

COURSE INFORMATION

1 .	Name of Course	General Chemistry	
2 .	Course Code	PGC0225	
3 .	Type of Course (e.g. : Core, major, elective etc.)	Core for Foundation in Life Sciences	
4 .	Synopsis	General chemistry provides a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.	
5 .	Version (State the date of the Senate's approval - previous and the current approval date)	Current: August 2017 Previous: June 2014	
6 .	Name(s) of Academic Staff	Ho Sew Tiep Radziah Shaikh Abdullah Leonard Yew Chi Boon	
7 .	Semester and Year Offered	Trimester 2	
8 .	Credit Value	3	
9 .	Pre-Requisite	None	
10 .	Objective of the course in the programme:	To expose students to fundamental principles of physical and inorganic chemistry with special emphasis on the core concepts, basic principles and methods of chemistry.	
11 .	Justification for including the course in the programme:	To provide fundamental knowledge and skills required for further learning in the field of the Life Sciences.	
12 .	Course Learning Outcomes (CLO)	Domain	Level
	CLO1: State the fundamental principles of physical and inorganic chemistry.	Cognitive	1
	CLO2: Illustrate chemical reactions and the use of quantitative aspects of general chemistry.	Cognitive	2
	CLO3: Interpret the laws, principles, concept and theories of chemistry in relevant topics.	Cognitive	2
	CLO4: Explain various basic applications of bonds and periodicity.	Cognitive	2

13. Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment:															
Course Learning Outcomes (CLO) (Must tally with CLOs in item 12)	Programme Learning Outcomes (PLO)												Teaching Methods	Assessment Method	
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12			
CLO1 State the fundamental principles of physical and inorganic chemistry.	√	√												Lecture, Tutorial	Quiz, Test, Final Exam
CLO2 Illustrate chemical reactions and the use of quantitative aspects of general chemistry.	√	√												Lecture, Tutorial, Lab	Quiz, Assignment, Lab Report, Test, Final Exam
CLO3 Interpret the laws, principles, concept and theories of chemistry in relevant topics.	√	√												Lecture, Tutorial	Assignment, Test, Final Exam
CLO4 Explain various basic applications of bonds and periodicity.	√	√												Lecture, Tutorial	Quiz, Assignment, Final Exam
Total	4	4												Indicate the relevancy between the CLO and PLO by ticking "√" the appropriate relevant box (This description must be read together with standards 2.1.2, 2.2.1, and 2.2.2 in Area 2 – pages 16 & 18 of COPPA 2.0)	
14. Transferable Skills: Problem solving, Technical skills and Critical thinking.															
15. Distribution of Student Learning Time (SLT)															
Course Content Outline	**CLO	Teaching and Learning Activities				Guided Learning (NF2F)*	Independent Learning (NF2F)*	Total SLT							
		Guided Learning (F2F)*													
		*L	*T	*P	*O										
1 The Components of Matter and Stoichiometry: Elements, Compounds and Mixtures, An atomic View of Matter, Dalton's Atomic Theory, The Atomic Theory Today, Compounds; Formulas, Names, and Masses, Mixtures: Classification and Separation, The Mole, Determining the Formula of an Unknown Compound, Writing and Balancing Chemical Equations, Calculating Amounts of Reactant and Product	CLO1 & CLO2	2	1			1	4	8							
2 The Major Classes of chemical Reactions: The Role of Water as a Solvent, Writing Equation for Aqueous Ionic Reactions, Precipitation Reactions, Acid-Base Reactions, Oxidation-Reduction (Redox) Reactions, Reversible Reactions	CLO1 & CLO2	2	1	2		1	5	11							

