

المركز الوطني للتقويم والاعتماد الأكاديمي

**National Center for Academic Accreditation and Evaluation**

### ATTACHMENT 5.

**T6. COURSE SPECIFICATIONS**

**(CS)**

**Course Specifications**

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| Institution: | Date: |
| College/Department : *Chemistry* | |

**A. Course Identification and General Information**

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| 1. Course title and code: CHEM 530 |
| 2. Credit hours: 2 |
| 3. Program(s) in which the course is offered.  (If general elective available in many programs indicate this rather than list programs)  *Master of Chemistry* |
| 4. Name of faculty member responsible for the course  Dr. Ammar Tighezza |
| 5. Level/year at which this course is offered: 1st level |
| 6. Pre-requisites for this course (if any): NA |
| 7. Co-requisites for this course (if any): NA |
| 8. Location if not on main campus: |
| 9. Mode of Instruction (mark all that apply):  100%  X  a. traditional classroom What percentage?  b. blended (traditional and online) What percentage?  c. e-learning What percentage?  d. correspondence What percentage?  f. other What percentage?  Comments: |

**B Objectives**

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| 1. What is the main purpose for this course?  This course will cover the chemical kinetics of homogeneous and heterogeneous reactions including complex reactions, chain reactions, branched chain explosions and degenerate branching reactions. |

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| 2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)  Simulation software for Chemical kinetics such as Excel will be employed when applicable to perform *the analysis of chemical kinetics data, simulation, and solving related problems.* |

**C. Course Description** (Note: General description in the form used in Bulletin or handbook)

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| Course Description:  The courses deals with kinetics of chemical reactions occurring in the gas, liquid phase, and on surfaces. Firstly the chemical kinetics laws for simple chemical reaction will be revisited and as possible, examples will be included from different area of chemistry. In particular kinetic of reactions such as complex reactions Degenerate Branching or Cool Flames, Branched chain explosions  Chain reactions in gaseous phase will be discussed. In addition the course will cover the Kinetics of reactions in solution and heterogeneous reactions. Simulation software for Chemical kinetics such as Excel will be employed when applicable to perform the analysis of chemical kinetics data, simulation, and solving related problems. |

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| 1. Topics to be Covered | | |
| List of Topics | No. of  Weeks | Contact hours |
| Review of chemical kinetics laws for simple reactions | 1 | 2 |
| Chemical kinetics laws for complex reactions | 2 | 4 |
| Kinetics of chain reactions in gaseous phase | 2 | 4 |
| Branched chain explosions | 2 | 4 |
| Degenerate Branching or Cool Flames | 2 | 4 |
| Kinetics of reactions in solution | 2 | 4 |
| Heterogeneous reactions | 3 | 6 |

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| 2. Course components (total contact hours and credits per semester): | | | | | | | |
|  | | Lecture | Tutorial | Laboratory/  Studio | Practical | Other: | Total |
| Contact  Hours | Planed | 2\*15 |  |  |  |  | 30 |
| Actual | 2\*15 |  |  |  |  | 30 |
| Credit | Planed | 2 |  |  |  |  | 2 |
| Actual | 2 |  |  |  |  | 2 |

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| 3. Additional private study/learning hours expected for students per week.  2 |

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| 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy | | | |
| **On the table below are the five NQF Learning Domains, numbered in the left column.**  **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.) | | | |
| **Code**  **#** | **NQF Learning Domains**  **And Course Learning Outcomes** | **Course Teaching**  **Strategies** | **Course Assessment**  **Methods** |
| **1.0** | **Knowledge** | | |
| 1.1  1.2  1.3  1.4  1.5  1.6  1.7  1.8 | Distinguish between chain and non-chain mechanisms  Recognize that there can be kinetically equivalent mechanisms.  Know the significance of third bodies in complex mechanisms  Understand the special features of surface termination  memories about branched chains and explosions  recognize the differences between reactions in the gas phase and solution  Know the ways in which the solvent can affect reactions in solution  Understand the ways in which charges or dipoles in the reactants can affect the rate | Flipped classroom and small group strategies are used sometime used instead of classical lectures strategy | Homework and in-class exams |
| **2.0** | **Cognitive Skills** | | |
| 2.1  2.2  2.3  2.4  2.5 | Deduce mechanisms from experimental observations  Apply the steady state treatment  Adapt transition state theory from gas phase to solution  Discuss the primary salt effect and make corrections for non-ideality  Discuss the effect of the solvent on the rate constant in terms of charges of the reactants and the relative permittivity of the solvent | Flipped classroom strategy | Homework and in-class exams |
| **3.0** | **Interpersonal Skills & Responsibility** | | |
| 3.1 | Preparation & presentation of PowerPoint projects | Self-learning strategy | Homework |
| 3.2 |  |  |  |
| **4.0** | **Communication, Information Technology, Numerical** | | |
| 4.1 | Using MS Excel for data analysis | Demonstrating in practical classes | Homework |
| 4.2 |  |  |  |
| **5.0** | **Psychomotor** | | |
| 5.1 | NA |  |  |

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| 5. Schedule of Assessment Tasks for Students During the Semester | | | |
|  | Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.) | Week Due | Proportion of Total Assessment |
| 1 | First homework | 3 | 5 % |
| 2 | Second homework | 5 | 5 % |
| 3 | First midterm exam | 7 | 20 % |
| 4 | Third homework | 9 | 5 % |
| 5 | Fourth homework | 11 | 5 % |
| 6 | Second midterm exam | 13 | 20 % |
| 7 | Final exam | 15 | 40 % |
| 8 |  |  |  |

**D. Student Academic Counseling and Support**

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| 1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)  Two hours per week |

**E Learning Resources**

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| 1. List Required Textbooks   * An introduction to Chemical Kinetics, Margaret R. Wright 2004, John Wiley & Sons, Ltd. * As supporting Arabic book (optional): Chemical Kinetics and Mechanism of Reaction, Suleiman Al-Khouiter   1419, Dar Al Khriji. |
| 2. List Essential References Materials (Journals, Reports, etc.) |
| 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  <http://academic.pgcc.edu/%7Essinex/chm2000.htm>  Last accessed on 24/10/2018. |
| 4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. |

**F. Facilities Required**

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| Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.) |
| 1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)  Ordinary room with 15 students capacity |
| 2. Technology resources (AV, data show, Smart Board, software, etc.)  Smart Board with MS Excel software |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) |

**G Course Evaluation and Improvement Processes**

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| 1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching  Course evaluation by students through Edugate. |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department  Course revision by other colleagues |
| 3. Processes for Improvement of Teaching  Handout and references book made available for student. Lecture notes are given for the different parts of the course. Additional homework for practice at home. |
| 4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)  Colleague checked the course content, exam papers. |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.  Periodical revision of course material and making appropriate changes and updates. |

Name of Course Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date Specification Completed: \_\_\_\_\_\_\_\_\_\_\_\_

Program Coordinator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date Received: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_