**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course a1st & 2nd / Academic Year 2017 – 2018n1st & 2nd / Academic Year 2017 – 2018, 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 |
| Physical chemistry | 3. Course title/code |
| Chemical engineering programe | 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 |
| 120 hrs. / 4 hrs. per week | 7. Number of hours tuition (total) |
| 18-10-2017 | 8. Date of production/revision of this specification |
| 9. Aims of the Course |
| 1-Give an introduction to the uses of physical chemistry in chemical engineering |
| 2-It provide many opportunities for the intermediate applications of ideas and equations in solving problems |
| 3-Studying thermodynamics laws zero,first , second and third law  |
| 4-Learning about Thermo chemistry |
| 5-Show how rates of chemical reactions can be understood |
| 6-Learn about different energy like entropy ,Gibbs and Helmoltz energies |
| 7-Drive Maxwell relation used in thermodynamics relations |
| 8-Understnnd phase equilibrium and chemical equilibrium |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding

A1. Calculation of ideal gas law and real gas lawsA2.calculationsof enthalpy at different conditionsA3.calculations of different energiesA4.learning about reactions rates |
|  B. Subject-specific skillsB1.solving physical chemistry problems using differentiated laws during all the chaptersB2.connect between theory and the experimental work in the physical chemistry laborotary |
|  Teaching and Learning Methods |
| C1. Developing critical and creative thinking skills related to physical chemistry.C2.Using mathematical models.C3. Analysis assumptions.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  Assessment methods  |
| .D. General and Transferable Skills (other skills relevant to employability and personal development) D1.Communitiyeffectivity.D2. Work individually and team members in international and multidicplinary teams. D3. Understanding impact of engineering solutions in an environmental and social context. |
| C. Thinking Skills C1. Developing critical and creative thinking skills related to physical chemistry.C2. Using mathematical modelsC3. Analysis assumptions |
|  Teaching and Learning Methods  |
| 1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Con Examinations, Tests, and Quizzes.
7. Extracurricular Activities.
8. Student Engagement during Lectures.
9. Responses Obtained from Studentsnection between Theory and Application.
10. Field Trips.
11. Seminars.

 In- and Out-Class oral conservations9-experments in physical chemistry lab |
|  Assessment methods |
| 1- Examinations ,Tests , and Quizzes2-Students Engagments during lectures3-Response obtained from students4-Examinations in lab |

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| 11. Course Structure |
| Assessment Method | TeachingMethod | Unit/Module or Topic Title | ILOs | Available websites related to the subjectHours | Week |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Zero law of thermodynamics | A1 | 42 the.2 tut. | 1 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Zero law of thermodynamics | A1 | 42 the.2 tut. | 2 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | First law of thermodynamics | B1 | 42 the.2 tut. | 3 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | First law of thermodynamics | A2,B1 | 42 the.2 tut. | 4 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Second law of thermodynamics | A2,B1 | 42 the.2 tut. | 5 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Second law of thermodynamics | A2,B1 | 42 the.2 tut. | 6 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Third law of thermodynamics | A2,A3,B1 | 42 the.2 tut. | 7 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | thermochemistry | A2,A3,B1 | 42 the.2 tut. | 8 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Gibbs energy and Helmoltz energy | A2,A3,B1 | 42 the.2 tut. | 9 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Chemical equilibrium | A2,A3,B1 | 42 the.2 tut. | 10 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Chemical equilibrium | A2,A3,A4,B1 | 42 the.2 tut. | 11 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Phase equilibrium | A2,A3,A4,B1 | 42 the.2 tut. | 12 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Phase equilibrium | A2,A3,A4,B1 | 42 the.2 tut. | 13 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Gas kinetics | A2,A3,A4,B1 | 42 the.2 tut. | 14 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Gas kinetics | A2,A3,A4,B1 | 42 the.2 tut. | 15 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Electro chemical equilibrium | A2,A3,A4,B1 | 42 the.2 tut. | 16 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Electro chemical equilibrium | B2 | 42 the.2 tut. | 17 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Electro chemistry | B2 | 42 the.2 tut. | 18 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Electro chemistry | B2 | 42 the.2 tut. | 19 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Ideal solution | A5 | 42 the.2 tut. | 20 |
| 1 – 4 of article (10) | 1-9 ofarticle (10) | Non ideal solution | A5 | 42 the.2 tut. | 21 |

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| 12. Infrastructure |
| Text bookPhysical chemistry seventh edion by albertyRefrencesPhysical chemistry by S.CHANDPhysical chemistry by moore***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 |
| 75 | Maximum number of students |

**Instructor**

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