

Section 1: Basic Module Data

Module Title	INTRODUCTORY CHEMISTRY
Faculty	Health, Life and Social Sciences
Department	Forensic and Biomedical Sciences
Programme(s) in which this module appears:	BSc (Hons) Forensic Science
Code:	FRS 1***
Credit Rating:	30
Level:	1
Pre-requisites:	None
Co-requisites:	None
Barred Combinations:	
Module Co-ordinator:	Dr J Gonzalez-Rodriguez

Section 2: Module Synopsis

This unit covers all the major areas of chemistry (inorganic, organic, physical) and is directed towards those theoretical and conceptual aspects that are developed subsequently in later stages of the course. Furthermore, students are encouraged to develop the practical skills necessary for all the future chemistry-based practical applications.

Section 3: Outline Syllabus

Laboratory Skills

GLP, SOPs and recording of laboratory work
Accurate weighing – error & precision
Handling and transference of chemicals
Use of pipettes and burettes
Volumetric flasks
Analytical precision in making standard solutions

Chemical structure

Atoms and molecules – building blocks of matter.
Elements and compounds - chemical bonding.
Shapes of molecules, isomerism
Relating chemical names to structure Functional groups, nomenclature (IUPAC)
Ions and isotopes
States of matter and changes in state
Relationship between bonding and physical properties

Chemical properties

Solubility, corrosion, biodeterioration, permeability; flammability
Interaction with radiation: UV, VIS, IR. Radioactivity
Optical and morphological properties
Crystallinity, transparency/translucency, colour
Introduction to colorimetry

Molecules of biological importance

Structure, properties and reactions of the important biological molecules:
amino acids, peptide bonding, proteins, protein conformation (fibrous/globular), Denaturation, fats, fatty acids, phospholipids, cholesterol, carbohydrates, monosaccharides, polysaccharides

Chemical Reactions

Thermodynamics
Kinetics
Equilibria, including pH; buffers and stability constants

Reaction mechanisms

Redox, addition, substitution + elimination
Reaction schemes – synthesis of selected compounds

Section 4: Learning Outcomes

The student will be able to:

1. converse in major aspects of chemical terminology, nomenclature, conventions and units
2. demonstrate understanding of atomic structure and relate this to properties of the elements, their compounds, and their position in the Periodic Table
3. demonstrate understanding of the models of chemical bonding and molecular shapes (including isomerism) and use these models to explain properties of substances
4. relate bulk properties of substances (including macromolecules) to the properties of individual atoms and molecules
5. describe chemical and physical properties of gases, liquids, solutions and solids
6. explain the structure, properties and synthesis of selected compounds
7. demonstrate understanding of the fundamental chemical properties of substances including electrical, thermal, optical and radioactivity
8. demonstrate understanding of the structure, properties and functions of proteins, lipids and carbohydrates
9. demonstrate understanding of chemical change and factors that influence the progress of a chemical reaction (principles of thermodynamics and kinetics)
10. identify the major types of chemical reaction and understand the main characteristics associated with them
11. demonstrate skills in the safe-handling of chemical materials, taking into account their physical and chemical properties, including any specific hazards associated with their use
12. demonstrate skills required for the conduct of standard laboratory procedures
13. demonstrate skills in the monitoring, by observation and measurement, of chemical properties, events or changes, and the systematic and reliable recording and documentation thereof
14. interpret data derived from laboratory observations and measurements in terms of their significance and the theory underlying them
15. conduct risk assessments concerning the use of chemical substances and laboratory procedures

Section 5: Learning and Teaching Strategy/Methods

Students will use a variety of learning methods to achieve their learning outcomes:

Lecture Series	These will provide the students with a broad knowledge of chemistry and will cover the theoretical and conceptual aspects that are developed subsequently in later stages of the course.
Seminars	Develop problem-solving skills within applied areas of chemistry, and giving the students opportunity to address areas of difficulty.
Laboratory	This will allow the student to develop an understanding of good laboratory practice, together with all the practical skills necessary for all future chemistry-based practical applications within the programme.

Section 6: Assessment

Coursework (50%)

Unseen examination (50%)

Section 7: Relationship to Professional Body

None

Section 8: Indicative Reading

Key Texts

Housecroft, C.E. and Constable, E.C. (2006) *Chemistry (3rd Edition)*, Prentice Hall.

Recommended Reading

Atkins, P.W. and De Paula, J. (2001). *Atkins' Physical Chemistry (7th Edition)*, Oxford University Press.

¹Jones, A., Clemmet, M., Higton, A. and Golding, E. (1999). *Access to Chemistry*, Royal Society of Chemistry.

Maskill, H. (1996). *Mechanisms of Organic Reactions (Oxford Chemistry Primers)*, Oxford University Press.

Mingos, D.M.P. (1995). *Essentials of Inorganic Chemistry 1 (Oxford Chemistry Primers, 28)*, Oxford University Press.

Price, G. (1998). *Thermodynamics of Chemical Processes (Oxford Chemistry Primers)*, Oxford University Press.

Zumdahl, Steven S. (2005). *Chemical Principles (5th Edition)*, D C Heath and Company.

¹ This text is recommended for those students without an A2 in chemistry