of operations research and quantitative management.    | A. Recommended books and references (scientific journals, reports) |
| Iraqi Virtual Library/External Internet Research.                                                                                                | B - Electronic references, websites...                             |

Theoretical subject teacher Practical subject teacher: **Dr. Muna Abdel Qader Ahmed**

Practical subject teacher: **M. Salah Fahmy Shaba**

Chairman of the Scientific Committee: **prof Dr Qais Nazem Ghazi**

Head of the Department of Agricultural Economics : Assistantt.  
Prof. Dr. **Zwaid Fathi Abdel**