

# LF205-15 Genetics and Genomics

**22/23**

**Department**

Life Sciences

**Level**

Undergraduate Level 2

**Module leader**

Guy Barker

**Credit value**

15

**Module duration**

5 days

**Assessment**

Multiple

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

The ability to sequence whole genomes at increasingly affordable costs has dramatically improved our ability to explore the molecular genetic basis of complex variation. This provides enormous potential for advances in food security, human and animal health, and adaptation to climate change including sustainable energy sources. This module will introduce and reinforce the concepts and techniques in genetics and genomics that can be used to understand and manipulate complex traits, including hands-on workshops in several of the topics.

[Module web page](#)

### Module aims

The ability to sequence whole genomes at increasingly affordable costs has dramatically improved our ability to explore the molecular genetic basis of complex variation. This provides enormous potential for advances in food security, human and animal health, and adaptation to climate change including sustainable energy sources. This module will introduce the concepts and techniques in genetics and genomics that can be used to understand and manipulate complex traits, including an introduction to practical skills.

### 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 computational biology  
Conservation Genetics  
Pedigree analysis and linkage mapping  
Genetics and Ageing  
Personalised nutrition  
Gene therapy  
Ethical issues  
"The End Game" finding a causal gene  
Genome-Wide Association Mapping  
The Extended Genome

## **Learning outcomes**

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

- Level 5 understanding of molecular genetic methods that will include advanced pedigree analysis, recombination (linkage) mapping of quantitative variation, and genome-wide association mapping
- Level 5 understanding of how molecular genetics can increasingly play an important role in our everyday lives
- Level 5 understanding of of sub-cellular biology with modern genetics to appreciate how the phenotype of whole organism is determined.

## **Indicative reading list**

The module will use a combination of recent review articles and refereed papers exemplifying the techniques and their implementation.

## **Subject specific skills**

Show a practical understanding of molecular genetic methods that will include advanced pedigree analysis, recombination (linkage) mapping of quantitative variation, and genome-wide association mapping.

Show an understanding of how molecular genetics can increasingly play an important role in our everyday lives

## **Transferable skills**

Self directed learning  
Adult learning  
Activity based learning

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# Study

## Study time

Type	Required
Lectures	12 sessions of 1 hour (8%)
Seminars	4 sessions of 1 hour (3%)
Practical classes	3 sessions of 6 hours (12%)
Private study	116 hours (77%)
Total	150 hours

## Private study description

Self directed learning and revision for the end of year exam

## 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.

Students can register for this module without taking any assessment.

## Assessment group D1

	Weighting	Study time
Workshop 1	7%	10 hours
Computer based assessment - students will submit a written report		
Workshop 2	7%	10 hours
Computer based assessment - students will submit a written report		
Workshop 3	16%	10 hours
Computer based assessment - students will submit a written report		
Online Examination	70%	45 hours
45 min short answer paper / 45 min essay paper		

~Platforms - Moodle

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## Weighting

## Study time

- Online examination: No Answerbook required

## Assessment group R1

### 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

Individual written feedback for Workshops.  
Post exam board cohort level feedback for exam.

[Past exam papers for LF205](#)

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## Availability

## Courses

This module is Core for:

- UBSA-3 Undergraduate Biological Sciences
  - Year 2 of C100 Biological Sciences
  - Year 2 of C100 Biological Sciences
- Year 2 of ULFA-C1A1 Undergraduate Biological Sciences (MBio)
- Year 2 of ULFA-C113 Undergraduate Biological Sciences (with Placement Year)
- Year 2 of ULFA-C1A5 Undergraduate Biological Sciences with Industrial Placement (MBio)
- Year 2 of UIPA-C1L8 Undergraduate Life Sciences and Global Sustainable Development

This module is Core optional for:

- Year 2 of UIPA-C1L8 Undergraduate Life Sciences and Global Sustainable Development

This module is Optional 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)
- UBSA-C1B9 Undergraduate Biomedical Science
  - Year 2 of C1B9 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
- ULFA-C1A3 Undergraduate Biomedical Science (MBio)
  - Year 2 of C1A3 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
- Year 2 of ULFA-C1A7 Undergraduate Biomedical Science with Industrial Placement (MBio)
- ULFA-CB18 Undergraduate Biomedical Science with Placement Year
  - Year 2 of CB18 Biomedical Science with Placement Year
  - Year 2 of CB18 Biomedical Science with Placement Year
  - Year 2 of CB18 Biomedical Science with Placement Year
- Year 2 of ULFA-B140 Undergraduate Neuroscience (BSc)
- Year 2 of ULFA-B142 Undergraduate Neuroscience (MBio)
- Year 2 of ULFA-B143 Undergraduate Neuroscience (with Industrial Placement) (MBio)
- Year 2 of ULFA-B141 Undergraduate Neuroscience (with Placement Year) (BSc)