3 Thermochemistry: Energy Flow and Chemical Change Forms of Energy and Their Interconversion, Entalpy: Heats of reaction and Chemical Change, Calorimetry, Stoichiometry of Thermochemical Equation, Standard Enthalpy of Formation and Reaction	CLO1 & CLO2	3	1	2			5	11
4 Atomic Structure and Chemical Periodicity: Atomic Spectra, The Quantum-Mechanical Model of the Atom, Characteristics of Many-Electron Atoms, The Quantum-Mechanical Model and the Periodic Table, Trends in Three Key Atomic Properties, Atomic Structure and Chemical Periodicity	CLO3 & CLO4	4	1				5	10
5 Chemical Bonding: Atomic Properties and Chemical Bonds, The Ionic Bonding model, The Covalent Bonding Model, Between the Extremes: Electronegativity and Bond Polarity, An Introduction to Metallic Bonding, Depicting Molecules and Ions With Lewis Structure, Valence-Shell Electron-Pair Repulsion (VSEPR) Theory and Molecular Shape, Valence Bond (VB) Theory and Orbital Hybridization	CLO3 & CLO4	2	2			1	5	10
6 Intermolecular Forces: Liquids, Solids and Phase Changes: An Overview of Physical States And Phase Changes, Quantitative Aspects of Phase Changes, Types of Intermolecular Forces, Properties of Liquid State, The Solid State: Structure, and Properties	CLO3 & CLO4	3	1				4	8
7 Kinetics and Equilibrium: Factors That Influence Reaction Rate, Expressing The Reaction rate, The Rate Law And Its Components, Integrated Rate Law: Concentration Changes Over Time, Catalysis, The Dynamic Nature Of The Equilibrium State, Expressing Equilibria With Pressure Terms: Relation Between Kc And Kp, Reaction Conditions And The Equilibrium State: Le Châtelier's Principles	CLO2 & CLO3	2	1	4		1	6	14
8 Acid-Base Equilibria: Acids and Bases in Water, The pH Scale, The Brønsted-Lowry Acid-Base Definition, Solving Problems Involving Weak-Acid Equilibria, Molecular Properties and Acid Strength , Acid-Base Properties of Salt Solutions, The Lewis Acid-Base Definition, Acid dissociation constant, pKa, and the relative strength of acids and bases	CLO2 & CLO3	3	1				4	8
							Total SLT	80

SUMMATIVE ASSESSMENT

1. Continuous Assessment	Percentage %	Total SLT
Online/Written quizzes	10%	3
Lab submissions	10%	0
Assignments	10%	10
Project		
Written test	20%	5
Total SLT for Continuous Assessment		18

2. Final Assessment	Percentage %	Total SLT	
		F2F	ILT
Final Exam	50%	2	20
Total SLT for Final Assessment (F2F + NF2F)		22	
Grand Total	100%	120	

****Indicate the CLO based on the CLO's numbering in Item 12.**

***L= Lecture, *T= Tutorial, *P= Practical, *O= Others, F2F*= Face to Face, NF2F*= Non Face to Face**

16 . **Identify Special Requirement to Deliver the Course (e.g., software, nursery, computer lab, simulation room):**

Not available

17 . **Main References:**

Chang, R. (2013). Chemistry (11th Ed). New York: McGraw-Hill.

18 . **Additional References:**

Chang, R. & Goldsby, K.A. (2014). General Chemistry: the Essential Concepts (7th Ed). McGraw-Hill Education.

Tro, N.J. (2015). Introductory Chemistry (5th Ed). Pearson.

Timberlake, K.C. & Timberlake, W. (2014). Basic Chemistry (4th Ed). Pearson Education Inc.

Brown, T.L., LeMay, H.E., Bursten, B.E., Murphy, C.J. & Woodward, P.M. (2012). Chemistry the Central Science (12th Ed). Prentice-Hall.

Silberberg, M.S. (2013). Chemistry: the Molecular Nature of Matter and Change (6th Ed – Global Edition). McGraw-Hill Education.

Petrucci, R.H., Herring, F.G., Madura, J.D. & Bissonnette, C. (2011). General Chemistry: Principles and Modern Applications (10th Ed). Pearson Canada Inc.

Note:

Cells shaded light grey contain formulas / fixed values. Edit these formulas only if needed.