

# BL2309 Applied Molecular Biology

(BL2309 online module handbook version 122)

**Credits:** 15

**Semester:** 2

**Module Organiser**

Dr Simon Young

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**Pre-requisite Modules:**

Before taking this module you must pass BL1101 and pass BL1102

**Anti-requisite Modules:**

**Post-requisite Modules:**

**Additional Module**

**Information:**

[Please check MMS regularly for additional module information](#)

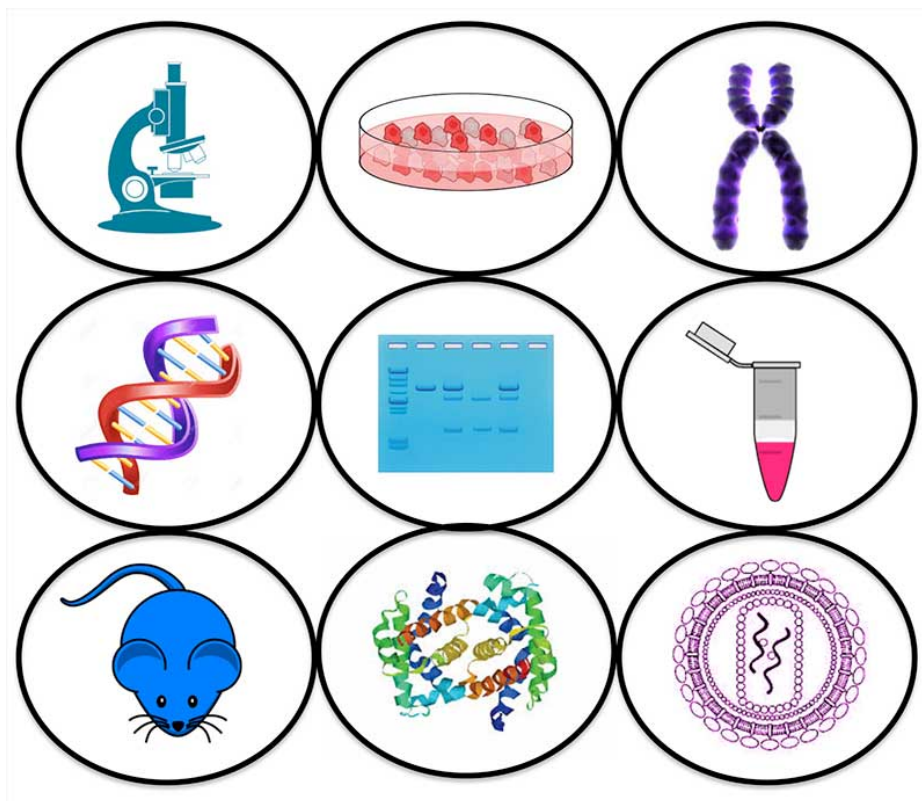


image: Applied Molecular Biology – A Powerful Box of Tools

Techniques in molecular biology represent a powerful box of tools that are used to address a wide variety of modern research questions across a broad range of biological disciplines including; ecology, biotechnology, cell biology, medicine, conservation biology, infectious disease, evolution, genetics and synthetic biology. Key molecular biology techniques will be introduced in the context of case studies that will provide examples of how molecular biology techniques are being used in cutting edge research to address real-life questions and problems that impact health, food security, the environment and the economy.

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[BL2309View content for BL2309 \(2023/4\) in the Module Management System \(MMS\)](#)

[View the current Biology Online Module Catalogue for BL2309](#)

[BL2309View BL2309 \(2023/4\) in the University of St Andrews Module Catalogue](#)

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# BL2309: Timetable

**Legend** (not all modules have every event type):

lecture	tutorial	workshop	practical	other
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## Semester 2: Week 1

DATE & TIME	VENUE	STAFF	EVENT
Thursday 18-01-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Lecture L1: <b>Introduction to module</b> 2023-4_BL2309_L1
Friday 19-01-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jacqueline Nairn</a> -	Lecture L2: <b>Topic 1: The era of omics I</b> 2023-4_BL2309_L2

