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| **logo University of Management & Technology**  School of Science  Department of Chemistry | | | | |
| CH-102 (PRINCIPLES OF CHEMISTRY-II) | | | | |
| **Lecture Schedule** | **Sec N/N1/P** (Mon,Tue, Thur & Friday) | **Semester** | | Spring 2021 |
| **Pre-requisite** | Principles of Chemistry-I | **Credit Hours** | | 3+1 |
| **Instructor** | Muhammad Arif | **Contact** | | [Muhammadarif@umt.edu.pk](mailto:Muhammadarif@umt.edu.pk) |
| **Moodle Link** | | <https://lms.umt.edu.pk/moodle/course/view.php?id=6799> |
| **Office** | 3S-32 Hall | **Office Hours** | | See office window |
| **Course Description** | Chemistry is greatly involved in today’s world of science and engineering. It is playing the role of backbone in new discoveries in almost all [fields](http://www.exampleessays.com/essay_search/engineering_fields.html). The more chemistry a student understands, the more beneficial it is. This course provides a relationship between structure and properties of liquids, solids and different organic compounds, The course will cover the chemistry concepts such as the intermolecular forces, colligative properties, stoichiometry, properties of matter & solutions, acid and bases, chemical equilibrium, and chemical kinetics. | | | |
| **Expected Outcomes** | Participants who successfully complete this course will be able to learn and understand the basic concepts of acids & bases, principles and application of chemical equilibrium systems in quantitative analysis, properties of main group elements in the periodic table, knowledge of radioactive isotopes, radioactivity and methods of analysis in the field of nuclear chemistry. They will also be able to explain the titration processes and their applications in daily life and industries. | | | |
| **Textbook**  **&**  **Reference Book** | **Chemistry**  7th Edition J. McMurry & Robert C. Fay By Pearson Education | | **Chemical Principles, The Quest for Insight**,  Peter Atkins & Loretta Jones, 6th Edition,  By W.H. Freeman and Company, New York | |
| **Grading Policy** | Quizzes 15%  Assignments: 20%  Midterm: 25%  Final Exam: 40% | | All quizzes will be announced well before time. **No make-ups** will be offered for missed quizzes. **SA grade** will be awarded for less than 80% attendance. | |

**CH-102 (Principles of Chemistry-II)**

**Lecture plan (Spring 2021)**

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| **Week** | **Lectures** | **TOPICS** | **CH** | **SECTIONS** |
| 1 | 1  2 | Energy and Its Conservation, Internal Energy and State Functions  Expansion Work, Energy and Enthalpy, Thermochemical Equations | 9  9 | 9.1, 9.2  9.3, 9.4 |
| 2 | 1  2 | Thermodynamic Standard State, Enthalpies of Chemical and Physical Changes Calorimetry and Heat Capacity, Fossil Fuels | 9  9 | 9.5, 9.6  9.7 |
| 3 | 1  2 | Bond Dissociation Energies, Fuel Efficiency, Heats of Combustion, An Introduction to Entropy Gases and Gas Pressure, The Gas Laws | 9  10 | 9.10-9.12  10.1, 10.2 |
| 4 | 1  2 | The Ideal Gas Law, Stoichiometric Relationships with Gases Mixtures of Gases: Partial Pressure and Dalton’s Law of Pressure | 10  10 | 10.3,10.4  10.5 |
| 5 | 1  2 | Kinetic Molecular Theory of Gases, Gas Diffusion and Effusion Graham’s Law, Real Gases, Earth’s Atmosphere and Air Pollution | 10  10 | 10.6, 10.7  10.8-10.10 |
| 6 | 1  2 | Properties of Liquids, Phase Changes between Solids, Liquids, and Gases, Process of Evaporation, Vapor Pressure, and Boiling Point | 11  11 | 11.1, 11.2  11.3, 11.4 |
| 7 | 1  2 | Kinds of Solids, Probing the Structure of Solids: The process of  X- Ray Crystallography, Solutions and Energy Changes Processes | 11  12 | 11.5  12.1, 12.2 |
| 8 | 1  2 | Concentration Units for the preparation of different solutions in lab  **Midterm Exam** | 12 | 12.3  -- |
| 9 | 1  2 | Some Factors That Affect Solubility, Physical Behavior of Solutions Colligative Properties Fractional Distillation of Liquid Mixtures | 12  12 | 12.4, 12.5  12.9 |
| 10 | 1  2 | Reaction Rates, Rate Laws and Reaction Order Zeroth-Order, Reactions, First-Order Reactions,Second-Order Reactions, | 13  13 | 13.1, 13.2  13.4, 13.5 |
| 11 | 1  2 | Reaction Rates and Temperature: The Arrhenius Equation Catalysis, Homogeneous and Heterogeneous Catalysts The Equilibrium State, | 13  13 | 13.6, 13.7  13.12, 13.13 |
| 12 | 1  2 | The Equilibrium Constant *K*c The Equilibrium Constant *K*p, Heterogeneous Equilibria, Using the concept Equilibrium Constant | 14  14 | 14.1, 14.2  14.3-14.5 |
| 13 | 1  2 | Factors effect on Equilibrium Mixture: Le Châtelier’s Principle, Changes in Concentration, Pressure and Volume, Temperature | 14  15 | 14.6-14.10  15.1, 15.2 |
| 14 | 1  2 | Acid–Base Concepts: The Brønsted–Lowry Theory, Acid and Base Strength Factors affect Acid Strength, | 15  15 | 15.3, 15.4  15.5-15.5 |
| 15 | 1  2 | Measuring pH, Equilibria of Weak Acids, Calculating Equilibrium Concentrations in Solutions of Weak Acids | 15  15 | 15.7, 15.9  15.14, |
| 16 | 1  2 | The pH Scale,  Properties of Acid, Base and Salts | 15  15 | 15.6  15.15 |