1. KentVision Code and title of the module

CHEM7420 – Advanced Concepts in Physical and Inorganic Chemistry

## Division and School/Department or partner institution which will be responsible for management of the module

Division of Natural Sciences (Chemistry and Forensic Science)

## The level of the module (Level 4, Level 5, Level 6 or Level 7)

Level 7

## The number of credits and the ECTS value which the module represents

15 Credits (7.5 ECTS)

## Which term(s) the module is to be taught in (or other teaching pattern)

Autumn or Spring

## Prerequisite and co-requisite modules and/or any module restrictions

Prerequisite: Successful completion of Stage 3 of the Chemistry Programme to threshold required for progression into Stage 4

## The course(s) of study to which the module contributes

Compulsory for the following courses:

MChem Chemistry

Not available as an elective module

## The intended subject specific learning outcomes. On successfully completing the module students will be able to:

8.1 Demonstrate knowledge and critical understanding of advanced concepts in inorganic and physical chemistry including terminology, theory, units and conventions.

8.2 Demonstrate knowledge and critical understanding of essential facts, concepts, principles and theories relating to chemistry and to apply this knowledge and understanding to the solution of qualitative and quantitative problems.

8.3 Recognise and critically analyse problems and plan strategies for their solution by the evaluation, interpretation and synthesis of scientific information and data.

8.4 Understand the importance of observational and instrumental monitoring of physiochemical events and changes, and the systematic and reliable documentation of the above.

8.5 Collate, interpret and explain the significance and underlying theory of experimental data to advanced chemical principles.

## The intended generic learning outcomes. On successfully completing the module students will be able to:

9.1 Analyse problems and plan strategies for their solution by evaluating and interpreting qualitative and quantitative information, extending to situations where evaluations need to be made based on limited information.

9.2 Time-management and organisational skills, as evidenced by the ability to plan and implement efficient and effective modes of working. Self-management and organisational skills with the capacity to support life-long learning.

9.3 Demonstrate independent learning and the ability to evaluate relevant research and suggest future directions and developments.

9.4 Demonstrate the generic skills needed for students to undertake further training of a professional nature.

9.5 Use data-processing skills and search engines to search for and critically assess the scientific literature and to make use of the results.

## A synopsis of the curriculum

The properties of species containing transition metals and lanthanides are governed by the electronic structure of these metals and ions and a more in-depth understanding of their electronic states will be provided in this module in order to explore these properties and current research trends. The consequences of these concepts for physical properties will be explored. Current research ideas will also be incorporated.

Nanoscale phenomena are increasingly important in cutting edge materials science. Understanding colloids and interfaces is integral to entry into this field. Students will learn the physical chemistry of these systems, starting from classifications, and move forward to understanding the thermodynamics and kinetics through application of principles of structural chemistry. Characterisation and up-to-date applications of colloidal systems will be delivered.

## Reading list

## The University is committed to ensuring that core reading materials are in accessible electronic format in line with the Kent Inclusive Practices.

## The most up to date reading list for each module can be found on the university's [reading list pages](https://kent.rl.talis.com/index.html).

## Contact Hours

Private Study: 124

Contact Hours: 26

Total: 150

## Assessment methods

13.1 Main assessment methods

* Assignment 1 – 10%
* Assignment 2 – 10%
* Examination (3 hours) – 80%

13.2 Reassessment methods

* Like-for-like

## Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section 12) and methods of assessment (section 13)

**Module learning outcomes against learning and teaching methods:**

| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Private Study | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures | **x** | **x** |  | **x** | **x** | **x** |  | **x** | **x** | **x** |
| Workshops | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** |

**Module learning outcomes against assessment methods:**

| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Assignment 1 | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Assignment 2 | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Examination | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |

## Inclusive module design

The Division recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

## Campus(es) or centre(s) where module will be delivered

Canterbury

## Internationalisation

Science is an international discipline with widely applicable international resonance. This module presents subject-specific knowledge generated, developed, and refined by scientists around the world. Mastery of the learning outcomes will equip students to apply the knowledge in a wide range of international contexts and these will be addressed in making the content relevant to current global issues. The Division of Natural Sciences is an international community of students and staff and group activities and teaching will provide a platform for internationally-focussed discussion.

**DIVISIONAL USE ONLY**

**Module record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

| Date approved | New/Major/minor revision | Start date of delivery of (revised) version | Section revised  (if applicable) | Impacts PLOs (Q6&7 cover sheet) |
| --- | --- | --- | --- | --- |
| 13 Dec 2021 | Major | Sept 2022 | 5, 8, 10, 12, 14 | No |
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| Revised FSO Jan 2018 |