MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module Title** | General Chemistry | | | | **Module Delivery** | | |
| **Module Type** | Basic | | | | * **☒ Theory** * **☐ Lecture** * **☒ Lab** * **☐ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | ITC320030 | | | |
| **ECTS Credits** | 6 | | | |
| **SWL (hr/sem)** | 150 | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | | | 1 |
| **Administering Department** | | BID | **College** | BMIC | | | |
| **Module Leader** | Omar A.M | | **e-mail** | omara.m@uoitc.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Professor | **Module Leader’s Qualification** | | | | Ph.D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | | | |
| **Peer Reviewer Name** | | jwan k alwan | **e-mail** | jwanism@uoitc.edu.iq | | | |
| **Scientific Committee Approval Date** | | 18/06/2023 | **Version Number** | | | 1.0 | |

| **oRelation with other Modules**  **العلاقة مع المواد الدراسية الأخرى** | | | |
| --- | --- | --- | --- |
| **Prerequisite module** | None | **Semester** |  |
| **Co-requisites module** | None | **Semester** |  |

| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| --- | --- |
| **Module Aims**  **أهداف المادة الدراسية** | 1. SOME BASIC CONCEPTS OF CHEMISTRY (terminology and historic development of chemistry). 2. The student will learn how to prepare solutions and concentration calculations 3. Formula types of a compound 4. STRUCTURE OF ATOM Atomic number, isotopes and isobars. 5. Development of modern atomic theory 6. Stoichiometry 7. Chemical Bonding and Molecular Structure 8. Classification of Elements and Modern periodic law |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | 1. Describe and classify matter with regard to its physical state and composition 2. Perform basic unit calculations and conversions 3. Explain the relation between mass, moles, and numbers of atoms or molecules. 4. Calculate solution concentrations using molarity 5. Formulate and balance chemical equations 6. Perform stoichiometric calculations involving mass, moles, and solution molarity 7. Interpret titration curves for acid-base systems |
| **Indicative Contents**  **المحتويات الإرشادية** | This module covers general chemistry. Students combine two courses to form a module. They choose those courses which best meet their individual needs. Topics covered by the various courses can include  **PART A**  Some Basic Concepts of Chemistry (General Introduction), Important and scope of chemistry. Laws of chemical combination, Dalton’s atomic theory: concept of elements, atoms and molecules. stoichiometry and calculations based on stoichiometry  **PART B**  Structure of Atom Atomic number, isotopes and isobars. Concept of shells and subshells, dual nature of matter and light  de Broglie’s relationship, Heisenberg uncertainty principle, concept of orbital, quantum numbers, shapes of s,p and d orbitals, rules for filling electrons in orbitals- Aufbau principle, Pauli exclusion principles and Hund’s rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.  **PART C**  Classification of Elements and Periodicity in Properties Modern periodic law and long form of periodic table periodic trends in properties of elements- atomic radii, ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, valence. Chemical Bonding and Molecular Structure Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, valence bond theory, resonance, geometry of molecules, VSEPR theory,  **PART D**  concept of hybridization involving s, p and d orbitals and shapes of some simple molecules, Molecular orbital theory of homonuclear diatomic molecules (qualitative idea only). Hydrogen bond. Holidays, Scientific trip |

| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
| --- | --- |
| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students’ participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. |

| **Student Workload (SWL)**  **الحمل الدراسي للطالب** | | | |
| --- | --- | --- | --- |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 78 | **Structured SWL (h/w)**  **الحمل الدراسي المنتظم للطالب أسبوعيا** | 5 |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 72 | **Unstructured SWL (h/w)**  **الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 5 |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | 150 | | |

| **Module Evaluation**  **تقييم المادة الدراسية** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **As** | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO #1, 2, 3 and 7 |
| **Assignments** | 2 | 10% (10) | 2, 12 | LO # 1, 5, 6 and 7 |
| **Projects / Lab.** | 1 | 10% (10) | Continuous |  |
| **Report** | 1 | 10% (10) | 13 | LO # 5, and 6 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | LO # 1-6 |
| **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) |  |  |

| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | Some Basic Concepts of Chemistry (General Introduction), Important and scope of chemistry. Laws of chemical combination, Dalton’s atomic theory: concept of elements, atoms and molecules. |
| **Week 2** | Atomic and molecular masses. Mole concept and molar mass; and empirical and molecular formula; chemical reactions |
| **Week 3** | stoichiometry and calculations based on stoichiometry |
| **Week 4** | Structure of Atom Atomic number, isotopes and isobars. Concept of shells and subshells, dual nature of matter and light |
| **Week 5** | de Broglie’s relationship, Heisenberg uncertainty principle, concept of orbital, quantum numbers, shapes of s,p and d orbitals, |
| **Week 6** | rules for filling electrons in orbitals- Aufbau principle, Pauli exclusion principles and Hund’s rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals. |
| **Week 7** | **Mid-term** **Exam 1** |
| **Week 8** | Classification of Elements and Periodicity in Properties  Modern periodic law and long form of periodic table |
| **Week 9** | periodic trends in properties of elements- atomic radii, ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, valence. |
| **Week 10** | Chemical Bonding and Molecular Structure Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, |
| **Week 11** | valence bond theory, resonance, geometry of molecules, VSEPR theory, |
| **Week 12** | concept of hybridization involving s, p and d orbitals and shapes of some simple molecules, |
| **Week 13** | Molecular orbital theory of homonuclear diatomic molecules (qualitative idea only). Hydrogen bond. |
| **Week 14** | Holidays , Scientific trip |
| **Week 15** | **Review** |

| **Delivery Plan (Weekly Lab. Syllabus)**  **المنهاج الاسبوعي للمختبر** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | Lab 1: Laboratory Safety ; An introduction to the available laboratory equipment and glassware |
| **Week 2** | Complement  lab 1 |
| **Week 3** | Lab 2: Introduction to Laboratory Techniques (Solution and solubility Preparations) |
| **Week 4** | Complement  lab 2 |
| **Week 5** | Lab 3: Density determination |
| **Week 6** | Complement  lab 3 |
| **Week 7** | Lab 4: The empirical formula of a compound |
| **Week 8** | Complement  lab 4 |
| **Week 9** | Lab 5: Purification of table salt |
| **Week 10** | Complement  lab 5 |
| **Week 11** | Lab 6: The chloride content experiment |
| **Week 12** | Complement  lab 6 |
| **Week 13** | Lab 7: Prepare a secondary standard solution of hydrochloric acid |
| **Week 14** | Complement  lab 7 |
| **Week 15** | Test examination |

| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
| --- | --- | --- |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | Genetics: Analysis of Genes and Genomes, Sixth edition, 2005, by D. L. Hartl and E. W. Jones. | no |
| **Recommended Texts** | 1. Concepts of Genetics, Klug, Cummings, Spencer, and Palladino Pearson Benjamin Cummings. 2. Bettelheim - Laboratory Experiments For General, Organic and Biochemistry 4e. 3. Solving General Chemistry Problems 5th ED - R. Nelson Smith. 4. general\_chemistry\_whitten full | No |
| **Websites** |  | |

| **Grading Scheme**  **مخطط الدرجات** | | | | |
| --- | --- | --- | --- | --- |
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group**  **(50 - 100)** | **A -** Excellent | **امتياز** | 90 - 100 | Outstanding Performance |
| **B -** Very Good | **جيد جدا** | 80 - 89 | Above average with some errors |
| **C -** Good | **جيد** | 70 - 79 | Sound work with notable errors |
| **D -** Satisfactory | **متوسط** | 60 - 69 | Fair but with major shortcomings |
| **E -** Sufficient | **مقبول** | 50 - 59 | Work meets minimum criteria |
| **Fail Group**  **(0 – 49)** | **FX –** Fail | **راسب (قيد المعالجة)** | (45-49) | More work required but credit awarded |
| **F –** Fail | **راسب** | (0-44) | Considerable amount of work required |
|  |  |  |  |  |
| **Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |