UNIVERSITI TEKNOLOGI MARA

CPE435: PROCESS CHEMISTRY

Course Name (English)	PROCESS CHEMISTRY APPROVED
Course Code	CPE435
MQF Credit	3
Course Description	This course is an advanced course in chemistry. The topics covered include acid-base reactions, chemical equilibrium, thermochemistry, electrochemistry and kinetics.
Transferable Skills	NIL
Teaching Methodologies	Lectures, Tutorial
CLO	CLO1 Discuss the basic concept of chemistry in everyday life and application towards chemical engineering field CLO2 Analyze theoretical basis for the operation of chemical nanosystem. CLO3 Evaluate the concept of redox reaction, thermochemistry and kinetic reactions in chemical engineering.
Pre-Requisite Courses	No course recommendations

Topics
1. Atoms, Molecules and Chemical Bonding 1.1) Atomic Orbitals 1.2) Electronic Configuration 1.3) Quantum Theory 1.4) Molecular Orbitals 1.5) Bonding and Intermolecular Forces
2. Acids and Bases 2.1) Arrhenius, Bronsted and Lewis Acids and Bases 2.2) Autoionization 2.3) Strong Acids and Bases 2.4) Weak Acids and Bases 2.5) Acid-base Titration
3. Oxidation and Reduction 3.1) Redox Potentials 3.2) Redox Stability 3.3) Diagrammatic Potential Data 3.4) Chemical Extraction
4. Thermodynamics and Equilibria 4.1) First Law of Thermodynamics 4.2) Second Law of Thermodynamics 4.3) Physical Transformation of Pure Substances 4.4) Simple Mixtures 4.5) Chemical Equilibria
5. Chemical Reaction Kinetics and Catalysis 5.1) Molecules in Motion: Gases and Liquids, and Diffusion 5.2) Rates of Chemical Reactions: Chemical Kinetics and Rate Laws 5.3) Homogeneous, Heterogeneous and Enzymatic Catalysis
6. Frontier Chemistry 6.1) Nanomaterials, nanoscience and nanotechnology 6.2) Characterization and fabrication

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Assignment 1	5%	CLO1
Assignment	Assignment 2	5%	CLO3
Assignment	Assignment 3	10%	CLO2
Test	Test 1	10%	CLO1 , CLO2
Test	Test 2	10%	CLO2 , CLO3

Reading List

Recommended Text

- **Brown T.L, LeMay Jr. H.U., Bursten B.E 2003, *Chemistry the Central Science*, 10 Ed., New Jersey: Prentice Hall.**

Reference Book Resources

- **Atkins P.W. 1994, *Physical Chemistry*, 5 Ed., , Oxford University Press [ISBN:]**
- **Barrow G.M 1996, *Physical Chemistry*, 6 Ed., , McGraw-Hill [ISBN:]**
- **Zumdahl, S.S. 1993, *Chemistry*, 3 Ed., , Lexington: D.C Health and Co. [ISBN:]**
- **McMurray J. 2004, *Organic Chemistry*, 6 Ed., , Belmont: Thomson Learning Inc. [ISBN:]**
- **Silberberg, M. 2011, *Chemistry: The Molecular Nature of Matter and Change*, 6 Ed., New York: McGraw-Hill.**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources