**Ministry of Higher Education and Scientific Research**

**Supervision and Scientific Evaluation Body**

**Quality Assurance and Academic Accreditation Office**

**Course Description Sample**

**Subject: Medical Chemistry**

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| 1. Educational Institution | Shatt Al Arab University College |
| 2. Department / Center | Medical Instrumentation Engineering Techniques. |
| 3. Course Title /Code | Medical Chemistry / MIET1107 |
| 4. Lecturer Name | Ahmed Sami |
| 5. Type of Teaching | Lecture -Lecture – Lab – Seminar- Tutorial |
| 6. Academic Year /Term | 2023/2024 |
| 7. Total No. of Teaching Hours | 175 |
| 8. Date f Preparing this Course Description | 22/11/2023 |

9. **Course Objectives**

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| To write and balance chemical equation which many calculations depend on |
| To convert chemical formula to components composition percent or to conclude empirical formula depending upon composition percent |
| To predict about the economic pathway for specific reaction to happen depending upon stoichiometric calculations of balanced chemical equations. |
| To know how to prepare buffers with different ranges of ph using acids with suitable dissociation constant of acid. |
| To understand the effect of common ions on equilibrium of reversible reactions. |
| To focus on theoretical working principles of spectrophotometric instruments. |
| To discuss the importance of isotopes in diseases treatment and diagnosis. |

10. **Course Output, Methodology and Evaluation**

(A) **Cognitive Objectives**

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| Demonstrate understanding of basic concepts in chemistry, including the structure of atoms, isotopes, and the use of chemical formulas and equations. |
| Apply unit conversion techniques to convert between different units of measurement. |
| Compare and contrast different methods of expressing analytical concentrations |
| Understand the principles of electrochemistry and electrochemical cells. |
| Define and apply the laws of thermodynamics. |
| Analyze the behavior of buffer solutions and the factors influencing the solubility of precipitates. |
| Define and calculate acid-base dissociation constants. |
| Interpret the pH scale and its significance. |
| Analyze the behavior of buffer solutions and the factors influencing the solubility of precipitates. |
| Understand sources and types of errors in analytical chemistry. |
| Apply statistical methods to analyze and interpret analytical data, including average, mode, range, standard deviation, and relative standard deviation. |
| Define and identify redox reactions. |
| Demonstrate the ability to balance redox equations. |
| Analyze the principles of photochemistry and the use of spectrophotometry. |
| Understand the electromagnetic spectrum, absorption, emission, and the Beer Lambert law. |
| Understand the principles and applications of potentiometry, conductive meter, pH-meter, and chemical sensors. |

(B) **Skill Objectives Related to the Program**:

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| Develop skills in writing and balancing chemical equations. |
| Practice unit conversion for different physical quantities. |
| Convert between different concentration units. |
| Balance complex chemical equations using stoichiometric principles. |
| Perform calculations related to equilibrium concentrations. |
| Calculate pH and pOH of acidic and basic solutions. |
| Design buffer solutions and calculate their pH. |
| Perform statistical analysis of experimental data. |
| Identify oxidation-reduction reactions. |
| Balance redox equations using oxidation number methods. |
| Set up and analyze electrochemical cells. |
| Apply thermodynamic principles to solve problems related to heat, work, and energy changes. |
| Calculate entropy and Gibbs free energy changes. |
| Apply the second law of thermodynamics to predict the spontaneity of processes. |
| Operate spectrophotometers and analyze data. |

**Methods of Teaching and Learning**

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**Methods of Evaluation**

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| **Number calendar element degree** |

(C) **Sentimental and Value Objectives**

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**Methods of Teaching and Learning**

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**Methods of Evaluation**

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D) **General and Qualitative Skills (other skills related to the ability of employment and personal development)**

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11. **Course Structure**

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| **Week** | **No of Hours** | **Required Learning Output** | **Title of Subject** | **Teaching Method** | **Evaluation** |
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12.**Infrastructure**

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| a. Textbooks |  |
| b. References | **1**  **- ESSENTIALS OF GENERAL CHEMISTRY**  **By EBBING GABBON RAGSDALE**  **2**  **- CHEMICAL PRINCIPLES**  **By Steven S Zumdahl - 4th edition** |
| c. Recommended books and periodicals (journals, reports, etc.) |  |
| d. Electronic references, internet websites, etc | Google |

13. **The Plan of Improving the Course**

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