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<tr><td>Level</td><td colspan="6">Level - 03</td></tr>
<tr><td>Course Synopsis Course Code</td><td colspan="6">CYU3201</td></tr>
<tr><td>Course Title</td><td colspan="6">Basic Principles of Chemistry II</td></tr>
<tr><td>Credit value</td><td colspan="6">02</td></tr>
<tr><td>Core/Optional</td><td colspan="6">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Pass in Chemistry in A/L or pass in Chemistry in Foundation in Science (OUSL)</td></tr>
<tr><td>Hourly breakdown</td><td colspan="2">Theory</td><td>Practical</td><td>Independent Learning</td><td>Assessment</td><td>Total</td></tr>
<tr><td></td><td>16 Sessions; x 2hrs = 32 hrs</td><td>CDS 1 x 4 hrs + DS 2 x 4 hrs + RDS 1 x 4 hrs = 16 hrs</td><td>N/A</td><td>16 Sessions x 3hrs + 2 hrs on-line = 50 hrs</td><td>CAT 2 x 1 hrs = 02 hrs</td><td>100 hrs</td></tr>
<tr><td>Course Aim/s.</td><td colspan="6">Develop an understanding the behavior of gases using the ideal gas model and the factors responsible for deviating from ideal behavior to non-ideal behavior of gases, develop an understanding of the basic concepts and terminology and use them in study of classical thermodynamics, develop the ability in applying the first and second laws of thermodynamics in various thermodynamic process, develop an understanding of the basics concepts and terminology used in reaction kinetics and the ability to use them in evaluating kinetic parameters using experimental data, develop and understanding experimental techniques used in reaction kinetics, develop an understanding of the chemistry of Galvanic cells, develop the ability in using electrode potentials and emf measurements in problem solving.</td></tr>
<tr><td>PLOs addressed by course</td><td colspan="6">PLO1: TheoriticalKnowledge: Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the BSc degree.
PLO2: Practical Knowledge and Application. Acquire competency in practical skills and the necessary knowledge to appropriately use these skills.
PLO3: Communication: Communicate reliably, efficiently and effectively to present information, ideas and concepts to the scientific community as well as to the wider society.
PLO4: Individual Work, Team Work and Leadership: Function effectively as an individual, and as a team member, sharing work and experiences, leading and managing assigned tasks to completion on time, demonstrating leadership to address situations in diverse and multi-disciplinary environments in day to day life.
PLO5: Creativity and Problem Solving: Identify problems and argue out and analyze such problems using qualitative and/or quantitative practical approaches in scientific methodology to provide valid conclusions
PLO6: Adaptability and Flexibility: Develop appropriate strategies to adapt to changing environments.
PLO8: Vision for Life: Identify where one wants to be and develop long term goals maintaining competency to conduct scientific investigations and proceed to undertake further studies.
PLO9: Lifelong Learning: Foresee new trends and recognize their impact, and update knowledge and develop new skills to meet future changes and challenges.</td></tr>
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<tr><td>Course Learning Outcomes (CLO)</td><td colspan="2">The students should be able to:

CLO 1: Describe three states of matter using the principle of motion of particles and state "perfect gas law" as an idealized model.(PLO 01)
CLO 2: State the factors responsible for deviations of gases from ideal behavior and explain how they bring about such deviations. (PLO 01)
CLO 3: Define the terminology related to different types of systems, processes, functionality and properties related to the first and second laws of thermodynamics. (PLO 01)
CLO 4 Use first and second laws of thermodynamics in problem solving. (PLO 02)
CLO 5: Describe how the kinetics of reaction is quantified (PLO 01, 03).
CLO 6: Describe how kinetic parameters are determined through experiment. (PLO 05, 03)
CLO 7: Describe how a chemical reaction generates an emf in a Galvanic cell. (PLO 05)
CLO 8: Explain the necessity and uses of a cell diagram. (PLO 01)
CLO 9: Use electrode potentials and emf measurements in problem solving.(PLO 01,02, 04, 06)</td></tr>
<tr><td>Content

(Main topics, sub topics)</td><td colspan="2">States of Matter
The behavior of ideal gases using the ideal gas model and the factors responsible for deviating from ideal behavior to non-ideal behavior of gases; Van der Waal's equation.
Chemical Thermodynamics
Basic concepts and terminology; language of thermodynamics, mathematics of thermodynamics; heat and work; first law of thermodynamics; internal energy, heat capacity; expansion and compression of gases, Joules Thomson effect; application of first law of thermodynamics; second law of thermodynamics; application of second law of thermodynamics; free energy change; relationship between first law and second law; auxiliary relationships.
Reaction Kinetics
Basic concepts and terminology; order of a reaction; elementary reaction; molecularity; rate equation; rate constant and catalyst; basic mathematics used in kinetics; factors that affect the rate, Arrhenius equation; experimental methods in determining the kinetics of a reaction.
Galvanic cells
Reversible electrodes; construction of cells; cell diagram; anode, cathode and cell reactions of a cell diagram; electromotive force (emf) of a cell diagram and a cell reaction; emf and Gibbs free energy of a cell reaction; electrode potential; determination of pH, thermodynamic parameters of a reaction, endpoint of a titration and the solubility product of a sparingly soluble salt using potentiometry; primary, secondary and fuel cells.</td></tr>
<tr><td>Teaching Learning methods</td><td colspan="2">Self-learning:
• Instructional material (IL)
• Online activities (OL)
Compulsory contact sessions:
• Compulsory day-school (CDS)
• Assessments: MCQs (MCQ), structured essay (SEQ)
Non-compulsory contact sessions:
• Day school (DS)</td></tr>
<tr><td rowspan="2">Assessment strategy</td><td>Overall Continuous Assessment Mark (OCAM): 40%</td><td>Final Assessment: 60%</td></tr>
<tr><td>Continuous Assessment (CA); (60% Best NBT + 40% Other NBT) (02 hrs)</td><td>Final Evaluation
Theory: 100% (02 hrs)</td></tr>
<tr><td>Recommended Readings:</td><td colspan="2">1. Atkins P. W., (1994), Physical Chemistry, Oxford University press, ELBS 5th edition
2. Klotz I. M, Rosenberg R. M., Chemical Thermodynamics, Basic Concepts and Methods, Published by Wiley 7th Edition
3. Thermodynamics and Chemistry, Second Edition 2015 by Harward De Voe (E-Book free downloadable at http://www2.chem.umd.edu/thermobook/)
4. Aleksishvili M. & Sidamonidze S., Problems in Chemical Thermodynamics, with Solutions, Gordon M. Barrow, McGraw-Hill, London.</td></tr>
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