Module Specification

Module Title	Solid State and Inorganic Chemistry	Module Code	CHE203a

Credit Value	15	Level	5	Mode of Delivery	On Campus		Semester A

Pre-requisite modules	Co-requisite modules	Overlapping modules
CHE103 or CHE103A recommended		CHE203

1) Content Description

Provide a description of the module, as it will appear in the Module Directory and on the Student Information System (approx. 70-80 words).

This module introduces key aspects of inorganic chemistry, including crystal chemistry, crystallography, electronic structure of solids and main group chemistry. Periodic trends in the p-block are considered. Synthesis, structure and bonding are discussed, with emphasis on aluminosilicates and boron hydrides. In addition, characterisation techniques such as X-ray diffraction and multi-nuclear NMR are introduced.

2) Module Aims

Specify the aims of the module, i.e. the broad educational purposes for offering this module.

This module aims to provide students with an understanding of a number of basic, but extremely important ideas, concerning synthesis, structure and properties of inorganic compounds, with emphasis on chemistry of the solid-state and chemistry of the main group elements. The module additionally aims to give a firm understanding of periodic relationships between structure, bonding and reactivity in main group chemistry, using appropriate theories to model behaviour. A good understanding of characterisation techniques routinely used in inorganic chemistry (such as X-ray diffraction and multinuclear NMR) is also aimed for.

3) Learning Outcomes

Identify the learning outcomes for this module, i.e. knowledge, skills and attributes to be developed through completion of this module. Outcomes should be referenced to the relevant QAA benchmark statements and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008). The SEEC Credit Level Descriptors for Further and Higher Education 2003 and Queen Mary Statement of Graduate Attributes should also be used as a guiding framework for curriculum design.

Academic Content:	
A1	Comparative crystal chemistry (including close packing approach, common structural types, polyhedral representations).
A2	Crystallography: including crystal symmetry, space groups, X-ray diffraction, single crystal and powder diffraction methods, crystal structure refinement, crystal structure solution, limitations of X-ray diffraction techniques.
A3	Electronic structure of solids including band structure of metals, semiconductors (p- and n- type) and insulators. Hall effect in semiconductors. Technological applications of electronic, optoelectronic and optical materials.
A4	Periodicity in the main group elements; descriptive chemistry of the p-block elements (e.g. B, N, O, Al, Si, halogens, noble gases) and their compounds (e.g. halides, aluminsilicates, oxoacids).
A5	Electron-deficient compounds (structure and bonding in electron deficient boron hydrides); boron cluster compounds and Wade's rules

A 6	Multi-nuclear NMR; applications in the study of main group compounds.

Disciplinary skills - able to:	
B1	Rationalize applications of technologically-important classes of materials, by relating them to specific structural features and/or electronic properties of the compounds.
B2	Analyse and rationalize periodic trends in p-block chemistry.

Attributes:	
C1	Acquire and apply knowledge relating to the principles and practices of solid state and inorganic chemistry
C2	Produce analyses which are grounded in experimental evidence (e.g. spectroscopic and diffraction data)
C3	Apply existing knowledge and skills to investigate unfamiliar problems.
C4	Able to conduct calculations of intermediate complexity, in a confident and reliable manner.

4) Reading List

Provide an indicative reading list for the module. This should include key texts and/or journals but should not be an exhaustive list of materials.

C.E. Housecroft and A.G. Sharpe, Inorganic chemistry (4th ed.), Pearson.
D.F. Shriver and P.W. Atkins, Inorganic chemistry (3rd ed.), OUP.
N.N. Greenwood and A. Earnshaw, Chemistry of the elements (2nd ed.), Butterworth-Heinemann.
F.A. Cotton et al., Advanced inorganic chemistry (6th ed.), Wiley.
L. Smart and E.A. Moore, Solid state chemistry: an introduction (3rd ed.), CRC Press.
M.J. Winter, d-block chemistry, OUP.
N.C. Norman, Periodicity and the s- and p-block elements, OUP.

5) Teaching and Learning Profile

Provide details of the method of delivery (lectures, seminars, fieldwork, practical classes, etc.) used to enable the achievement of learning outcomes and an indicative number of hours for each activity to give an overall picture of the workload a student taking the module would be expected to undertake. This information will form the Key Information Set for each undergraduate programme and will be used to populate the KIS widget found on the QMUL programme information pages. More information can be found online about KIS. You may also wish to refer to the QAA guidance on contact hours when completing this section.

Activity Type	KIS Category	Time Spent (in hours)
Lecture	Scheduled	26
Practical Classes and Workshops	Scheduled	8
Guided Independent Study	Independent	116
	Total	150

Specify the total module notional study hours. This should be a total of the hours given for each activity. The notional study hours for each academic credit point is 10. A 15 credit point module therefore represents 150 notional study hours.

Activity Type	Total Time Spent (in hours)	Percentage of Time Spent
Scheduled learning and teaching	34	22.7
Placement	0	0
Independent Study	116	77.3
Total	300	100

Use the information provided in the box above to specify the total time spent and the percentage time spent in each category of teaching and learning activity.

6) Assessment Profile

Provide details of the assessment methods used to assess the achievement of learning outcomes.

Description of Assessment	Assessment Type	KIS Category	Duration/Length	Percentage Weighting	Final element of assessment	Qualifying Mark
Coursework	Written Assignment including essay	Coursework		20%	No	
Examination	Written Exam	Written	2 Hours	80%	Yes	

Final element of assessment: The assessment that takes place last. There should normally be only one element of assessment marked as final unless two assessment or submission dates occur on the same day.
Qualifying mark: A specified minimum mark that must be obtained in one or more elements of assessment in order to pass a module. This is in addition to, and distinct from, the requirement to achieve a pass in the module mark to pass the module.

Reassessment

Provide details of the reassessment methods used, specifying whether reassessment is either standard reassessment or synoptic reassessment.

○ Standard Reassessment ◉ Synoptic Reassessment

Synoptic reassessment details (if you have indicated synoptic reassessment above, please give details)		
Brief Description of Assessment	Assessment Type	Duration/Length of Examination/ Coursework
Resit Examination	Written Exam	2 Hours