1. **Title of the module**

CHEM6220 (CH622) - Topics in Inorganic Synthetic Chemistry

1. **School or partner institution which will be responsible for management of the module**

Physical Sciences

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 6

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

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

Autumn and Spring

1. **Prerequisite and co-requisite modules**

Prerequisite:

Completion of Stage 2 of the following programmes:

BSc Chemistry

MChem Chemistry

Chemistry with a Year in Industry

1. **The programmes of study to which the module contributes**

BSc Chemistry

MChem Chemistry

Chemistry with a Year in Industry

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

Have a knowledge and understanding of:

A1 Core and foundation scientific concepts, terminology, theory, units, conventions, and laboratory practice and methods in relation to inorganic synthetic chemistry.

A3 Areas of inorganic synthetic chemistry including synthetic pathways of inorganic materials, such as sol-gel, “shake and bake” and high pressure synthesis.

A4 Appreciate developments at the forefront of some areas of inorganic materials chemistry such as nanoparticles and catalysts.

Intellectual skills:

B1 Ability to demonstrate 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.

B2 Ability to 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.

Subject-specific skills:

C1 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.

C2 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.

C3 The ability to collate, interpret and explain the significance and underlying theory of experimental data, including an assessment of limits of accuracy.

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

Have a knowledge and understanding of:

Transferable skills:

D1 Communication skills, covering both written and oral communication.

D2 Generic skills needed for students to undertake further training of a professional nature.

D3 Problem-solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.

D4 Numeracy and computational skills, including such aspects as error analysis, order-of-magnitude estimations, correct use of units and modes of data presentation.

D7 Interpersonal skills, relating to the ability to interact with other people and to engage in team working within a professional environment.

D8 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.

1. **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 a number of functional inorganic solids and nanomaterials in our chemistry laboratory.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

* Synthesis of Inorganic Materials, Ulrich Schubert, Nicola Husing, ISBN: 978-3-527-32714-0, Wiley
* Basic Solid State Chemistry, Anthony West, ISBN: 978-0-471-98756-7
* Solid State Chemistry: An Introduction, Lesley Smart, Elaine Moore, ISBN: 978-1-439-84790-9

1. **Learning and teaching methods**

Total contact hours: 42

Private study hours: 108

Total study hours: 150

1. **Assessment methods**
   1. Main assessment methods

Assignment 1 (7 hours, 8.333%)

Assignment 2 (7 hours, 8.333%)

Assignment 3 (7 hours, 8.333%)

Lab report 1 (7 hours, 5%)

Lab report 2 (7 hours, 5%)

Lab report 3 (7 hours, 5%)

Examination 3 hours (60%)

13.2 Reassessment methods

Like-for-like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *A1* | *A3* | *A4* | *B1* | *B2* | *C1* | *C2* | *C3* | *D1* | *D2* | *D3* | *D4* | *D7* | *D8* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Private Study** |  |  |  |  |  |  |  |  | **X** | **X** |  | **X** | **X** | **X** |
| *Lectures* | **X** | **X** | **X** | **X** | **X** |  |  |  |  |  |  |  |  |  |
| *Laboratory classes* |  |  |  |  |  | **X** | **X** | **X** |  |  | **X** |  | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Assignments* |  | **X** | **X** | **X** | **X** |  |  |  |  | **X** | **X** |  |  |  |
| *Laboratory reports* | **X** |  |  |  |  | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** |
| *Examination* | **X** | **X** | **X** |  |  |  |  |  |  |  | **X** |  |  |  |

1. **Inclusive module design**

The School 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

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Inorganic Chemistry is an international subject with synthetic techniques developed and optimised by scientists in many countries relying on principals that are based on physical laws that operate regardless of geographic location. Mastery of the subject-specific learning outcomes will enable students to apply the theories and techniques on which this module is based to a wide range of contexts internationally. Furthermore the module specifically discusses a number of relevant processes that have been developed or are used in industrially outside of the UK. The module team is drawn from the School of Physical Sciences, which includes a significant number of staff originating from outside the UK and these and many others have international experience of teaching and research collaboration. When compiling the reading list, the range of texts that are available internationally have been considered and a selection of texts has been identified to complement the delivery of the material. The School of Physical Sciences provides support to its students that is attuned to its international student body.

**FACULTIES SUPPORT OFFICE USE ONLY**

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

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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Revised FSO Jan 2018