LF219-15 Tools for Biochemical Discovery

20/21

Department
Life Sciences
Level
Undergraduate Level 2
Module leader
Alexander Cameron
Credit value
15
Module duration
10 weeks
Assessment
Multiple
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module is a core requirement for the Biochemistry degree stream and it is also a natural, though not obligatory, foundation for a more advanced module in Year 3, ‘Structural Molecular Biology’ which takes the subject further, particularly in terms of biophysical techniques and computer-based methods for studying protein structure and function. It will provide an appreciation of the principles upon which key techniques in the field of biochemical discovery provide biochemical information.

Module web page

Module aims

Students will gain from this module the ability to discuss with confidence the theoretical and practical basis of key techniques in the field of biochemical discovery. They will understand the principles which underlie interpretation of data sets obtained with these techniques and be able to make informed decisions as to which technique is appropriate to use for a particular type of biochemical sample. They will gain an appreciation of how different techniques can collectively contribute to the understanding of a biological problem and will be aware of what is the current

state-of-the-art for key techniques in biochemical discovery.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Introduction to Spectroscopic techniques

Lecture 1 Introduction to mass spectrometry
Lecture 2 Proteomics
Lecture 3- Solution spectroscopies - Circular dichroism
Lecture 4 - Solution spectroscopies - Fluorescence

Biophysical techniques to identify and measure biological interactions

Lecture 5 Introducing affinity, measuring affinity and examples of biological interactions where affinity matters
Lecture 6 Measuring affinity, kinetics and surface plasmon resonance
Lecture 7 Thermodynamic measurements and affinity, drug designs and molecular docking
Lecture 8
Lecture 9 Protein-protein interactions; the interactome

Introduction to structural biology techniques
Lectures 10 - 13 Crystallography
Lectures 14-15 NMR
Lectures 16 and 17 - Principles of structure determination by cryo-electron microscopy

Workshops
Crystallography
Ewald Sphere
Fourier Transforms

Learning outcomes

By the end of the module, students should be able to:

- Level 5 understanding of the theoretical and practical basis of key techniques in the field of biochemical discovery
- Level 5 understanding of the principles which underlie interpretation of data sets obtained with these techniques
- Level 5 understanding of research techniques and their applications
- Level 5 understanding of how different techniques can collectively contribute to the understanding of a biological problem
- Level 5 understanding and awareness of what is the current state-of-the-art for key techniques in biochemical discovery

Subject specific skills

Understand the theoretical and practical basis of key techniques in the field of biochemical

discovery

Understand the principles which underlie interpretation of data sets obtained with these techniques

Make decisions as to which technique is appropriate to use for a particular type of biochemical sample

Appreciate how different techniques can collectively contribute to the understanding of a biological problem

Show awareness of what is the current state-of-the-art for key techniques in biochemical discovery

Transferable skills

Quantitative analysis, self directed learning, adult learning, appraisal of source material

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Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (9%)
Practical classes	3 sessions of 6 hours (8%)
Private study	112 hours (50%)
Assessment	75 hours (33%)
Total	225 hours

Private study description

self directed learning and revision

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D

	Weighting	Study time
Tools for Biochemistry Laboratory	30%	30 hours

	Weighting	Study time
3x6 hr laboratory class- students submit a written report		
Online Examination 45 min short answer paper and 45 min essay paper	70%	45 hours

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- Online examination: No Answerbook required

Assessment group R

	Weighting	Study time
In-person Examination - Resit 45 min SAQ paper / 45 min essay paper	100%	

- Answerbook Green (8 page)
- Students may use a calculator

Feedback on assessment

Informally via lecture workshops.

Past exam papers for LF219

Availability

Courses

This module is Core for:

- UBSA-C700 Undergraduate Biochemistry
  - Year 2 of C700 Biochemistry
  - Year 2 of C700 Biochemistry
- ULFA-C1A2 Undergraduate Biochemistry (MBio)
  - Year 2 of C1A2 Biochemistry
  - Year 2 of C700 Biochemistry
- Year 2 of ULFA-C702 Undergraduate Biochemistry (with Placement Year)
- Year 2 of ULFA-C1A6 Undergraduate Biochemistry with Industrial Placement (MBio)