

Department of Teacher Education

University of Karachi

B.Ed. Hons (Elementary). VI-Semester

Science Content II Chemistry (DTE-532)

OBJECTIVES:

To develop scientific attitude and scientific thinking.

To develop a basic knowledge and understanding of Chemistry at school level.

To understand the relationship of chemical substances, its properties, and their application in life.

To explore content, process and the language of chemistry teaching to communicate with the learners age –range and cognitive reach.

To facilitate teacher to enable the students to engage in acquiring methods and processes that nurtures their curiosity, creativity and strengthens the interaction with environment.

To develop awareness of environmental concerns to permeate the entire school curriculum.

1. Atomic Structure
 - 1.1. Basic Atomic Structure
 - 1.2. Proton number and Mass number
 - 1.3. Isotopes
 - 1.4. Shells and Subshells of an atom
 - 1.5. Electronic configuration of first 20 elements of periodic table
2. Chemical Bonding
 - 2.1. Valency
 - 2.2. Electronegativity
 - 2.3. Ionization Potential
 - 2.4. Ionic Bond
 - 2.5. Covalent Bond
 - 2.6. Metallic Bonding
 - 2.7. Characteristics of ionic and covalent compounds
 - 2.8. Differences between mixtures and compound
3. Chemical Formulae and Equations
 - 3.1. Radicals and their valency
 - 3.2. Derivation of chemical formulae

- 3.3. Relative atomic and molecular mass
- 3.4. Percentage composition
- 3.5. Chemical Equation

- 4. Mole
 - 4.1. Avagadro Number and mole
 - 4.2. Gram atomic mass and Gram molecular mass
 - 4.3. Moles of gases
 - 4.4. Calculating purity and percentage yield
 - 4.5. Concentration of solution
 - 4.6. Moles and titration

- 5. The periodic Table
 - 5.1. History of Periodic Table
 - 5.2. Group and periods
 - 5.3. Metals, Non-metals and Metalloids
 - 5.4. The Alkali Metals
 - 5.5. The Alakaline Earth Metals
 - 5.6. The Halogens
 - 5.7. The Noble gases
 - 5.8. The Transitional Metals

- 6. Introduction to Organic Chemistry
 - 6.1. Organic compounds
 - 6.2. Fractional Distillation

- 6.3. Hydrocarbons
- 6.4. Properties of Alkanes
- 6.5. Properties of Alkenes
- 6.6. Properties of Alkynes

Assessment Criteria:

The course is spread over twelve weeks which focuses upon developing conceptual understanding of chemistry among prospective teachers. Therefore, more emphasis is on clear explanation of the concepts along with application of ideas into classroom. Active participation and end of term assignment will contribute to formative assessment and the final paper would comprise of 60 marks.

Reference Books:

- 1) Prescott, N. C. (2003) A course for O levels, Federal Publications
- 2) Petrucci (2010) General Chemistry.
- 3) Chemistry for Grade IX, Sindh Textbook board
- 4) Chemistry for Grade X1 and XII, Sindh Textbook Board

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B.Ed. Hons (Elementary). Semester VII

Science Content III Physics (DTE-621)

Unit 1: Concepts of Physics and Measure

- Introduction to Physics
- Physical Quantities
- Standard Form/ Scientific notation
- Measuring Instruments (Meter rule, Physical instruments, stop watch etc
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Unit 2: Dynamics

- Momentum
- Newton's Laws of motion
- Friction
- Uniform circular motion
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Unit 3: Geometrical optics

- Reflection of light
- Image Location by spherical mirror equation
- Refraction through a prism
- Compound microscope
- Telescope

- Defects in Vision

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Unit 4: Information and Communication Technology

- Components of ICT
- Flow of information
- Communication technology
- Storing information
- Handling Information
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Unit 5: Radio Activity

- Atom and atomic nucleus
- Natural radioactivity
- Natural transmutations
- Back ground radiation
- Half life
- Radio isotopes
- Fission and fusion
- Hazards and safety measures

References:

Physics for Class X, Pub, Sindh Text Book Board (2008)

Physics for Class XI, Pub, Sindh Text Book Board (2010)

Physics for Class XII, Pub, Sindh Text Book Board (2010)

Zin, S.M.S (2003). Reforming the science and technology curriculum. the smart school initiative in Malaysia

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B.Ed. Hons (Elementary). Semester VII

Science Pedagogy (DTE-641)

OBJECTIVES:

- To appreciate science not only as a body of knowledge but also as a process
- To explain the nature of science
- To demonstrate scientific thinking in their daily and professional lives
- To engage learners actively by planning interesting motivational activities
- To develop low teaching aids for teaching science
- To engage learners actively by applying the scientific inquiry approach
- To plan science lessons using interactive teaching strategies
- To assess science lessons using alternative assessment.

Unit 1: Introduction

Science Teaching?

Aims and Objectives of Teaching Science

Nature of Science

Science Process Skills

Unit 2: Teacher's Planning

National Curriculum of Science

General Outcomes of teaching Science

Formulating Instructional Objectives

Significance and application of STSE

Longterm Planning

Developing Unit Plan

Unit 3: Motivation for learning Science

Why Motivation

Ideas for motivation

Developing motivational activities for science

Unit 4: General Methods of teaching Science

Presentation Method

Discussion Method

Constructivist Approach

Demonstration Method

Unit 5: Inquiry Based Learning

Inductive Approach

Deductive Approach

Discovery Learning

Problem Solving

Using case studies for teaching science

Discrepant events

Unit 6: Teaching Aids

Need & importance of teaching aids

Types of teaching aids

Principles of using teaching aids

Using low cost teaching aids

Unit 7: Evaluating Learning of Science

Designing Select type items

Developing Structured questions

Portfolio: Purpose and development

Unit 8: Research in Science Education

Selected contemporary research papers on science education

Assessment Criteria:

The course is spread over twelve weeks which focuses upon developing science teaching skills with a focus on inquiry. All the methods and strategies are expected to be demonstrated and marked, therefore 50 marks are allocated for preparing and executing lessons in form of microteaching and the final term paper would be basic on summative concepts related to science teaching.

Guidelines for Assignments:

All should be preferably typed with proper indexing.

If two assignments will be found similar, no marks will be given.

Marks are also allocated for timely submission and execution of lessons.