Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Department of Microbiology

School of Genetics and Microbiology

Senior Sophister Handbook AY 2025–2026

Handbook Contents

1.General Course Information

1.1 Welcome

Welcome to Microbiology at Trinity College Dublin, the University of Dublin. The Department of Microbiology occupies the Moyne Institute of Preventive Medicine, a building presented to the College in 1953 by the late Grania Guinness (the dowager Marchioness of Normanby) in memory of her father, the first Baron Moyne. This 2025-2026 handbook is designed to help you find your way around your course details and requirements, and to describe the facilities and functions of the Department of Microbiology in the School of Genetics and Microbiology, which is part of the **Faculty of Science, Technology, Engineering, and Mathematics (STEM**). It is intended to complement information found in the University Calendar. The latter includes details of university regulations and procedures and may be consulted online, in this handbook or the departmental office.

Enjoy the year!

1.2 Regulation notification

This handbook applies to students taking the Moderatorship in Microbiology. It is available to download from the Departmental website. Please retain for future reference. The information provided in this handbook is accurate at time of preparation. Any necessary revisions will be notified to students *via* email. Please note that although every effort has been made to ensure the accuracy of the contents of this handbook, it is not a legally binding document and the Department of Microbiology reserves the right to modify any element, subject to the normal regulations of the University. In the event of any conflict or inconsistency between the General Regulations published in the University of Dublin College Calendar (http://www.tcd.ie/calendar/) and this handbook, the provisions of the General Regulations will prevail.

Reference/Source

Calendar Calendar Part II

Part B: General Regulations and Information

Calendar Part III, Section 1: General Academic Regulations

1.3 Contact Details

Senior Sophister Staff Contact Details

Staff Name	Role/Title	Email
Marta Martins	Head of Discipline	mmartins@tcd.ie
Kim Roberts	Course Advisor	kroberts@tcd.ie
Jayne Vance	SS Course Administrator/Office	magoverj@tcd.ie

Direct queries regarding timetabling, submission deadlines, *etc*. should be made to the course administrator in the first instance or to the SS Course Advisor/Director if necessary. E-mails sent outside working hours are unlikely to be read before the following working day.

Department of Microbiology Teaching Staff

Dr. Matthew Dorman, Assistant Professor (dormanmj@tcd.ie)

Dr. Anna Ershova, Teaching Fellow (eshovaa@tcd.ie)

Dr. Alastair Fleming, Associate Professor (Alastair.Fleming@tcd.ie)

Dr. Carsten Kroger, Assistant Professor (Carsten.Kroeger@tcd.ie)

Dr. Marta Martins, Head of Discipline (mmartins@tcd.ie)

Dr. Máire Ní Leathlobhair, Assistant Professor (nleathlm@tcd.ie)

Dr. Nicky O'Boyle, Assistant Professor (oboylen1@tcd.ie)

Dr. Siobhan O'Brien, Assistant Professor (siobhan.o-brien@tcd.ie)

Dr. Kim Roberts, Assistant Professor (kroberts@tcd.ie)

In addition, the Department has teaching links with the Department of Clinical Microbiology, School of Medicine at St. James's Hospital http://www.medicine.tcd.ie/clinical_microbiology/ and the School of Dental Science https://www.tcd.ie/dental/.

1.4 Key locations

The Department of Microbiology is located in the Moyne Institute of Preventive of Medicine building, overlooking the College Park.

Interactive College Map

1.5 The Senior Sophister Year in Microbiology

Module Descriptors

The Core Curriculum (MIU44002, MIU44003)

Senior sophister students explore in further detail the major areas of Microbiology under the themes of (a) **Molecular and Cellular Biology**, and (b) **Microbial Pathogenicity**. The themes are covered in two Core Modules: MIU44002, and MIU44003. **Lectures in the core themes are compulsory for all students**. These 10 ECTS modules require lecture attendance by students, self-directed study guided by recommended reading material and further reading beyond the course. These modules are assessed by written exams during the semester 1 examination period in December.

Advanced Topic Courses (MIU44004)

Students are provided an opportunity to choose **three** areas of Microbiology for advanced study. Each component consists of 10 hours, and together the 3 courses account for **10 ECTS (credits).** The format of these courses varies from lectures to small group tutorials and in many cases includes elements of student participation, assigned reading and group assignments. Students are required to carry out self-guided study on primary literature sources in preparation for class participation and presentations. The group size for each advanced topic is capped at approximately 16 students. Students will return a sheet ranking each option in order of preference. It is strongly recommended that where applicable, students select the advanced topic course run by their capstone project supervisor. Advanced topics are assigned based on the junior sophister class ranking. Please note that we do not publish or release the junior sophister class ranking.

