

Module Specification

Module Title Module Code
Credit Value Level Mode of Delivery Semester A

Pre-requisite modules	Co-requisite modules	Overlapping modules
<input type="text"/>	<input type="text"/>	<input type="text"/>

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).

Spectroscopic techniques have revolutionized our understanding of matter at the molecular level and are essential tools in chemical research and in the development of the subject. This module aims to provide students with a coherent and rigorous introduction to the principles and applications of spectroscopic techniques, in a way that spans the traditional fields of chemistry. It covers the more common techniques, including IR, UV-VIS, NMR and EPR spectroscopy, and lays the foundations for more detailed coverage of spectroscopic techniques in subsequent years of the degree programs.

2) Module Aims

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

This module aims to equip students with an understanding of the principles of spectroscopy and a knowledge of how spectroscopic techniques can be applied for the study of molecular structure, and more generally as techniques of qualitative and quantitative chemical analysis.

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	Nature of light: the electromagnetic spectrum, photons of light and the interaction of light with molecules
A2	Spectroscopy: theoretical principles (transition types, selection rules etc.) and practical issues (quantification etc.)
A3	Basic molecular spectroscopy: molecular energies, rotational and vibrational transitions in the gas phase.
A4	Spectroscopic techniques (IR, UV-VIS, NMR, EPR): principles and illustrative applications in chemistry and Mass spectrometry: principles and illustrative applications in chemistry.

Disciplinary skills - able to:	
B1	Identify and explain the nature of the transitions induced when specific wavelengths of light interact with matter.
B2	Analyse molecular spectroscopic data and conduct calculations relating to the properties of molecules.
B3	Interpret spectra (from one of more spectroscopic techniques) so as to identify molecular characteristics and/or to determine the full structure of molecules.

Attributes:	
C1	Acquire and apply knowledge relating to the principles and practices of spectroscopy.
C2	Produce analyses which are grounded in experimental evidence.
C3	Apply analytical skills to investigate unfamiliar problems.
C4	Able to conduct calculations 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.

Chemistry Introducing inorganic, organic and physical chemistry, by A. Burrows et al. (Oxford University Press)
 Organic Chemistry by J. Clayden, N. Greeves and S. Warren (Oxford University Press)
 Atkins Physical Chemistry, by P.W Atkins and J. de Paula (Oxford University Press)
 Foundations of Spectroscopy, by LS Duckett et al. (Oxford Chemistry Primer)
 Nuclear Magnetic Resonance, P. J. Hore, Oxford Chemistry Primer
 Molecular Spectroscopy, John M. Brown, Oxford Chemistry Primer
 Spectroscopic Methods in Organic Chemistry, D. Williams et al., Mc-Graw-Hill

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	8
Total		30

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	30	20
Placement	0	0
Independent study	120	80
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 Hours	80%	Yes	
Coursework	Written assignment	Coursework		20%	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 Hours