

MODULE SYNOPSES***CP8518 – Chemistry I***

Upon completion of this module, students will develop an in-depth understanding of the electronic structure of atoms and its basis for the study of chemical bonding. Students will learn to apply the VSEPR model to visualise three dimensional structure of molecules and determine the possible types of interactions to explain the physical and chemical properties of matter. They will also learn the structure and bonding of matter and be able to predict trends in the properties of matter and its reaction. This will enable students to apply the fundamental ideas of conservations of matter and energy in stoichiometry and thermochemistry. The module also aims to equip students with the analytical and observation skills and techniques critical for working in a chemical laboratory by exposing them to a range of experimental techniques in the areas of titration, thermochemistry and qualitative inorganic analysis.

CP8503 - Chemical Safety and Biosafety

This module aims to provide students with knowledge on important topics such as risk groups; risk assessment; handling of Biohazardous materials and chemical waste; storage and disposal of biohazards. Laboratory design, safe practices and containment equipment of the four biosafety levels, routes of transmission and decontamination are taught. In addition, students have to examine the implications of local regulations to laboratory operations such as the Workplace Safety and Health Act (WSHA) and the Biological Agents and Toxin Act (BATA).

CP8520 – Chemistry II

Upon completion of this module, students will develop a basic understanding that changes in matter involved the study of its feasibility due to kinetics and thermodynamics consideration and extent of change. The qualitative and quantitative aspects of chemical kinetics are introduced to students and this will form the basis for the study of chemical equilibrium, including chemical equilibria in aqueous media involving acids and bases. Topics in organic chemistry will introduce students to basic concepts on how simple molecules can be constructed and applied to organic reaction transformations and functional group interconversion. This provides students the opportunity to apply their knowledge on structure and bonding to understand the structure and reactivity of organic molecules. The module also aims to equip students with the analytical and observation skills critical for working in a chemical laboratory by exposing them to a range of experimental skills and techniques in the areas of reaction kinetics, simple organic synthesis and purification and qualitative organic analysis.

CP8511 - Instrumental Analysis

This module aims to provide students with practical laboratory skills and theoretical knowledge to perform chemical analysis using analytical instruments such as gas and liquid chromatograph; ultra-violet visible, infra-red spectrophotometer, etc. It provides students with a capability for problem solving, independent thinking and innovation so that they can work effectively in research teams and/or in the industry on life science or chemical analysis.
geochemical life cycles and human diseases.

CP8508 - Good Laboratory Practice and Management

On completion of this module, individuals will be competent in terms of knowledge and skills in managing an accredited laboratory. He or she will also be trained to maintain the rigour of a quality documentation and technical competency in a testing

laboratory. Being conversant with international standard guidelines on good laboratory practices and management, they could work efficiently and effectively in a chemical/biological accredited laboratory.

CP8509 - Applied Statistics and Quality Assurance

This module aims to provide an understanding of important concepts of ISO 9000, ISO 14000, quality assurance and the use of statistics in quality control in control charts and experimental design in the chemical manufacturing, life science and service sectors.

CP8522 – Chemistry III

The module aims to provide students with the fundamentals of organic synthesis and reaction mechanisms. Topics include stereochemistry, chemical kinetics, substitution, addition and elimination reactions.

CP8523 – Data Analytics for Industrial Application

This module aims to equip participants with the knowledge on a range of data analysis tools and also the skills to apply these tools on industrial data. Participants will learn to develop efficient models for predictive data analysis and to apply the trained models on offline data and on streaming data to generate automated alerts.

CP8524 – Molecular Biochemistry

The module aims to provide students with an understanding of the structure of water and biomolecules like proteins, carbohydrates and lipids. The types and functions of enzymes and energy and their roles in cells will be covered.

CP8521 - Environmental Sustainability

This module aims to provide students with the underlying principles and key concepts of environmental and water technology and how these can be applied to the resolution of contemporary global issues such as climate change, environmental degradation, transboundary pollution, species extinction, soil remediation, etc. It enhances a growing environmental awareness towards waste minimisation, environmental impact assessment, industrial health and safety, quality and purification of water. Practical classes will impart to students hands-on laboratory skills and experience relating environmental and water analysis while case studies assignment will develop students' awareness and global perspective of the current developments in environmental and water technology.

CP8517 - Petrochemicals and its Applications

This module aims to provide students with laboratory skills and the theoretical knowledge of petrochemicals and its applications. Detailed knowledge of the various processes to convert petrochemicals to basic building blocks followed by their conversion to useful common and specialty chemicals, as well as their importance to Singapore's economy will be taught. In addition, the role of the specialty chemicals derived from petrochemicals will be covered. Students will acquire the essential skills to determine the physical and chemical properties of petroleum products and petrochemicals.

CP8519 – Principles of Chemical Processes

This module provides students with basic understanding of chemical engineering principles and applications of engineering measurements. Types of processes (unit operations) and equipment used in the chemical industry will be covered too. Students will also learn to interpret engineering drawings.