**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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| University of Baghdad - College of Engineering | 1. Teaching Institution |
| Chemical Engineering Department | 2. University Department/Centre |
| Basic principles of chemical engineering 2 – Chem. E.244 | 3. Course title/code |
| Chemical Engineering Programs | 4. Programme(s) to which it contributes |
| Yearly system with full study | 5. Modes of Attendance offered |
| 1st & 2nd / Academic Year 2017 – 2018 | 6. Semester/Year |
| 120 hour / 4 hour per weak | 7. Number of hours tuition (total) |
| 10/10/2017 | 8. Date of production/revision of this specification |
| 9. Aims of the Course |
| 1. Study Real gas relationships and gas mixture
2. Study Forms of energy and Latent heat of vaporization
3. Knowing the First law of thermodynamic
4. Define Standard heat of reaction ,Types of systems ,Heat capacity
5. Material balances with chemical reaction review
6. Study material balances with recycle , by pass and purge.
7. Energy balance without and with chemical reaction
8. Humidity charts and their uses
9. Heat of solution, Enthalpy-concentration charts and their uses.
10. Material and energy balance for complete projects.
11. Unsteady state material balance ,
12. Unsteady State energy balance.
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding

A1. Calculation Real gas relationships and gas mixture.A2. Define Forms of energy and the First law of thermodynamic A3. Using Energy balance without and with chemical reactionA4. Using Humidity charts A5. Enthalpy-concentration charts and their uses A6. Knowing how to balance unsteady material and energy systems |
|  B. Subject-specific skillsB1. Solve problems for real gas and their mixture B2. Using diagrams and chart for calculation Humidity and heat of solutionB3. Used unsteady state balances for solving systems |
| C. Thinking Skills C1. Learning the basic calculation and principles in chemical engineeringC2. Using mathematical methods for solving material and energy balancesC3. Solving unsteady state models  |
| D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Activity with societyD2. The work with a team D3. How engineering is benefit for society and environment |
|  Teaching and Learning Methods  |
| 1. Lectures
2. Class work
3. Home work
4. Daily and monthly exams
5. Problem answers
6. Meeting
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|  Assessment methods |
| 1. Daily and monthly exams
2. Outside lecture teaching
3. Students problem answers
4. Students notes
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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 of article (1) | Real gas relationships and gas mixture | A1 | 4 Hours2 Theoretical2 Tutorial | 1 |
| 1-4 of article (10) | 1-9 of article (1) | Real gas relationships and gas mixture | A1 | 4 Hours2 Theoretical2 Tutorial | 2 |
| 1-4 of article (10) | 1-9 of article (1) | Forms of energy  | B1 | 4 Hours2 Theoretical2 Tutorial | 3 |
| 1-4 of article (10) | 1-9 of article (1) |  Latent heat of vaporization | A2,B1 | 4 Hours2 Theoretical2 Tutorial | 4 |
| 1-4 of article (10) | 1-9 of article (1) | First law of thermodynamic | A2,B1 | 4 Hours2 Theoretical2 Tutorial | 5 |
| 1-4 of article (10) | 1-9 of article (1) | Standard heat of reaction | A2,A3,B1 | 4 Hours2 Theoretical2 Tutorial | 6 |
| 1-4 of article (10) | 1-9 of article (1) | Types of systems  | A2,A3,B1 | 4 Hours2 Theoretical2 Tutorial | 7 |
| 1-4 of article (10) | 1-9 of article (1) | Heat capacity | A2,A3,B2 | 4 Hours2 Theoretical2 Tutorial | 8 |
| 1-4 of article (10) | 1-9 of article (1) | Energy balance without chemical reaction  | A2,A3,B1 | 4 Hours2 Theoretical2 Tutorial | 9 |
| 1-4 of article (10) | 1-9 of article (1) | Energy balance with chemical reaction  | A2,A3,B1 | 4 Hours2 Theoretical2 Tutorial | 10 |
| 1-4 of article (10) | 1-9 of article (1) | Material balances with chemical reaction review | A2,A3,A4B1 | 4 Hours2 Theoretical2 Tutorial | 11 |
| 1-4 of article (10) | 1-9 of article (1) | Study material balances with recycle , by pass and purge | A2,A3,A4B1 | 4 Hours2 Theoretical2 Tutorial | 12 |
| 1-4 of article (10) | 1-9 of article (1) | Material and energy balances | A2,A3,A4B1 | 4 Hours2 Theoretical2 Tutorial | 13 |
| 1-4 of article (10) | 1-9 of article (1) | Material and energy balances | A2,A3,A4B1 | 4 Hours2 Theoretical2 Tutorial | 14 |
| 1-4 of article (10) | 1-9 of article (1) | Heat of solution | A2,A3,A4B1 | 4 Hours2 Theoretical2 Tutorial | 15 |
| 1-4 of article (10) | 1-9 of article (1) | Enthalpy-concentration charts and their uses | A2,A3,A4B1 | 4 Hours2 Theoretical2 Tutorial | 16 |
| 1-4 of article (10) | 1-9 of article (1) | Definitions of different kinds of humidity  | B2 | 4 Hours2 Theoretical2 Tutorial | 17 |
| 1-4 of article (10) | 1-9 of article (1) | Humidity charts and their uses  | B2 | 4 Hours2 Theoretical2 Tutorial | 18 |
| 1-4 of article (10) | 1-9 of article (1) | Material and energy balance for complete projects. | B2 | 4 Hours2 Theoretical2 Tutorial | 19 |
| 1-4 of article (10) | 1-9 of article (1) | Unsteady state material balance | A5 | 4 Hours2 Theoretical2 Tutorial | 20 |
| 1-4 of article (10) | 1-9 of article (1) | Unsteady State energy balance | A5 | 4 Hours2 Theoretical2 Tutorial | 21 |

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| 12. Infrastructure |
|  | Required reading:Basic principles and calculations in chemical engineering 7th edition,by David M.Himmeblau the University of Texas.1. Supplementry problems for basic principles and calculations in chemical engineering 6th edition,by David M.Himmeblau the University of Texas(1996).2.Elementary principles of chemical processes 3ed edition(2005)3.Richard M.Felder ,Ronald W.Rousseau. OthersLecture notes Students answers for problems |
| Internet knowledge for chemical engineering  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  internship, field studies | Community-based facilities(include for example, guestLectures , internship , field studies) |

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| 13. Admissions |
|  | Pre-requisites |
|  | Minimum number of students |
| 75 | Maximum number of students |