## Semester 2: Week 2

DATE & TIME	VENUE	STAFF	EVENT
Wednesday 24-01-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jacqueline Nairn</a> -	Lecture L3: <b>Introduction to practical 1</b> 2023-4_BL2309_L3
Thursday 25-01-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jacqueline Nairn</a> -	Lecture L4: <b>Topic 1: The era of omics II</b> 2023-4_BL2309_L4
Thursday 25-01-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Jacqueline Nairn</a> -	Practical P1: <b>Practical 1: A proteomic study of an ancient protein with a timely application</b> 2023-4_BL2309_P1 Please bring your laptop
Friday 26-01-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jacqueline Nairn</a> -	Lecture L5: <b>Topic 1: The era of omics III</b> 2023-4_BL2309_L5
Friday 26-01-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Jacqueline Nairn</a> -	Practical P2: <b>Practical 1: A proteomic study of an ancient protein with a timely application</b> 2023-4_BL2309_P2 Please bring your laptop

## Semester 2: Week 3

DATE & TIME	VENUE	STAFF	EVENT
Thursday 01-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Prof Dave Ferrier</a> -	Lecture L6: <b>Topic 2: Molecular evolution and comparative genomics I</b> 2023-4_BL2309_L6
Friday 02-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Prof Dave Ferrier</a> -	Lecture L7: <b>Topic 2: Molecular evolution and comparative genomics II</b> 2023-4_BL2309_L7

## Semester 2: Week 4

DATE & TIME	VENUE	STAFF	EVENT
Wednesday 07-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Prof Dave Ferrier</a> -	Lecture L8: <b>Introduction to practical 2</b> 2023-4_BL2309_L8
Thursday 08-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Prof Dave Ferrier</a> -	Lecture L9: <b>Topic 2: Molecular evolution and comparative genomics III</b> 2023-4_BL2309_L9
Thursday 08-02-2024 14:00 to 17:00	Biomolecular Sciences Building BMS Teaching lab level 2	<a href="#">Prof Dave Ferrier</a> -	Practical P3: <b>Practical 2: Gene family evolution</b> 2023-4_BL2309_P3 Assessed practical - Please bring your laptop
Friday 09-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jacqueline Nairn</a> -	Tutorial T1: <b>Feedback for Practical 1</b> 2023-4_BL2309_T1

Friday 09-02-2024 14:00 to 17:00	Biomolecular Sciences Building BMS Teaching lab level 2	<a href="#">Prof Dave Ferrier</a> -	Practical P4: <b>Practical 2: Gene family evolution</b> <small>2023-4_BL2309_P4</small> Assessed practical - Please bring your laptop
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## Semester 2: Week 5

DATE & TIME	VENUE	STAFF	EVENT
Thursday 15-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	-	Other O1: <b>Reading Day</b> <small>2023-4_BL2309_O1</small> Feel free to use the lecture theatre to study
Friday 16-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Tutorial T2: <b>Mid term Q&amp;A</b> <small>2023-4_BL2309_T2</small>

## Semester 2: Week 6

DATE & TIME	VENUE	STAFF	EVENT
Wednesday 21-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Natalie Pilakouta</a> -	Lecture L10: <b>Topic 3: Molecular tools in ecology I</b> <small>2023-4_BL2309_L10</small>
Thursday 22-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Natalie Pilakouta</a> -	Lecture L11: <b>Topic 3: Molecular tools in ecology II</b> <small>2023-4_BL2309_L11</small>
Thursday 22-02-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Natalie Pilakouta</a> -	Practical P5: <b>Practical 3: The genetic basis of fitness in the wild: a case study</b> <small>2023-4_BL2309_P5</small> Please bring your laptop
Friday 23-02-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Natalie Pilakouta</a> -	Lecture L12: <b>Topic 3: Molecular tools in ecology III</b> <small>2023-4_BL2309_L12</small>
Friday 23-02-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Natalie Pilakouta</a> -	Practical P6: <b>Practical 3: The genetic basis of fitness in the wild: a case study</b> <small>2023-4_BL2309_P6</small> Please bring your laptop

