# 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 they take full advantage of the learning opportunities 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 | CHEM 311/ firstCHEM 312/ second |
| 4. Modes of Attendance offered | Attendances |
| 5. Semester/Year | First/2022-2023Second/2022-2023 |
| 6. Number of hours tuition (total) | 3 hours for each semester |
| 7. Date of production/revision of this specification | First/second2022-2023 |
| 8. Aims of the Course |
|  1-Identification of the transitional elements and the chemical properties of the transition elements, as well as the various oxidation causes them and the electronic arrangement of transitional elements, the geometric forms of complexes, and the types of ligands used in the preparation of complexes |
| The most important theories that have explained the composition of complexities and what theory is most acceptable include first: series theory and second: Werner's theory. |
| Complex writing method, effective atomic number base, transitional element interactions, use, preparation, and presentation |
| 2- A- Introducing students to the basic concepts of persistent theories of coordination compounds |
| Give the student an accurate description of the bonding theories, the theory of valence persistence, magnetic measurements and the number of individual electrons of complexes of geometric shapes: tetrahedral, octahedral and square planar, inner orbital complexes and outer orbital complexes. |
| Crystal field theory, measurement of the amount of splitting of the crystalline field in the case of a strong and weak field, knowledge of the energy of electronic (Jean-Teller's distortion) and interpretation of the colours of complexes |
| - MOT Theory sigma and pi bonding |
| And describe thermodynamic stability, motor stability and factors affecting the stability of complexes |

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| 9· Learning Outcomes, Teaching, Learning and Assessment Methode |
| A- Cognitive goals. A1. Introducing students to basic concepts of transition elements A2. Enable students to learn a set of examples about the interpretation of complex colours and magnetic propertiesA3. and how complexes with geometric shapes are related: quadrant, eight surfaces and a flat square according to these theories |
| B. The skills goals special to the course. B1. Analysis and inference skillsB2. Ask students a range of thinking questions during lectures, such as what, how, when and why specific topics give students duties that require subjective interpretations |
| Teaching and Learning Methods |
| Forming discussion groups during lectures to discuss |
| Assessment methods |
| Weekly exams, monthly exams, specific grades, duties and activities. |
| C. Affective and value goals C1.C2.C3.C4. |
| Teaching and Learning Methods |
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| Assessment methods |
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| D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)D1.D2.D3.D4. |

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| 10. Course Structure |
| Week | Hours | ILOs | Unit/Module or Topic Title | Teaching Method | Assessment Method |
| First 1 | 3 | inorganic | A detailed explanation of the course material for the first semester and then an introduction to coordination chemistry | Attendance | monthly exams and quizzes  |
| 2 | 3 |  | Transition elements and chemical properties of transition elements as well as their various oxidation states |  |  |
| 3 | 3 |  | Know the electronic arrangement of the transitional elements and the most important compounds of the transitional elements |  |  |
| 4 |  |  | Definition of the concept of harmonic compounds with examples |  |  |
| 5 |  |  | exam |  |  |
| 6 |  |  | Know the types of ligands used to prepare complexes. |  |  |
| 7 |  |  | the rule of effective atomic number with examples |  |  |
| 8 |  |  | Interactions of transitional elements + activities about the course |  |  |
| 9 |  |  | And the geometric shapes of the harmonic compounds |  |  |
| 10 |  |  | exam |  |  |
| Second1 |  |  | Introduce students to the basic concepts of theories for coordination compounds |  |  |
| 2 |  |  | Give the student an accurate description of the VBT theory with the examples |  |  |
| 3 |  |  | Complementing the Theory of VBT and the Concept of inner Orbital Complexes and outer Orbital Complexes |  |  |
| 4 |  |  | Magnetic properties of complexes with geometric shapes: tetrahedral, octahedral and square planar |  |  |
| 5 |  |  | Crystal field theory and measurement of the amount of energy of splitting of the crystalline field in the case of a strong and weak field  |  |  |
| 6 |  |  | exam |  |  |
| 7 |  |  | Interpretation of the colours of complexes |  |  |
| 8 |  |  | The energy of splitting and deformation in octahedral complexes (Jhan Teller) Scientific activities |  |  |
| 9 |  |  | Orbital molecular bonding σ in octahedral complexes and molecular orbital diagram |  |  |
| 10 |  |  | exam |  |  |

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| 11. Infrastructure |
| 1. Books Required reading: |  |
| 2. Main references (sources) | Introduction to coordination chemistry, Geoffrey A.Lawrance, WILEY, Australia,2010Inorganic chemistry, Gary L. Miessler, Paul J. Fischer, Donald A. Tarr, Fifth edition,2014 |
| A- Recommended books and references (scientific journals, reports…). |  |
| B-Electronic references, Internet sites… |  |
| 12. The development of the curriculum plan |
| Follow-up scientific development by identifying new books and research through the Internet - Participation in scientific conferences inside and outside the country - Participation in scientific workshops and seminars inside and outside the country |
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