Module Specification

Module Title	Topics in Physical Chemistry	Module Code	CHE304U

Credit Value	15	Level	6	Mode of Delivery	On Campus		Semester A

Pre-requisite modules	Co-requisite modules	Overlapping modules
CHE111, CHE312		

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 will explore the theory of ionic solutions, the behaviour of molecules at interfaces and the properties of interfaces including the thermodynamics of interfaces and the kinetics of adsorption. Experimental methods for the investigation and characterisation of such systems will be discussed. Further topics include the conductivity and electrochemistry of ionic solutions, molecular adsorption at interfaces and self-assembly, as well as experimental techniques for nanoscale investigations, e.g. atomic force microscopy and scanning tunnelling microscopy.

2) Module Aims

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

The module aims to provide students with:

- An understanding of the fundamental science of ionic solutions, liquid interfaces and solid surfaces.
- An appreciation of the importance of interfacial phenomena in both natural, biological systems, and in commercial chemical technology.

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:	
A 1	Be aware of terminology relevant to the field of interface science and be able to discuss and explain basic principles relating to solution chemistry and interface science;
A 2	Have gained knowledge of the properties of solutions and surfaces, surface structure, processes such as adsorption and desorption, and reactivity at interfaces and be able to perform calculations relevant to the topics discussed in the module.

Disciplinary skills - able to:

B1	This module will enhance students' understanding of solutions and interfaces. They will gain an appreciation of the way in which scientific theories develop and are modified. They will also gain a fundamental understanding of core experimental techniques used in the field and an appreciation of the crucial link between theory and experiment

Attributes:	
C1	Independent study, including use of a wide-range of information resources to supplement supplied lecture notes.
C2	Ability to solve numerical problems and produce, to deadlines, clear solutions to problems for continuous assessment marks and tutorial discussion and Improve planning and organisational skills, and ability to handle information

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.

In addition to a standard physical chemistry textbook (e.g. Atkins' Physical Chemistry), the following books and other information sources provide useful material for this course:

1. P.H. Rieger, *Electrochemistry*, Prentice-Hall International Edition, (1987) 0-13-249138-9. QD 553
2. J. Koryta, J. Dvorak and L. Kavan, *Principles of Electrochemistry*, 2nd Edn., John Wiley & Sons, (1993). ISBN 0-471-93836-6. QD 553.
3. *An Introduction to Surface Chemistry*, by R.M. Nix http://www.chem.qmul.ac.uk/surfaces/scc/
4. *Physical Chemistry of Surfaces*, A. W. Adamson, Wiley
5. *Intermolecular and Surface Forces*, J.N. Israelachvili, Academic Press
6. *Physics and Chemistry of Interfaces*, H-J. Butt, K. Graf, M. Kappl, Wiley

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)
Lectures	Scheduled	22
Workshops	Scheduled	6
	Total	28

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	28	18.7
Placement	0	0
Independent Study	122	81.3
Total	150	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
Examination	Exam	Exam	2 h 30 minutes	90%	Yes	
Coursework	Written assignment	Coursework		10%	No	

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	Examination	2 h 30 minutes