UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title:	Materials Characterisation (Distance Learning)
Module Code:	CFS7019-B
Academic Year:	2019-20
Credit Rating:	20
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry
FHEQ Level:	FHEQ Level 7 (Masters)
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	**Hours**
Tutorials	6
Directed Study	194

Availability	
Occurrence	**Location / Period**
BDA	University of Bradford / Semester 2 (Feb - May)

Module Aims

To introduce you to the methods of use in modern analysis of macromolecules & non-polymeric materials. To study both the theory behind the full range of techniques as well as basic interpretation of the data. The course aims to provide a general understanding of techniques & will prepare you for advanced res. or dev. of polymer system in industry. Many chemists work in the analytical sciences in industry or government laboratories (e.g. in forensics, pathology or health & safety labs) & the characterisation of polymers and non-polymeric materials plays a crucial role for many of these areas.

Outline Syllabus

1. Polymer distributions
2. Polymers in solution
3. Polymer solution viscometry

4. Light scattering of polymer solutions
5. Colligative properties and osmometry
6. Polymer NMR techniques and data interpretation
5. Mass spectrometry-theory and instrumentation
7. Size exclusion chromatography
8. Other chromatographic techniques
9. Scattering and diffraction techniques
10. Calorimetry
11. Mechanical analysis techniques
12. Thermal analysis techniques
13. Mass spectrometry of materials
14. Optical and electron microscopy techniques
15. Surface science/analysis techniques.

LTA Strategy cont Assessment 1: Problem solving workshops based on lecture material.
Assessment 2: Summative examination in May to cover the whole module.

Learning Outcomes	
1	LO 1.1 - Analyse molar mass distributions. LO 1.2 - Explore how chemical comp. & shape are dispersed & how these factors can be overlayed with distributions in molar mass LO 1.3 - Evaluate solution behaviour of polymers. LO 1.4 - Critically examine how molar mass & shape effects solution viscosity LO 1.5 - Critically examine how molar mass & shape effect light scattering behaviour in solution. LO 1.6 - Critically examine how molar mass affects colligative properties. LO 1.7 - Evaluate how NMR spectroscopy can used to characterise materials. cont/ under LO2 & LO3
2	LO 2.1- Converse using the language of the polymer science. LO 2.2 - Use specialist software packages and spread sheets to analyse data. LO1 cont./ LO 1.8- Critically evaluate the theory & application of size exclusion chromatography in the analysis of polymers. LO 1.9 Evaluate the other chromatographic techniques for polymer analysis. LO 1.10 Evaluate how light, x-ray and neutron scattering can be used to study materials in the solid state & in dispersion.
3	LO 3.1 - Be competent at self study and be able to quickly assimilate information. LO 3.2 - Be able to think across your own discipline and explore other fields. LO1 cont./ LO 1.11 Evaluate how calorimetric & mechanical techniques can be used to study polymers in the solid state. LO 1.12 Evaluate the use of mass spectrometry for the analysis of materials.

Learning, Teaching and Assessment Strategy

This module will be taught at distance. The VLE will be used to deliver fundamental knowledge, providing you with the opportunity to acquire the information to enhance your knowledge and understanding. This material will be made available at the start of the course. Recordings of

lectures will be made available on the VLE as they are delivered. The VLE will also be used to provide access to online resources and external links to websites of interest. Course tutors will be available to answer your queries on course materials at times to be specified in the module handbook. On-line tutorial sessions will be arranged where you will have the opportunity to discuss course content with your peers and course tutors. At the start of this module we will look at distributions and dispersity in polymers: including dispersity in molar mass composition and shape. We will then build on your earlier studies on the solution behaviour of polymers, which forms the basis of many of the characterisation techniques that are in use. We then move onto study the various techniques for providing molar mass, shape and chemical composition, as well as various microscopy techniques and surface science/analysis tools. Directed study provides you with the opportunity to undertake guided reading and to develop your own portfolio of learning to enhance transferable skills and knowledge relating to evaluation of own role and subject provision. Assessments will involve a summative examination and a number of assessed workshops involving discussions and problem solving exercises. cont in OS

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Examination - closed book	Summative assessment: closed book exam	2 hours	50%
Summative	Coursework	Problem based workshop (2000 words)	0 hours	50%

Reading List

To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html.

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.