**COURSE SPECIFICATION**

|  |
| --- |
| 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. |

|  |  |
| --- | --- |
| College of Engineering/ University of Baghdad | 1. Teaching Institution |
| Chemical Engineering Department (CHED) | 2. University Department/Centre |
| Chemical Engineering Principles /CHE141 | 3. Course title/code |
| Chemical Engineering Department (CHED) | 4. Programme(s) to which it contributes |
| Annual System; There is only one mode of delivery, which is a “Day Program”. 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 Semesters/Academic Year 2017 -2018 | 6. Semester/Year |
| 120 hrs. / 4 hrs. per week | 7. Number of hours tuition (total) |
| 2-10-2017 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aims of the course are:  1.  Students develop a fundamental understanding of the basic principles of chemical engineering processes and calculations.  2.  Students can examine and select pertinent data, and solve material balance problems (application, analysis, synthesis).  3.  Students can select and/or evaluate problem solution methods, for example, between analytic and numerical solution techniques.  4.  Students can give examples of important application of material balances in chemical engineering processes.  5.  Students can evaluate their own solutions and those of others to find and correct errors. | |
|  | |

|  |
| --- |
| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Ability to identify and describe various unit operations in chemical industry.  A2. Ability to change and derive units from one unit to others.  A3. Ability to calculate moles, density and concentrations.  A4. Ability to perform mass balance problems involving simple or multiple-unit processes, recycle, bypass and purge. .  A5.  Ability to calculate the density and specific gravity for gases. Calculate the partial pressure of the components of a saturated ideal gas. |
| B. Subject-specific skills  B1. Solve material balances problems involving ideal gases.  B2. Ability to demonstrate effective team work and problem solving skills.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  C. Thinking Skills  C1. Developing critical and creative thinking skills related to material balance on chemical engineering processes.  C2. Using different methods solution.  C3. Analysis assumptions.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Community effectively.  D2. Work individually and team members in international and multidicplinary teams.  D3. Understanding impact of engineering solutions in an environmental and social context. |
| Teaching and Learning Methods |
| 1. Lectures 2. Tutorials 3. Homework and assignments 4. Tests and Exams 5. In-Class questions and discussions 6. Connection between theory and application 7. Seminars 8. In- and Out-Class oral conservations 9. Reports, presentations, and posters |
| Assessment methods |
| 1. Examinations, Tests, and Quizzes. 2. Extracurricular activities and homework. 3. Student engagement during lectures |
|  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| 1 – 3 of article (10) | 1-9 of  article (10) | Dimensions & Units | A1, A2 | 4  3 the.  1 tut. | 1 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Conversion | A1, A2 | 4  3 the.  1 tut. | 2 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Moles & Density | A1, A2, A3 | 4  3 the.  1 tut. | 3 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Concentration | A1, A2, A3 | 4  3 the.  1 tut. | 4 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Choosing a basis | A1, A2, A3, B2 | 4  3 the.  1 tut. | 5 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Temperature | A1, A2, A3, B2 | 4  3 the.  1 tut. | 6 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Pressure | A1, A2, A3, B2 | 4  3 the.  1 tut. | 7 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Introduction to material balance | A4, B1, B2 | 4  3 the.  1 tut. | 8 |
| 1 – 3 of article (10) | 1-9 of  article (10) | General strategy for solving material balance problems | A4, B1, B2 | 4  3 the.  1 tut. | 9 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Solving material balance problems for single units without reaction | A4, B1, B2 | 4  3 the.  1 tut. | 10 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Solving material balance problems for single units without reaction | A4, B1, B2 | 4  3 the.  1 tut. | 11 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Solving material balance problems for single units without reaction | A4, B1, B2 | 4  3 the.  1 tut. | 12 |
| 1 – 3 of article (10) | 1-9 of  article (10) | The chemical equation and stoichiometry | A4, B1, B2 | 4  3 the.  1 tut. | 13 |
| 1 – 3 of article (10) | 1-9 of  article (10) | The chemical equation and stoichiometry | A4, B1, B2 | 4  3 the.  1 tut. | 14 |
| 1 – 3 of article (10) | 1-9 of  article (10) | The chemical equation and stoichiometry | A4, B1, B2 | 4  3 the.  1 tut. | 15 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balances for processes involving reaction | A4, B1, B2 | 4  3 the.  1 tut. | 16 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balances for processes involving reaction | A4, B1, B2 | 4  3 the.  1 tut. | 17 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balances for processes involving reaction | A4, B1, B2 | 4  3 the.  1 tut. | 18 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balance problems involving multiple units | A4, B1, B2 | 4  3 the.  1 tut. | 19 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balance problems involving multiple units | A4, B1, B2 | 4  3 the.  1 tut. | 20 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balance problems involving multiple units | A4, B1, B2 | 4  3 the.  1 tut. | 21 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Recycle (without reaction) | A4, B1, B2 | 4  3 the.  1 tut. | 22 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Recycle (involving reaction) | A4, B1, B2 | 4  3 the.  1 tut. | 23 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Bypass | A4, B1, B2 | 4  3 the.  1 tut. | 24 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Purge | A4, B1, B2 | 4  3 the.  1 tut. | 25 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Industrial application of material balances | A4, B1, B2 | 4  3 the.  1 tut. | 26 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Industrial application of material balances | A4, B1, B2 | 4  3 the.  1 tut. | 27 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Ideal gases & The ideal gas law | A5, B1, B2 | 4  3 the.  1 tut. | 28 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Ideal gas mixtures and partial pressure | A4, A5, B1, B2 | 4  3 the.  1 tut. | 29 |
| 1 – 3 of article (10) | 1-9 of  article (10) | Material balances involving ideal gases | A4, A5, B1, B2 | 4  3 the.  1 tut. | 30 |

|  |  |
| --- | --- |
| 12. Infrastructure | |
| ***Textbook***   1. David M. Himmelblau and James B. Riggs, 2004 "**Basic Principles and Calculations in Chemical Engineering",** Seventh Edition.   ***References***   1. Richard M. Felder and Ronald W. Rousseau, 1999 "**Elementary Principles of Chemical Processes",** Third Edition. 2. Joseph P. Reynolds, John S. Jeris and Louis Theodore, 2002 "Handbook of chemical and environmental Engineering Calculations"   ***Others***  1. Notebook prepared by the instructor of the course  2. Collection of sheets of solved and unsolved problems and Exams sheets | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| 1. Available websites related to the subject  2. Excel or similar software for the solution of lengthy problems. | Special requirements (include for example workshops, periodicals, IT software, websites) |
| 1. Field and scientific visits 2. Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

|  |  |
| --- | --- |
| 13. Admissions | |
| CHE121 and CHE123 | Pre-requisites |
| 40 | Minimum number of students |
| 70 | Maximum number of students |

***Instructor:***

**Asst. Prof. Dr. Ahmed Faiq Al-Alawy**

Assistant Professor, transport phenomena

Chemical Engineering Department

College of Engineering

University of Baghdad

Tel: +00964-7901205905

Email: [ahmedalalawy@yahoo.com](mailto:ahmedalalawy@yahoo.com)