**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 program specification. |

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| College of Engineering/ University of Baghdad | 1. Teaching Institution |
| Chemical Engineering | 2. University Department/Centre |
| Chemical Engineering Thermodynamics | 3. Course title/code |
| Chemical Engineering Program | 4. Program (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 / Academic Year 2017 – 2018 | 6. Semester/Year |
| 120 hrs. / 4 hrs. per week | 7. Number of hours tuition (total) |
| 01-10-2017 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| 1. Review of the laws of thermodynamics and driving a network of applicable equations in all branches of chemical engineering. | |
| 1. Review of the methods for the calculation of heat and work requirements in physical and chemical processes. | |
| 1. Review of the methods for the determination of equilibrium conditions for transfer of chemical species between phases. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. The students will be able to apply the derived network of equations in all branches of chemical engineering.  A2. The students will be able to calculate the heat and work requirements in physical and chemical processes.  A3. The students will be able to determine the equilibrium conditions for transfer of chemical species between phases. |
| B- Subject-specific skills  B1. The students will have skills to preform mass and energy balances of any physical and chemical process.  B2.The students will be able to apply the numerical techniques to solve the chemical thermodynamic problems. |
| C- Thinking Skills  C1. Developing critical and creative thinking skills related to chemical engineering thermodynamics.  C2. Using numerical methods.  C3. Analysis assumptions. |
| D- 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. Field Trips. 8. Seminars. 9. In- and Out-Class oral conservations. |
| E- Assessment methods   1. Examinations, Tests, and Quizzes. 2. Extracurricular activities. 3. Student engagement during lectures. 4. Responses obtained from students |
| F- General and Transferable Skills (other skills relevant to employability and personal development)  F1. Community effectivity.  F2.Work individually and team members in international and multidisciplinary teams.  F3. Understanding impact of engineering solutions in an environmental and social context. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| 1-3 | 1-6 | Introduction to Thermodynamics | A1 | 12 | 1-3 |
| 1-3 | 1-6 | First law and basic concepts | A1 | 12 | 4-6 |
| 1-3 | 1-6 | Volumetric properties of pure fluids | A1 | 20 | 7-11 |
| 1-3 | 1-6 | Heat effects | A2 | 16 | 12-15 |
| 1-3 | 1-6 | Second law of thermodynamics | A2 | 12 | 16-18 |
| 1-3 | 1-6 | Thermodynamic properties of fluids | A2 | 16 | 19-22 |
| 1-3 | 1-6 | Production of power from heat | A2 | 12 | 20-22 |
| 1-3 | 1-6 | Refrigeration and Liquefaction | A2 | 12 | 23-25 |
| 1-3 | 1-6 | Introduction to vapor liquid equilibrium | A3 | 20 | 26-30 |

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| 12. Infrastructure | |
| ***Textbook***  J. M. Smith & H. C. Van Ness "INTRODUCTION TO CHEMICAL ENGINEERING THERMODYNAMICS" 7th edition. McGraw-Hill 2001  ***References***   1. John M. Prausnitz “Molecular Thermodynamics of Fluid-Phase Equilibria" Prentice Hall 1999. 2. Robert H. Perry, Don Green “Perry’s Chemical Engineering Handbook "6th edition McGraw-Hill 1988. 3. R. C. Reid, J. M. Prausnitz and B. E. Poling "The Properties of Gases and Liquids" 4th edition McGraw-Hill 2001. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Available websites related to the subject | Special requirements (including example workshops, periodicals, IT software, websites) |
| Field and scientific visits | Community-based facilities  (including example, guest lectures, internship, field studies) |

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| 13. Admissions | |
|  | Pre-requisites |
| 30 | Minimum number of students |
| 80 | Maximum number of students |

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