



Perancangan Mengajar
FAKULTI KEJURUTERAAN MEKANIKAL
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHEMISTRY

DMCU 1233

SEMESTER 1

SESI 2013/2014

1.0 LEARNING OUTCOMES

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

- a. Recall the relevant chemistry principle studied. (C)
- b. 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. (C)
- c. Solve chemistry related problem by applying the relevant chemical principles. (C)
- d. Demonstrate the relevant chemistry laboratory skills. (P, A)
- e. Apply the various chemical properties learned to discuss the solution for relevant mechanical engineering problems. (C)

2.0 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; Properties of Matter; and Thermochemistry.

3.0 REFERENCES

- a. Chang, Raymond, 2013, *Chemistry*, 12th Ed. McGraw Hill, USA.
- b. N. J. Tro, 2009, *Introductory Chemistry*, 3rd Ed. Pearson Education International.
- c. Petrucci, R. H. and Hill J. W., 2002, *General Chemistry: An Integrated Approach*, Prentice Hall, USA.
- d. Halimatun Hamdan, et.al., 2001, *Kimia Asas Sains dan Kejuruteraan*, Johor Bahru.

4.0 COURSE IMPLEMENTATIONS

- a. Lectures – 2 hours per week for 13 weeks (Total = 26 hours)
- b. Tutorials – 3 hours per week for 7 weeks (Total = 21 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

- d. Test – 1 hours per session (Total = 1 hours)

5.0 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.

6.0 COURSE EVALUATIONS

| | CRITERIA | PERCENTAGE (%) |
|--------------------|---|----------------|
| COURSE WORK | | |
| Tests | 1 Test (1 hours/test) | 15 |
| Lab Report | 5 Experiments (3 hours/Experiment) | 20 |
| Quizzes | 2 Quizzes (0.5 hours/quiz) | 10 |
| Assignment | 1 Assignment (group) (2 hours preparation) | 15 |
| Final Exam | 2 ½ hours | 40 |
| TOTAL | | 100 |

7.0 COURSE CONTENT

| Week | Section | Contents | Remarks |
|---|--|--|----------------------------------|
| One 09/09/2013 – 13/09/2013 | Introduction | Introduction (a) Syllabus (b) Coursework (c) Assessment | Lab Briefing Guided Study |
| Two 16/09/2013 – 20/09/2013 | Chapter 1: Chemistry: The Study of Change | Chapter 1: Chemistry The Study of Change (a) Introduction (b) Classifications of matter (c) Physical & chemical properties of matter (d) Measurement (SI Units, mass & weight, volume, density, temperature scales) (e) Handling numbers (Scientific notation, significant figures) (f) Factor label method of solving problems | Lab 1 <i>Malaysia Day</i> |

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|--|--|---|---|
| <p>Three</p> <p>23/09/2013 – 27/09/2013</p> | <p>Chapter 2: Atoms, Molecules and Ions</p> | <p>Chapter 2: Atoms, Molecules and Ions</p> <p>(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)</p> | <p>Tutorial 1</p> |
| <p>Four</p> <p>30/09/2013 – 04/10/2013</p> | <p>Chapter 3: Chemical Reaction</p> | <p>Chapter 3: Chemical Reaction</p> <p>(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</p> | <p>Tutorial 2</p> |
| <p>Five</p> <p>07/10/2013 – 11/10/2013</p> | <p>Chapter 3: Chemical Reaction</p> | <p>Chapter 3: Chemical Reaction</p> <p>(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</p> | <p>Lab 2</p> <p>Quiz 1 (Chapter 1-2)</p> |
| <p>Six</p> <p>14/10/2013 – 18/10/2013</p> | <p>Chapter 4: Structure of Atoms and Periodic Table</p> | <p>Chapter 4: Structure of Atoms and Periodic Table</p> <p>(a) Model of the atom, quantum numbers (b) Atomic orbital, electron configuration and building up principle (Aufbau's, Hund's, Pauli's)</p> | <p>Tutorial 3 <i>Hari Raya Aidil Adha</i></p> |
| <p>Seven</p> <p>21/10/2013 – 25/10/2013</p> | <p>Chapter 4: Structure of Atoms and Periodic Table</p> | <p>Chapter 4: Structure of Atoms and Periodic Table</p> <p>(c) Periodic table (d) Periodic classification of the elements (e) Electron configurations of ions and transition metal</p> | <p>Lab 3</p> |
| <p>Eight</p> <p>28/10/2013 – 01/11/2013</p> | <p>Chapter 4: Structure of Atoms and Periodic Table</p> | <p>Chapter 4: Structure of Atoms and Periodic Table</p> <p>(f) Trends in physical and chemical properties such as atomic radii, ionization energies, electron affinities and electronegativities</p> | <p>Lab 4</p> |

