1. KentVision Code and title of the module

CHEM6220 – Topics in Inorganic Synthetic 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 6

## 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 and Spring

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

None

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

Compulsory for the following courses:

BSc (Hons) Chemistry;

BSc (Hons) Chemistry with a Foundation Year;

BSc (Hons) Chemistry with a year in Industry;

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 comprehensive understanding and knowledge of core and foundation scientific concepts, terminology, theory, units, conventions, and laboratory practice and methods in relation to inorganic synthetic chemistry.

8.2 Demonstrate wide-ranging knowledge of areas of inorganic synthetic chemistry including synthetic pathways of inorganic materials, such as sol-gel, “shake and bake” and high-pressure synthesis.

8.3 Demonstrate full appreciation of developments at the forefront of some areas of inorganic materials chemistry such as nanoparticles and catalysts.

8.4 Demonstrate extensive knowledge and understanding of inorganic synthetic chemistry methods and to apply such knowledge and understanding to the solution of qualitative and quantitative problems in inorganic synthetic chemistry.

8.5 Recognise and analyse problems in inorganic synthetic chemistry and plan strategies for their solution by the evaluation, interpretation and synthesis of scientific information and data.

8.6 Display professional skills in the safe handling of chemical materials, taking into account their physical and chemical properties, including any specific hazards associated with their use and to risk assess such hazards.

8.7 Display confident skills required for carrying out documented standard laboratory procedures involved in synthetic work in relation to inorganic systems. Skills in observational and instrumental monitoring of physiochemical events and changes. The systematic and reliable documentation of the above. Operation of standard analytical instruments employed in the chemical sciences.

8.8 Collate, interpret, and explain the significance and underlying theory of experimental data, including an assessment of limits of accuracy.

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

9.1 Demonstrate assured communication skills.

9.2 Display the ability to identify and undertake further training of a professional nature.

9.3 Demonstrate comprehensive problem-solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.

9.4 Demonstrate confident numeracy and computational skills, including such aspects as error analysis, order-of-magnitude estimations, correct use of units and modes of data presentation.

9.5 Demonstrate assured interpersonal skills, relating to the ability to interact with other people and to engage in team working within a professional environment.

9.6 Demonstrate 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.

## A synopsis of the curriculum

‘*Nanoscience will sculpt the scientific landscape of the 21st century.*’ Here, you will be exposed to the synthesis of nanomaterials spanning nanoparticles, nanorods and porous architectures. You will learn how to control their shape, size, functionalisation, and stabilisation for a wide range of applications. The synthesis of functional inorganic solid is also introduced, including conventional solid-state synthesis, the use of intercalation and high-pressure synthesis to prepare novel materials and how solid-state materials can be synthesised at lower temperatures via solution-based methods. You will also synthesise several functional inorganic solids and nanomaterials in our chemistry laboratory.

## 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: 106

Contact Hours: 44

Total: 150

## Assessment methods

13.1 Main assessment methods

* Assignment 1 (7 hours) – 12.5%
* Assignment 2 (7 hours) – 12.5%
* Lab Reports (7 hours each) – 15%
* Examination (3 hours) – 60%

The assignments and the lab reports are compulsory sub-elements and must be passed to complete the module.

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 | 8.6 | 8.7 | 8.8 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 | 9.6 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Private Study |  |  |  |  |  |  |  |  | **x** | **x** |  | **x** | **x** | **x** |
| Lecture | **x** | **x** | **x** | **x** | **x** |  |  |  |  |  |  |  |  |  |
| Laboratory |  |  |  |  |  | **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 | 8.6 | 8.7 | 8.8 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 | 9.6 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Assignments x 2 |  | **x** | **x** | **x** | **x** |  |  |  |  | **x** | **x** |  |  |  |
| Lab Report | **x** |  |  |  |  | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** |
| Examination | **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) |
| --- | --- | --- | --- | --- |
| 9 Dec 2021 | Minor | Sept 2022 | 12 | No |
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| Revised FSO Jan 2018 |