## Spring Break: 26-Feb-2024 to 01-Mar-2024

## Semester 2: Week 7

DATE & TIME	VENUE	STAFF	EVENT
Thursday 07-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Prof Dave Ferrier</a> -	Tutorial T3: <b>Feedback for practical 2</b> <small>2023-4_BL2309_T3</small>
Friday 08-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Lecture L13: <b>Topic 4: Molecular tools in infectious disease I</b> <small>2023-4_BL2309_L13</small>

## Semester 2: Week 8

DATE & TIME	VENUE	STAFF	EVENT
Wednesday 13-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Lecture L14: <b>Topic 4: Molecular tools in infectious disease II</b> <small>2023-4_BL2309_L14</small>
Thursday 14-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Lecture L15: <b>Introduction to practical 4</b> <small>2023-4_BL2309_L15</small>
Thursday 14-03-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Simon Young</a> -	Practical P7: <b>Practical 4: Emerging disease outbreak</b> <small>2023-4_BL2309_P7</small> Assessed practical - Please bring your laptop
Friday 15-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Lecture L16: <b>Topic 4: Molecular tools in infectious disease III</b> <small>2023-4_BL2309_L16</small>
Friday 15-03-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Simon Young</a> -	Practical P8: <b>Practical 4: Emerging disease outbreak</b> <small>2023-4_BL2309_P8</small> Assessed practical - Please bring your laptop

## Semester 2: Week 9

DATE & TIME	VENUE	STAFF	EVENT
Thursday 21-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr V Anne Smith</a> -	Lecture L17: <b>Topic 5: Synthetic Biology I</b> 2023-4_BL2309_L17
Friday 22-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr V Anne Smith</a> -	Lecture L18: <b>Topic 5: Synthetic Biology II</b> 2023-4_BL2309_L18

## Semester 2: Week 10

DATE & TIME	VENUE	STAFF	EVENT
Wednesday 27-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Frances der Weduwen</a> -	Lecture L19: <b>Introduction to Practical 5</b> 2023-4_BL2309_L19
Thursday 28-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jens Tilsner</a> -	Lecture L20: <b>Topic 6: Genetically modified crops I</b> 2023-4_BL2309_L20
Thursday 28-03-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Frances der Weduwen</a> -	Practical P9: <b>Practical 5: mini-iGEM competition</b> 2023-4_BL2309_P9 Please bring your laptop
Friday 29-03-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Jens Tilsner</a> -	Lecture L21: <b>Topic 6: Genetically modified crops II</b> 2023-4_BL2309_L21
Friday 29-03-2024 14:00 to 17:00	Medical and Biological Sciences Building Biology teaching lab 143	<a href="#">Dr Frances der Weduwen</a> -	Practical P10: <b>Practical 5: mini-iGEM competition</b> 2023-4_BL2309_P10 Please bring your laptop

## Semester 2: Week 11

DATE & TIME	VENUE	STAFF	EVENT
Thursday 04-04-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> -	Tutorial T4: <b>Feedback for Practical 4</b> 2023-4_BL2309_T4
Friday 05-04-2024 10:00 to 11:00	Mathematical Institute Lecture theatre B	<a href="#">Dr Simon Young</a> jn37;dekf;np84;vas1;jt58	Tutorial T5: <b>Module summary &amp; feedback</b> 2023-4_BL2309_T5

# BL2309: Reading List

[BL2309Click for BL2309 reading list](#)

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## BL2309: Assessment

2-hour Written Examination = 50%, Coursework = 50%

[BL2309View coursework assessment details for BL2309 \(2023/4\) in MMS](#)

The following related information applies to all Biology modules:

