

CH160-30 Introduction to Inorganic Chemistry

21/22

Department

Chemistry

Level

Undergraduate Level 1

Module leader

Paolo Coppo

Credit value

30

Module duration

20 weeks

Assessment

20% coursework, 80% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

The aim of this module is to provide students with a foundational understanding of the effect that quantization of energy levels in atoms affects the structure of the compounds that result from bonding atoms together. As such it provides a fundamental look at chemical bonding and interatomic interactions, and the way these determine the structure and reactivity of inorganic compounds. Later parts of the module apply an understanding of bonding to two further areas: the chemistry of transition metal complexes and the redox properties of main group compounds.

Module aims

The aim of this module is to provide students with a foundational understanding of the effect that quantization of energy levels in atoms affects the structure of the compounds that result from bonding atoms together. As such it provides a fundamental look at chemical bonding and interatomic interactions, and the way these determine the structure and reactivity of inorganic compounds. Later parts of the module apply an understanding of bonding to two further areas: the chemistry of transition metal complexes and the redox properties of main group compounds.

The 6 CATS of skills-based assessed work is part of 18 CATS of skills-based content across the

three year 1 theory modules. An example of this overall content would be maths, coding, general IT, specific chemistry software and career development skills.

Provide skills development for a range of transferrable and chemistry-specific skills to support their studies and careers e.g. being able to use a range of generic software, chemical software, plus access relevant databases.

For the Maths skills component, this provides the mathematical learning support for the Year 1 modules and more advanced modules in Years 2/3/4, enabling students to solve problems in the main branches of chemistry. The mathematical skills taught allow students to understand the concepts behind much of chemistry and allow the processing of their own data.

The majority of the module content is drawn from components of A-level syllabuses. As such, most students will already be familiar with some aspects of the module syllabus, but the pattern of familiarity will be heterogeneous across the class. The primary aim of the module is to equip all students with the necessary mathematical skills to succeed in their chemistry degree at Warwick. The module is structured to allow individual students to concentrate their time on those bits of the module with which they are unfamiliar.

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.

Atomic structure, electronic structure of atoms (quantisation in a non-mathematical sense), bonding (simple MO for diatomics, ionic bonding and structures, metallic bonding). Introduction to coordination chemistry (crystal field theory, spectrochemical series, high spin/low spin, CFSE, complex formation and isomers, chelate effect), main group chemistry (periodicity, redox properties). Acidity and Redox reactions.

An example collective skills syllabus may include elements from the following:

1. Maths

- Perform routine algebraic manipulations.

- Manipulation of units and dimensions.

- Solve simple equations.

- Understand the basis of differential calculus, be able to differentiate and, find maxima and minima.

- Integrate functions and solve simple differential equations.

- Determine the limits of simple functions.

- Manipulate logarithmic and exponential functions.

- Introduction to error propagation.

- Perform routine trigonometric manipulations.

- Expand simple series.

- Manipulate complex numbers, vectors, and matrices.

2. Probability and statistics

3. Coding

4. General IT skills

5. Specific chemistry software training

6. Career development skills

Learning outcomes

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

- Identify the electronic structure of atoms
- Understand orbitals as wave functions and their interactions
- Identify the shape and symmetry features of simple molecules and metal complexes
- Assign ionic structures to solid compounds and perform calculations on the physical properties
- Understand the energetics of bonding
- Sketch molecular orbital diagrams of simple molecules
- Identify the electronic configuration of metal complexes
- Predict reactivity and magnetic properties of metal complexes
- Perform calculations on redox reactions
- Work out acidic constants, pH, concentrations of Bronsted acids and bases
- Evaluate the reactivity of Lewis acids

Indicative reading list

“Inorganic Chemistry” 7th ed. Rourke et al. Oxford University Press

Subject specific skills

Numeracy

Problem solving

Critical thinking

Transferable skills

Numeracy

Problem solving

Critical thinking

Study

Study time

Type	Required
Lectures	60 sessions of 1 hour (20%)
Tutorials	7 sessions of 1 hour (2%)
Private study	233 hours (78%)
Total	300 hours

Private study description

N/A

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D2

	Weighting	Study time
Assessed	20%	
Online Examination	80%	
~Platforms - AEP		

- Graph paper
- Answerbook Green (8 page)
- Periodic Tables
- Students may use a calculator

Feedback on assessment

Cohort level examination feedback provided via Moodle. Written feedback provided for assessed work components.

[Past exam papers for CH160](#)

Availability

Post-requisite modules

If you pass this module, you can take:

- CH272-15 Materials and Polymers

Courses

This module is Core for:

- UCHA-4 Undergraduate Chemistry (with Intercolated Year) Variants
 - Year 1 of F101 Chemistry (with Intercolated Year)
 - Year 1 of F122 Chemistry with Medicinal Chemistry (with Intercolated Year)
- UCHA-3 Undergraduate Chemistry 3 Year Variants
 - Year 1 of F100 Chemistry
 - Year 1 of F100 Chemistry
 - Year 1 of F121 Chemistry with Medicinal Chemistry
- UCHA-F110 Undergraduate Master of Chemistry (with Industrial Placement)
 - Year 1 of F100 Chemistry
 - Year 1 of F110 MChem Chemistry (with Industrial Placement)
 - Year 1 of F112 MChem Chemistry with Medicinal Chemistry with Industrial Placement
- Year 1 of UCHA-F107 Undergraduate Master of Chemistry (with Intercolated Year)
- UCHA-F109 Undergraduate Master of Chemistry (with International Placement)
 - Year 1 of F109 MChem Chemistry (with International Placement)
 - Year 1 of F111 MChem Chemistry with Medicinal Chemistry (with International Placement)
- UCHA-4M Undergraduate Master of Chemistry Variants
 - Year 1 of F100 Chemistry
 - Year 1 of F105 Chemistry
 - Year 1 of F110 MChem Chemistry (with Industrial Placement)
 - Year 1 of F109 MChem Chemistry (with International Placement)
 - Year 1 of F125 MChem Chemistry with Medicinal Chemistry
- Year 1 of UCHA-F127 Undergraduate Master of Chemistry with Medicinal Chemistry(with Intercolated Year)