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| <p>Nine</p> <p>04/11/2013 – 08/11/2013</p> | | <p>SEMESTER BREAK</p> | <p><i>Deepavali</i> <i>Awal Muharram</i></p> |
| <p>Ten</p> <p>11/11/2013 – 15/11/2013</p> | <p>Chapter 5: Chemical Bonding</p> | <p>Chapter 5: Chemical Bonding (a) Ionic bonding, covalent bonding (b) Electronegativity and polarity, molecular geometry (c) Intermolecular forces and effect of polarisation</p> | <p>Tutorial 4</p> <p>Test (Chapter 1- 4)</p> |
| <p>Eleven</p> <p>18/11/2013 – 22/11/2013</p> | <p>Chapter 6: Properties of Matter</p> | <p>Chapter 6: Properties of Matter (a) Three states of matter, phase changes (b) The gas laws (Boyle's, Charles' & Guy Lussac's, Avogadro's, Ideal gas equation) (c) Gas stoichiometry</p> | <p>Lab 5</p> |
| <p>Twelve</p> <p>25/11/2013 – 29/11/2013</p> | <p>Chapter 6: Properties of Matter</p> | <p>Chapter 6: Properties of Matter (d) Liquids properties (Surface tension, cohesion, adhesion, viscosity) (e) Solids (Crystalline and amorphous solid), unit cell (cubic cells) (f) Characterization of materials</p> | <p>Tutorial 5</p> |
| <p>Thirteen</p> <p>02/12/2013 – 06/12/2013</p> | | <p>PRESENTATION WEEK</p> | <p>Tutorial 6</p> |
| <p>Fourteen</p> <p>09/12/2013 – 13/12/2013</p> | <p>Chapter 7: Thermochemistry</p> | <p>Chapter 7: Thermochemistry (a) Energy in chemical reaction, system and surrounding (b) Exothermic and endothermic process, enthalpy (c) Thermochemistry equation</p> | <p>Tutorial 7</p> <p>Quiz 2 (Chapter 5 - 6)</p> |

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| Fifteen 16/12/2013 - 20/12/2013 | Chapter 7: Thermochemistry | Chapter 7: Thermochemistry (d) Calorimetric, heat capacity , specific heat capacity (e) Standard enthalpy of formation, standard enthalpy of reaction (f) Hess Law | Revision |
| Sixteen 23/12/2013 - 27/12/2013 | | STUDY WEEK | <i>Krismas Day</i> |
| Seventeen 30/12/2013 - 02/01/2014 | | EXAMINATION WEEK | |

8.0 COURSE STAFFS

a. Lecture Sessions & Laboratory Sessions

| GROUP | 1 DMC |
|-------|---|
| | Mr. Imran Syakir Bin Mohamad Room: 8/5/9, Fifth Floor, Academic Building, Industrial Campus, UTeM ☎: 06-234-6761, 📠: 012-5531131 ✉: imran@utem.edu.my http://imsymo.blogspot.com/p/kimia.html |

b. Technician/Laboratory Staff

| GROUP | 1 DMC |
|-------|--|
| | Mr. Ismail Bin Ibrahim Room: Chemistry Lab, Industrial Campus, UTeM ☎: 06-234-6870 ✉: ismailb@utem.edu.my |