School of Biology Marking Criteria:	See <a href="#">JH booklet info (st-andrews.ac.uk)</a>
Late submission of continuous assessment work:	All late submissions of coursework that do not require electronic submission should be made via the Biology Teaching Office, Level 2, BMS Building, North Haugh.
Exam details:	See School of Biology UG Handbook <a href="#">JH booklet info (st-andrews.ac.uk)</a> : All Biology exams will be conducted online for 2022-23.
Exam timetable:	See <a href="#">Timetables - Exams - University of St Andrews (st-andrews.ac.uk)</a>
Expected attendance:	See <a href="#">JH booklet info (st-andrews.ac.uk)</a> for detailed attendance requirements.
Good Academic Practice & Avoiding Academic Misconduct:	See <a href="#">JH booklet info (st-andrews.ac.uk)</a>
University Student Handbook:	<a href="#">University Student Handbook</a>
School and University regulations in the School and University Undergraduate Handbook relating to absence reporting, penalties and rules for late submission of work, extensions for coursework, return of coursework, S-coding, good academic practice and Academic Alerts.:	<a href="#">JH booklet info (st-andrews.ac.uk)</a> <a href="#">University Student Handbook</a>

# Who to ask

(Information in this section applies to all Biology Modules)

**Before contacting staff**, students should check the content of the Biology Undergraduate Handbook, the module handbook and specific task instructions.

## Questions about

General teaching matters  
Rescheduled or cancelled events  
Lecture or practical content  
Completing assessed practical assignments  
Completing assessments  
Marking on continuous assessment  
Marking on exams  
Rearranging practical days  
Absence and/or extensions  
Difficulties with academic progress which impact more than one module:  
Overall performance, progress or future directions:  
Disability:  
For advice and support on any issue e.g. academic, financial, international, personal or health matters, or if you are unsure of who to go to for help:

## University assistance with urgent matters out of office hours:

## Contact

Biology Teaching Office ( [bioteach@st-andrews.ac.uk](mailto:bioteach@st-andrews.ac.uk) )  
Check your University email  
The lecturer who presented the material  
The lecturer who set the assignment  
Module Organiser ( [Dr Simon Young say2@st-andrews.ac.uk](mailto:Dr Simon Young say2@st-andrews.ac.uk) )  
The Demonstrator or Module Organiser ( [Dr Simon Young say2@st-andrews.ac.uk](mailto:Dr Simon Young say2@st-andrews.ac.uk) )  
Module Organiser ( [Dr Simon Young say2@st-andrews.ac.uk](mailto:Dr Simon Young say2@st-andrews.ac.uk) )  
Module Organiser ( [Dr Simon Young say2@st-andrews.ac.uk](mailto:Dr Simon Young say2@st-andrews.ac.uk) )  
Module Organiser ( [Dr Simon Young say2@st-andrews.ac.uk](mailto:Dr Simon Young say2@st-andrews.ac.uk) ) **and** the Biology Teaching Office ( [bioteach@st-andrews.ac.uk](mailto:bioteach@st-andrews.ac.uk) )  
Year Coordinator  
See School of Biology UG Handbook for list: [JH booklet info \(st-andrews.ac.uk\)](http://www.st-andrews.ac.uk/jh-booklet-info)  
Advisor of Studies  
Disability Coordinator ( [biodisabilities@st-andrews.ac.uk](mailto:biodisabilities@st-andrews.ac.uk) )  
Advice & Support Centre  
Address: 79 North Street, St Andrews  
Email: [theasc@st-andrews.ac.uk](mailto:theasc@st-andrews.ac.uk)  
Web: <https://www.standrews.ac.uk/ask-a-question/>  
Tel: 01334 462020  
Tel: 01334 476161  
Web: <https://www.st-andrews.ac.uk/students/advice/counselling/incrisis/>

## Biology Teaching Office:

We are happy to hear from you about teaching matters. The School of Biology Teaching Office is open Monday to Friday 09.00 - 13.00 and 14.00 - 17.00. School of Biology staff will respond to your emails during these hours. Our team will provide a response to you within three working days.

