**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.  |

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| College of Engineering/ University of Baghdad | 1. Teaching Institution |
| Chemical Engineering | 2. University Department/Centre |
| Industrial Management / 322 | 3. Course title/code |
| Chemical Engineering Program | 4. Programme(s) to which it contributes |
| Annual System ; There is only onemode of delivery, which is a “DayProgram”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | 5. Modes of Attendance offered |
| 1st & 2nd / Academic Year 2017 – 2018 | 6. Semester/Year |
| 60hrs. / 2 hrs. per week | 7. Number of hours tuition (total) |
| 11-10-2017 | 8. Date of production/revision of this specification  |
| 9. Aims of the Course |
| The aims of the course:1. The student will have the skills as a project manager.
2. **The ability to transform industrial problems to** linear programming models and find the optimal solution.
3. To deal with unexpected events during the production process.
4. To make the right decision of **industrial problems to find the maximum** **profit or minimum cost; such as;** assignment, transportation, blending and **petroleum refinery** problems; such as crude oil distillation; and others.
5. **Calculate the project time.**
6. **Study how to prevent any delay in project** accomplishes **time.**
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method  |
| 1. Knowledge and Understanding

 A1. The student will have the skills as a project manager: A2. To convert practical industrial problems to linear programming models. A3. To Find the optimal solution of the models. A4. To under stand the duality theory models to the dual form.  A5. The student will be able to deal with unexpected events during the production processes by post –optimally analysis.  A6. To find the minimum cost of the transportation problems. A7. To make the right decision of assignment problems. A8. To calculate the project time by studying the net work models.  A9.To find the critical path to prevent any delay in the project accomplishes time. **A10.** **To study and modeling of important industrial applications, such as, blending of gasoline and petroleum refinery problems.**  |
|  B. Subject-specific skillsB1. Modeling of optimization problems.B2. Studying linear programming methods.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_C. Thinking Skills C1. Developing critical and creative thinking skills related to optimization problems.C2. Modeling of industrial problems.C3.Deal with un-expected events.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Community affectivity. D2. Work individually and team members in international and multidisciplinary teams. D3. Understanding impact of engineering solutions in an environmental and social context. |
|  Teaching and Learning Methods |
| 1. Lectures.
2. Tutorials.
3. Home and class works and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Report.
7. Connection between Theory and Application.
8. Field Trips.
9. Seminars.
10. In- and Out-Class oral conservations.
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|  Assessment methods  |
| 1. Examinations, Tests, and Quizzes.
2. Extracurricular Activities.
3. Student Engagement during Lectures.
4. Responses Obtained from Students
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| 11. Course Structure |
| Assessment Method | TeachingMethod | Unit/Module or Topic Title | ILOs | Hours | Week |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Concepts Principles, Development, Assumptions (LP)**  | A1  |  2 |  1 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **General statement , Modeling , Standard Form** | A1,2,3, B1,2 |  2 | 2 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) |  **Graphical Method**  | A1,2,3, B1,2 | 1 the.1 tut. | 3 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Simplex Method**  | A1,2,3, B1,2 | 1 the.1 tut. | 4 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Big M-Technique**  | A1,2,3, B1,2 |  21 the.1 tut. | 5 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Two-Phase Method**  | A1,2,3, B1,2 |  21 the.1 tut. | 6 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Algebric Method** | A1,2,3, B1,2 |  21 the.1 tut. | 7 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Special Cases of LP: Degeneracy, Alternative Solutions**  | A1,2,3, B1,2 |  21the.1 tut. | 8 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Unbounded Solutions, No feasible Solution** | A1,2,3, B1,2 |  21 the.1 tut. | 9 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Dual Model, Duality** | A1,2,3,4, B1,2 |  2 | 10 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Dual Simplex Method** | A1,2,3,4, B1,2 |  21 the.1 tut. | 11 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Post Optimally Analysis(graphically)** | A1,2,3, 5, B1,2 |  21 the.1 tut. | 12 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Post Optimally Analysis(simplex method)** | A1,2,3, 5, B1,2 |  21 the.1 tut. | 13 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Transportation problems: Model**, Matrix | A1,2,3, 6, B1,2 |  2 | 14 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The North-West the Least cost and VAM methods** | A1,2,3, 6, B1,2 |  21 the.1 tut. | 15 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Un- Balanced Model** | A1,2,3, 6, B1,2 |  21 the.1 tut. | 16 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Stepping Stone Method** | A1,2,3 ,6, B1,2 |  21 the.1 tut. | 17 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Modified Distribution Method** | A1,2,3, 6, B1,2 |  21 the.1 tut. | 18 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) |  **The Assignment Problems: The Model ,Matrix** | A1,2,3,7, B1,2 |  2 | 19 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Complete Enumeration Method** | A1,2,3,7, B1,2 |  21 the.1 tut. | 20 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Hungarian Method** | A1,2,3,7, B1,2 |  21 the.1 tut. | 21 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Un- balanced model** | A1,2,3,7, B1,2 |  2 | 22 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **LP Method , Transportation Method** | A1,2,3,6,7, B1,2 |  2 | 23 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Network Models: Critical Path Method**  | A1,8,9 |  2 | 24 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Earliest &Latest Times** | A1,8,9 |  2 | 25 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Program Evaluation and Review Technique (PERT)** | A1,8,9 |  2 | 26 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **The Blending problem** | A1,2,3,10, B1,2 |  2 | 27 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Petroleum- refinery operations** | A1,2,3,10, B1,2 |  2 | 28 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Crude oil distillation modeling** | A1,2,3,10, B1,2 |  2 | 29 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | **Crude oil distillation modeling** | A1,2,3,10, B1,2 |  2 | 30 |

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| 12. Infrastructure |
| ***Textbook***1. Mokhta S. B.,”Linear Programming and Network Flows” 3rd Edition, 2005.
2. Ann J. H.,” Linear Programming :An Emphasis on Decision Making”, Wesley, 1973
3. G. Hadley,” Linear Programming” ,Wesley.

***References***1. **عبدّ ذياب جزاع "بحوث العمليات" الطبعة الثانية و1986**
2. **النعيمي,"بحوث العمليات", الطبعة الأولى,1999**

***Others***1. Notebook prepared by the instructor of the course.
2. Collection of tutorial sheets of solved and unsolved problems and Exams questions
 | Required reading:· CORE TEXTS· COURSE MATERIALS· OTHER |
| Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) |
| Field and scientific visits | Community-based facilities(include for example, guestLectures , internship , field studies) |

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| 13. Admissions |
|  | Pre-requisites |
| / | Minimum number of students |
| 35 | Maximum number of students |

***Instructor:***

**Teacher : Maha Muhyi Alwan Al:Hussaini**

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