

FACULTY OF **ENGINEERING**

DEGREE COURSE: **INDUSTRIAL ENGINEERING BS**

SUBJECT: GENERAL CHEMISTRY

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OBJECTIVES

The course is aimed at providing students with the properties and behavior of the macroscopic world in terms of structure and arrangement of the constituent molecules and atoms.

CONTENTS

1. The basic structures of atoms and ions, periodic properties.
2. Covalent bonds and ionic bonds.
3. Molecular shape and structure.
4. Properties of gases.
5. Condensed phases, intermolecular forces, metallic solids, ceramic solids.
6. Thermodynamics: First and Second Law.
7. Gibbs energy. Criteria for spontaneity and equilibria.
8. Chemical kinetics.
9. Physical equilibria.
10. Chemical equilibria.
11. Aqueous solution equilibria. Acids and bases. Solubility equilibria.
12. Electrochemistry and corrosion.

LEARNING OUTCOMES

At the end of the course, students will:

- be able to understand the molecular nature of all phases of matter
- understand the various ways of depicting chemical compounds and chemical reactions
- develop abilities to solve basic quantitative problems regarding the properties of molecules, chemical equilibria, and chemical kinetics
- develop abilities to appropriately apply this knowledge to general scientific problems in various fields of science and engineering

ASSESSMENT

Written exam: multiple choice and open questions

RECOMMENDED TEXTBOOKS

1. P. Atkins, L. Jones, L. Laverman, Chemical Principles: the quest for insight. W. H. Freeman Publisher, Sixth Edition (2012), ISBN-10: 1429288973.
 2. J. C. Kotz, P. M. Treichel, J. Townsend, Chemistry and Chemical Reactivity. Thomson Brooks/Cole Publisher, Seventh Edition (2009), ISBN-10: 0495387037.
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