Biology Teaching Office (Level 2), University of St Andrews, Biomolecular Sciences Building, North Haugh, St Andrews, Fife KY16 9ST

Email: [bioteach@st-andrews.ac.uk](mailto:bioteach@st-andrews.ac.uk)

Tel: 01334 46 3602 or 3566

## BL2309: Contributing Staff

<b><u>Dr Simon Young</u></b> <b>(Module Organiser)</b>	Associate Lecturer (Education focused)	<a href="mailto:say2@st-andrews.ac.uk">say2@st-andrews.ac.uk</a>
<a href="#">Dr Frances der Weduwen</a>	Associate Lecturer (Education Focused)	<a href="mailto:fe9@st-andrews.ac.uk">fe9@st-andrews.ac.uk</a>
<a href="#">Prof Dave Ferrier</a>	Reader in Biology and Deputy Director of the Scottish Oceans Institute	<a href="mailto:dekf@st-andrews.ac.uk">dekf@st-andrews.ac.uk</a>
<a href="#">Dr Jacqueline Nairn</a>	Senior Lecturer	<a href="mailto:jn37@st-andrews.ac.uk">jn37@st-andrews.ac.uk</a>
<a href="#">Dr Natalie Pilakouta</a>	Lecturer	<a href="mailto:np84@st-andrews.ac.uk">np84@st-andrews.ac.uk</a>
<a href="#">Dr V Anne Smith</a>	Senior Lecturer	<a href="mailto:vas1@st-andrews.ac.uk">vas1@st-andrews.ac.uk</a>
<a href="#">Dr Jens Tilsner</a>	Lecturer	<a href="mailto:jt58@st-andrews.ac.uk">jt58@st-andrews.ac.uk</a>
<a href="#">Dr Simon Young</a> (Module Organiser)	Associate Lecturer (Education focused)	<a href="mailto:say2@st-andrews.ac.uk">say2@st-andrews.ac.uk</a>



## **BL2309: Learning Outcomes**

Students completing module BL2309 successfully should be able to:

- Identify a range of key techniques that are commonly used in molecular biology.
- Describe the concepts behind key molecular biology techniques, which generally require the manipulation of DNA, RNA, protein or lipid.
- Discuss examples of how molecular biology techniques are used to address current questions and problems across a broad range of biological disciplines.
- Learn about the large scale omic approaches in biology with the integrated experimental design and data analysis
- Gain an understanding of molecular evolution and the application of comparative genomics
- Understand the molecular basis of evolution in ecology
- Describe the application of molecular tools to the detection, control and treatment of viral diseases
- Understand the molecular tools and techniques utilised in synthetic biology
- Be aware of the fundamental techniques used to genetically modify crops

# **BL2309: Acquired Skills**

## **Practical Skills**

- Database interrogation
- Mendelian genetics

## **Transferable Skills**

- Group discussion - participating
- Short group presentation on given topic (up to 15 min)
- Short group presentation on project idea (up to 15 min)
- Short individual presentation on given topic (up to 15 min)
- Short informal presentation (using PowerPoint or not)
- "Short" practical write-up (e.g. completed worksheet)
- Critically evaluating sources/information
- Finding information on the web
- Finding literature
- Searching databases
- Ethical considerations
- Online learning
- Problem-solving questions
- Biodiversity analysis
- Calculations/equations
- Concentrations
- Data analysis
- Data analysis (depending on project)
- Data presentation
- Descriptive statistics
- Draw a line of best fit
- Genetic Drift
- Linear regression
- Logarithms
- Phylogenetic analysis
- Powers of ten
- Produce graphs/figures
- Produce tables
- Use Excel
- Use other data analysis software
- Sustainability Related Skills
- Generate class dataset
- Working in large groups
- Working in pairs/small groups

# Policies

(Information in this section applies to all Biology Modules)

- The procedures and regulations followed by the School of Biology are outlined in the [University Handbook](#) and in the School of Biology UG handbook [JH booklet info \(st-andrews.ac.uk\)](#)
- All coursework associated with the module must be completed and submitted by its due date.
- Specific School regulations relating to absence reporting, penalties and rules for late submission of work, extensions for coursework, return of coursework, S-coding, Good Academic Practice and Academic Alert are stated in the School of Biology UG handbook [JH booklet info \(st-andrews.ac.uk\)](#) and students are required to carefully read these regulations.
- Students are also referred to the University Handbook, available at: <http://www.st-andrews.ac.uk/studenthandbook/>