LF111-15 Chemistry for Biochemists

24/25

Department
Life Sciences
Level
Undergraduate Level 1
Module leader
Katrine Wallis
Credit value
15
Module duration
12 weeks
Assessment
100% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

The aim of the module is to provide an introduction to general chemistry that biochemistry students need, including chemical bonding, reaction mechanisms, thermodynamics, kinetics and quantum mechanics. It will provide the foundation for the first year organic chemistry module as well as physical chemistry needed throughout their degree. It will be taught through lectures and workshops.

Module aims

The aim is to provide students with a fundamental knowledge of chemistry required for a thorough understanding of biochemistry. It will provide students with general chemistry knowledge that is needed for organic chemistry which again underpins reaction mechanisms of enzymes and metabolism of cells and organisms. It will also provide an introduction to inorganic chemistry sufficient to understand how metal ions are incorporated into biological molecules and their crucial roles in metabolism and enzymes. Reaction kinetics and thermodynamics are also covered to provide an understanding of timescales and energetics involved in biochemistry. The quantitative and problem solving skills required for understanding these topics will be taught and practised in workshops.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module will cover:
Atomic and molecular orbitals. Relationship between bonding and shape including single and multiple bonds, conjugation and aromaticity.
Polarisation and electronegativity. Electrophiles and nucleophiles
Curly arrows and their use in describing reaction mechanisms
Co-ordination of metal ions in biological molecules
The three laws of thermodynamics
Enthalpy, Entropy and Gibbs free energy
Buffers and solutions
Redox reactions
Biological membranes
Rates of reactions and rate constants
collision theory and dependence of reactions on temperature
Affinity and binding of ligands
Enzyme kinetics including inhibitors and allosteric regulation
Introduction to quantum mechanics

Learning outcomes

By the end of the module, students should be able to:

- Solve basic problems involving kinetics and thermodynamics
- Examine types of bonding involved in molecules and complexes and describe reactions using curly arrows
- demonstrate an understanding of reaction kinetics and thermodynamics and apply this knowledge to biological molecules and reactions.

Subject specific skills

Analysis of biochemical data using quantitative approaches
Application of chemical bonding to understanding of chemical reactions and molecular interactions
Comprehension of physical principles underpinning biochemistry including thermodynamics and kinetics

Transferable skills

Critical thinking: analysing and interpreting data
Digital literacy: Use of excel or similar software to aid with calculations
Problem solving: selecting the correct approaches to solve a problem

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Study

Study time

Type	Required
Lectures	25 sessions of 1 hour (17%)
Seminars	8 sessions of 1 hour (5%)
Private study	117 hours (78%)
Total	150 hours

Private study description

Self-directed learning preparing for and revising lectures and workshops

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group B

	Weighting	Study time
Examination	100%	
MCQ and short answer exam paper		

Feedback on assessment

Post board cohort level feedback

Past exam papers for LF111

Availability

Courses

This module is Core for:

- Year 1 of UBSA-C700 Undergraduate Biochemistry
- ULFA-C1A2 Undergraduate Biochemistry (MBio)

    - Year 1 of C1A2 Biochemistry
    - Year 1 of C700 Biochemistry
- Year 1 of ULFA-C702 Undergraduate Biochemistry (with Placement Year)
- Year 1 of ULFA-C1A6 Undergraduate Biochemistry with Industrial Placement (MBio)