# TEMPLATE FOR COURSE SPECIFICATION

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**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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| 1. Teaching Institution | Al‐Nahrain University |
| 2. University Department/Centre | Department of Chemistry |
| 3. Course title/code | Radiation Chemistry/CHEM 371 |
| 4. Modes of Attendance offered | Presence |
| 5. Semester/Year | 2022/2023 - First semester |
| 6. Number of hours tuition (total) | 30 |
| 7. Date of production/revision of this specification | 1/9/2022 |
| 8. Aims of the Course |
| Introduce students to all basic concepts related to radiological chemistry and industrial processes related to the nuclear industry. |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methode |

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| 1. Cognitive goals .
2. A1.Introduce students to all basic concepts related to radiation chemistry.

A2.Raising awareness and educating students in the main operations related to the industrial processes of nuclear unitsA3.Preserving quality and protecting the environmentA4.Defining the types of radiation and radiation protectionA5.Defining the peaceful and military uses of nuclear energyA6 . |
| B. The skills goals special to the course. B1. Teaching the student about radiation sources and methods of preventionB2. To develop the student's skills to understand the industrial processes of the nuclear industriesB3. Teaching the student how to recognize the risks of working in nuclear operations and how to overcome them |
| Teaching and Learning Methods |
| Lectures, discussion during the lecture, presentation of specialized films and pictures that enhance the student’s understanding of his subject matter, and the student presents a project that is a case study of nuclear operations, which he presents as a presentation in front of his colleagues |
| Assessment methods |
| Two semester exams, short exams and a seminar at the end of the semester |
| C. Affective and value goals  C1. To develop the student's knowledge of radiochemistryC2. Learn how to preserve the environment from radioactive pollutionC3. Learn about nuclear industrial unitsC4. Identify the sources of radiation and methods of prevention C5. Various applications of atomic energy |
| Teaching and Learning Methods |
| Lectures and multiple visual and visual illustrations |
| Assessment methods |
| Two semester exams, short exams and a seminar at the end of the semester |

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| D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)D1. Teaching the student the industrial processes of radiation chemistryD2 Developing the student's skills to understand nuclear industrial applications.D3. Teaching the student how to identify the risks of working in radioactive materials and how to overcome themD4. Teaching students about the multiple uses of nuclear energy |

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| 10. Course Structure |
| Week | Hours | ILOs | Unit/Module or Topic Title | Teaching Method | Assessment Method |
| 1 | 2 | Introduction | Introduction | lecture  | Semester exam and short exams |
| 2 | 2 | Background radiation, Cosmic rays, radon gas | Background radiation, Cosmic rays, radon gas |  |  |
| 3 | 2 | Ozone layer, UV Rays, pollution | Ozone layer, UV Rays, pollution |  |  |
| 4 | 2 | Nuclear reactions, Nucleus, Radiation emissions | Nuclear reactions, Nucleus, Radiation emissions |  |  |
| 5 | 2 | Nuclear stability, Decay series | Nuclear stability, Decay series |  |  |
| 6 | 2 | Binding energy | Binding energy |  |  |
| 7 | 2 | Mid-exam-1 | Mid-exam-1 |  |  |
| 8 | 2 | Fission and Fusion | Fission and Fusion |  |  |
| 9 | 2 | Nuclear reactors | Nuclear reactors |  |  |
| 10 | 2 | Enrichment methods | Enrichment methods |  |  |
| 11 | 2 | Nuclear weapons | Nuclear weapons |  |  |
| 12 | 2 | Making new elements, cyclotrons | Making new elements, cyclotrons |  |  |
| 13 | 2 | Application of nuclear chemistry | Application of nuclear chemistry |  |  |
| 14 | 2 | Effects of radiation | Effects of radiation |  |  |
| 15 | 2 | Mid-exam-2 | Mid-exam-2 |  |  |

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| 11. Infrastructure |
| 1. Books Required reading: | Chemistry, Nuclear chemistry, McMurry, FayChapter 22 |
| 2. Main references (sources) | Chemistry, 4th Edition, Chapter 2 |
| A- Recommended books and references (scientific journals, reports…). | Chemistry, 4th Edition, Olmsted Williams |
| B-Electronic references, Internet sites… | https://ptable.com/?lang=en#Isotope |
| 12. The development of the curriculum plan |
| Update the information according to the development books and articles. |
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