

# LF219-15 Tools for Biochemical Discovery

**23/24**

**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

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## 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**

<b>Type</b>	<b>Required</b>
Lectures	20 sessions of 1 hour (13%)
Practical classes	3 sessions of 6 hours (12%)
Private study	112 hours (75%)
Total	150 hours

### **Private study description**

self directed learning and revision

## **Costs**

No further costs have been identified for this module.

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## **Assessment**

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

### **Assessment group D**

	<b>Weighting</b>	<b>Study time</b>
Tools for Biochemistry Laboratory	30%	30 hours
3x6 hr laboratory class- students submit a written report		

**Weighting****Study time**

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%

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

**Feedback on assessment**

Informally via lecture workshops.

[Past exam papers for LF219](#)

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**Availability****Courses**

This module is Core for:

- Year 2 of UBSA-C700 Undergraduate 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)
- Year 2 of UMDA-CF10 Undergraduate Integrated Natural Sciences (MSci)