

LF219-18 Tools for Biochemical Discovery

20/21

Department

Life Sciences

Level

Undergraduate Level 3

Module leader

Alexander Cameron

Credit value

18

Module duration

10 weeks

Assessment

100% exam

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.

The content of the course will be delivered with a combination of lectures and workshops on the core material supported by student-lead learning.

In the second half of the module the scope will be widened to explain how we study biological interactions including case studies. Topics will include proteomics, high-resolution light microscopy, SPR, ITC and immunoprecipitation.

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:

- 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

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

Study

Study time

| Type | Required |
|---------------|-----------------------------|
| Lectures | 20 sessions of 1 hour (11%) |
| Private study | 160 hours (89%) |
| Total | 180 hours |

Private study description

160 hrs of 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 B1

| | Weighting | Study time | Eligible for self-certification |
|-----------------------------|------------------|-------------------|--|
| Assessment component | | | |
| Online Examination | 100% | | No |

- Online examination: No Answerbook required

Reassessment component is the same

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 UBSA-C701 Undergraduate Biochemistry (with Intercalated Year)
- Year 2 of ULFA-C1A6 Undergraduate Biochemistry with Industrial Placement (MBio)