**Course Code: Chem100C**

**Course Title: Introduction to Chemistry**

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| Credit Hours | Credits 4, (3+1) |
| Prerequisite | Open to students who have not taken Chemistry at F.Sc. and A-level. |
| Course Hours | Tuesday, Thursday 9.30am - 10.45 pm in S-212  Lab. Hours: Thursday 2:00 pm – 3.50pm in S-148 |
| Office Hours | Monday & Wednesday 12.00pm to 1.30pm |
| Teacher’s Name and Contact | **Dr. Shazma Massey Azeem**  Phone:0300-6181868  Email: [shazmaazeem@fcccollege.edu.pk](mailto:shazmaazeem@fcccollege.edu.pk)  Office hours: Monday, Tuesday & Thursday 11am – 12.00noon |

Catalog Description:

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| Chemistry as a basic science, matter and states of matter, elements and periodicity, atomic structure, concept of mole and elementary stoichiometric calculations, acids and bases, elementary redox reactions and electro chemical cells, organic functional groups and major classes of organic compounds and their importance, and environmental aspects of chemistry. |

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| Course Objective(s) | Course Outcome(s) | Assessment(s) |
| At the end of the course, the students will be able to.   1. What is matter and classification of matter? 2. Explain Importance of certain elements in the periodic table. 3. Different acid-base concepts and acid-bases used in daily life and present in human body. 4. Conversion from mole to gram and gram to mole. 5. Explain importance of organic chemistry. | At the end of this course, the students are expected to:  1. Apply their knowledge to calculate the amount of reactant or product from the given equation.  2. Demonstrate different separation techniques.  3. Use acid base & pH concepts in daily life.  4. Demonstrate the properties of different elements in the periodic table.  5. Explain basic  concepts of  organic chemistry such as fractional distillation, cracking, functional group etc.  6. Demonstrate  Presentation skill by presenting on some recent topic. | Percentage  Class Test 15%  Mid 20%  Practical Exam 25%  Final 30%  Assignment 10% |

Textbooks and References:

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| **Textbook Name + Edition** | **Author** | **Publisher** |
| Chemistry & Chemical Reactivity (7th Edition) | Kotz, Treichet & Townsend | Brooks Cole ; 35644th edition (January 1, 1994) |
| Chemistry the central science (12th Edition) | Brown, Eugene Lemay, Bursten, Murphy and Woodward | Pearson Higher Ed, 2021 |
| Chemistry the molecular nature of matter and change (5th Edition) | Martin S. Silberberg | McGraw-Hill Science/Engineering/Math |

Syllabus breakdown in lectures:

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| **Week no.** | **Topic** | **Content Breakdown** |
| 1 | **Matter and Classification of matter,** | Matter and its classification: Pure and impure substance, states of matter and their mutual conversions  Elements, Compounds, Mixtures (Homogenous/Heterogeneous), Colloids, Suspensions, True solutions,  separation of binary and ternary mixtures using physical methods |
| 2 | **Atomic structure** | Atomic Number, Atomic Mass, Isotopes (Hydrogen/Chlorine), Relative Atomic Mass, Molecular/formula mass  and its calculation |
| 3 | **Periodic table** | Electronic configuration of first 20 elements (based on spdf notation)  Modern Periodic law, Groups and Periods (IUPAC System), Classification of Elements as Metals, non-metals,  metalloids, Periodic trends ((Metallic character, Atomic size, Electronegativity, Ionization Potential) with justification |
| 4 | **Periodic table videos** | Videos of the following elements (there advantages and disadvantages)  Na, Be, Mg, Ca, B, Al, C, Si, N, P, O, S, Cl, I, Ne and Ar. |
| 5 & 6 | **Bonding** | Covalent Bond  Pictorial or Structural representations showing covalent bonding in H2 , N2 , O2 , F2 , CH4 , H2O, NH3 (only valence electrons), Coordinate  covalent bond (NH3 -BF3 example)  Ionic Bonding Pictorial or  Structural representations showing ionic bond in NaCl, LiF, MgS, CaCl2 , Na2O |
| 7 & 8 | **Concept of Mole & Stoichiometric calculations** | problems related to moles & Stoichiometric calculations. Reversible and irreversible reactions, Simple conversions: moles to mass(g) (vice versa) and molar correlation of  the reactant/products with products/reactants |
| 9 | **Acids and bases** | Arrhenius and Lewis’ concepts of acids and bases with examples  General features of acids and bases  Uses/Occurrence of common acids and bases in daily life  Neutralization and its applications (ant’s and wasp’s stings; treatment of acid-affected agri-land; treatment of  acidic/basic industrial effluents, tooth paste), chemical equation for neutralization of strong acid vs. strong base |
| 10 | **Organic chemistry and its importance** | Organic vs. Inorganic compounds, general features  Hydrocarbons: alkanes, alkenes and alkynes (general formula of homologous series, condensed and expanded  structural formula of first 10 members of each series)  Derivatives of hydrocarbons-functional groups of alkyl halides, alcohols, amines, acids, ethers, esters, amides) |
| 11 | **Environmental Chemistry** | Air, water, soil pollution, Green Chemistry |
| 12 | **Presentation** |  |

Computer Usage:

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| Videos related to teaching topics, Moodle, Zoom, Assignment presentation |

Laboratory:

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| * Common laboratory glassware and apparatus * Safety in the Chemistry Laboratory * To study the reaction of alkali metals with water (H2O) * To separate individual components of a ternary mixture of naphthalene, sand and table salt. * Separation of components of mixture of KMnO4 and water. * Separation of two immiscible liquids (oil & water) * To separate different chemical components of a sample mixture of inks using paper chromatography. * To determine pH of some common household items. * To standardize given solution of NaOH volumetrically using 0.1 M HCl solution. * Determination of percentage purity of baking soda using 0.1 M HCl solution. |

Teaching Method:

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| Lecture, discussion, Assignments, videos |