

CHEMISTRY

DACS 1232

SEMESTER II

SESSION 2016/2017

1.0 OBJECTIVES

The objective of this course is to develop students so that they will be able to recognize various relevant chemistry principles involved in manufacturing engineering and be able to solve chemistry related problem by applying the relevant chemical principles for manufacturing engineering problems

2.0 LEARNING OUTCOMES

Upon completion of this course, the student should be able to:

- LO1 Recall the relevant chemistry principle studied.
- LO2 Explain verbally and writing the different chemical reactions, the differences in the reactivity of various elements, the nature of various chemical properties and chemical reactions and the factors affecting chemical properties and chemical reaction.
- LO3 Solve chemistry related problem by applying the relevant chemical principles.
- LO4 Demonstrate the relevant chemistry laboratory skills.
- LO5 Apply the various chemical properties learned to discuss the solution for relevant manufacturing engineering problems.

3.0 SYNOPSIS

This course will discuss about the concepts in Chemistry: The Study of Change; Atoms, Molecules and Ions; Chemical Reaction; Structure of Atoms; The Periodic Table; Chemical Bonding; and Properties of Matter.

4.0 REFERENCES

- a. Nivaldo, J. T., 2014, *Introductory Chemistry*, 4th Ed. Pearson, UK.
- b. Chang, Raymond, 2013, *Chemistry*, 12th Ed. McGraw Hill, USA.
- c. Petrucci, R. H. and Hill J. W. (2002). "*General Chemistry: An Integrated Approach*". Prentice Hall.
- d. Halimatun Hamdan *et al.* (2001). "*Kimia Asas Sains dan Kejuruteraan*". Johor Bahru.

5.0 COURSE IMPLEMENTATIONS

- a. Lectures – 2 hours per week for 13 weeks (Total = 26 hours)
- b. Tutorials – 3 hours per week for 6 weeks (Total = 18 hours)
- c. Laboratory – 3 hours per week for 5 weeks (Total = 15 hours)

There are 5 laboratory sessions throughout this course.

The laboratory session covers topics:

Lab 1: Usage and Calibrate of Lab Glassware Equipment

Lab 2: Density of Liquid and Solid

Lab 3: Preparation and Standardization of Solution

Lab 4: Vinegar Analysis

Lab 5: Boyle's Law

6.0 COURSE INSTRUCTIONS

Attendance is compulsory for lectures/tutorials/laboratories and should be more than 80% of the total contact hours. Students must wear shoe during laboratories sessions. The lecturer/lab assistant has the authority to ban the students from attending laboratories sessions in the case of failure to wear safety shoe. There will be no replacement for laboratories session unless a valid medical certificate (MC) is presented.

7.0 COURSE EVALUATIONS

COURSE WORK	CRITERIA	PERCENTAGE (%)
Tests	1 Test (1 hour/test)	15
Lab Report	5 Experiments (3 hours/Experiment)	25
Quizzes	2 Quizzes (15 minutes/quiz)	10
Assignment	1 Assignment (group)	10
Final Exam	2 hours	40
TOTAL		100

8.0 COURSE CONTENT

Week	Section	Contents	Remarks
One 13/02/2017 – 17/02/2017	Introduction	Introduction (a) Syllabus (b) Coursework (c) Assessment	Lab Briefing Guided Study
Two 20/02/2017 – 24/02/2017	Chapter 1	Chapter 1: Chemistry The Study of Change (a) Classifications of matter (b) Physical & chemical properties of matter (c) Measurement (SI Units, mass & weight, volume, density, temperature scales) (d) Handling numbers (Scientific notation, significant figures) (e) Factor label method of solving problems.	Lab 1
Three 27/02/2017 – 03/03/2017			Lab 2
Four 06/03/2017 – 10/03/2017	Chapter 2	Chapter 2: Atoms, Molecules and Ions (a) The structure of the atom (b) Atomic number, mass number and isotopes, molecules and ions (c) Chemical formulas (d) Naming compounds (Ionic compound, molecular compound, acids and bases, and organic compounds)	Tutorial 1
Five 13/03/2017 – 17/03/2017			Lab 3 Quiz 1 (Chapter 1)
Six 20/03/2017 – 24/03/2017	Chapter 3	Chapter 3: Chemical Reaction (a) Atomic mass, molar mass of an element and molecular (b) Avogadro's number (c) Percent composition of compounds (d) Empirical and molecular formulas (e) Chemical reactions and chemical equation (f) Amount of reactants and products (g) Limiting reagents and reaction yield (h) Reaction in aqueous solution, concentration of solution (i) Gravimetric analysis, acid-base titrations	Tutorial 2
Seven 27/03/2017 – 31/03/2017			Lab 4
Eight 03/04/2017 – 07/04/2017		MID SEMESTER BREAK	

Nine 10/04/2017 – 14/04/2017	Chapter 4	Chapter 4: Structure of Atoms and Periodic Table (a) Model of the atom, quantum numbers (b) Atomic orbital, electron configuration and building up principle (Aufbau's, Hund's, Pauli's) (c) Periodic table (d) Periodic classification of the elements (e) Electron configurations of ions and transition metal (f) Trends in physical and chemical properties such as atomic radii, ionization energies, electron affinities and electronegativities	Tutorial 3 Mid Semester Examination (Chapter 1–3)
Ten 17/04/2017 – 21/04/2017			Lab 5
Eleven 24/04/2017 – 28/04/2017		Assignment Presentation	Tutorial 4 Quiz 2 (Chapter 4)
Twelve 01/05/2017 – 05/05/2017	Chapter 5	Chapter 5: Chemical Bonding (a) Ionic bonding (b) Covalent bonding (c) Electronegativity, molecular geometry (d) Intermolecular forces and effect of polarisation	Labour Day (01/05/2017)
Thirteen 08/05/2017 – 12/05/2017			Wesak Day (10/05/2017)
Fourteen 15/05/2017 – 19/05/2017	Chapter 6	Chapter 6: Properties of Matter (a) Three states of matter, phase changes (b) The gas laws (Boyle's, Charles's, Guy Lussac's, Combined, Avogadro's, Ideal gas equation) (c) Gas stoichiometry (d) Liquids properties (Surface tension, cohesion, adhesion, viscosity) (e) Solids (Crystalline and amorphous solid), unit cell (cubic cells) (f) Materials Characterization (Scanning Electron Microscopy, Nitrogen Adsorption, X-ray Diffraction)	Tutorial 5
Fifteen 22/05/2017 – 26/05/2017			Tutorial 6 First Day of Ramadan (27/05/2017)
Sixteen 29/05/2017 – 02/06/2017		REVISION WEEK	Birthday of DYMM Yang Di Pertuan Agong (03/06/2017)
Seventeen 05/06/2017 – 09/06/2017		EXAMINATION WEEK	

9.0 SUBJECT EVALUATION REPORT FROM PREVIOUS SEMESTER

COURSE	SEMESTER	SUGGESTION	ACTION TAKEN

10.0 COURSE STAFFS

a. Lecture & Laboratory Sessions



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b. Laboratory Staff



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