Examination of MIU44004 includes an in-course assessment for each topic, worth 5%/0.5 ECTS of the final module mark. In total, the in-course assessment is worth 15%/1.5 ECTS of the final module mark, with the written examination at the end of the first semester worth the remaining 85%/8.5 ECTS. Format of the in-course assessment for each advanced topic is determined according to the preference of the academic lead.

Students are strongly discouraged from answering exam questions for topics they did not participate in. Whilst there may be some overlap between course themes between some advanced topics and the core modules, the material explored in the advanced

topics is much more detailed, and the core material is not specific enough for a good grade.

Problem Solving, data analysis and interpretation in Microbiology (MIU44005)

Students will develop their problem solving and data analysis skills throughout the Senior Sophister year, through reading and critiquing research papers, Advanced Topic discussions, laboratory work, etc. In the second semester, students will receive tutorials in data handling, data interpretation and problem solving to complement the lectures in the core themes and the capstone research projects. The culmination of these skills is then assessed by a written examination at the end of the second semester.

Research in Microbiology – Capstone Project (MIU44001)

This module comprises the capstone research project (20 ECTS) and **attendance at research seminars** given by invited international and national research leaders.

This module is assessed in three ways:

Literature review	3 ECTS (15%)
Laboratory/research performance	8 ECTS (40%)
Scholarly performance	9 ECTS (45%)

Research Project (Capstone Project)

Each student undertakes a nine week research project during semester 2 under the supervision of an academic member of staff. Students will receive a list of laboratory and computational research projects during semester 1. There will be an opportunity for students to discuss the projects with the supervisors at a coffee morning on Wednesday 1st October at 11 am. Students will then return a sheet, ranking each option in order of preference by 9am Monday 6th October. Projects will be assigned according to the JS class ranking. Please note that we do not publish or release the junior sophister class ranking.

Whichever project a student is allocated, it is up to the student to get stuck in and take ownership of the project. Part of the marking criteria for the "lab performance" grade is about the student's ability to work independently and bring their own ideas and thoughts to the project. **Please note that we do not allow students to complete their Senior Sophister project in a lab group they have already worked with, during a summer**

project for example. If you haven't already done so, please email the office to let us know if you have worked in any of the labs that are offering Senior Sophister projects.

The research module consists of several components, including research, presentations, a literature review, a poster presentation and a thesis. At the end of semester 1, students are asked to arrange to meet their supervisor to discuss the project and receive guidance on relevant reading material. Students are asked to read around the topic and write a 2000 word literature review summarising published research relevant to the project. This literature review is worth 3 ECTS and the submission deadline is during week 3 of the project. Students will receive feedback from their supervisors on the literature review during week 8 of the project and students are encouraged to apply this feedback to their thesis.

At the start of the projects, students are asked to present an outline of their project to their lab group. Similarly, towards the end of the projects students will present their findings to their lab group. During week 10 of semester 2, students will create an A0 poster showcasing their project (specific details to follow) that will be presented at the Festival of Research on Friday 27th March. The lab group presentations and poster presentation are opportunities for students to get feedback on their project before the thesis submission deadline, and form part of the lab performance mark.

At the end of the project, students produce a thesis of their research project (specific details to follow). In addition, students will undergo a short *viva voca* examination with the project supervisor and a second academic assessor. The aim of the *viva* is to assess a student's understanding of the background literature for their project, as well as the techniques used and their critical analysis of their findings. The project *viva* is used to moderate the module grades.

Microbiology Seminar Series

Throughout the academic year research seminars on the most current topics in Microbiology will be delivered by visiting scientists to the department. Attendance is **compulsory** as the subject matter is often relevant to the course work. Seminars will be usually held on Thursdays at 1pm, unless specified otherwise. Students are encouraged to attend these seminars, read up on the seminar topics and to integrate this information

with that provided in their course. This will help develop a deeper understanding of topics and facilitate more in-depth answering in examinations. Details of each invited seminar will be circulated in advance.

Annual Examinations

The Core (MIU44002, MIU44003) and Advanced (MIU44004) module examinations are held during the **Semester 1 examination period**. Students are formally examined on all material covered in the Core and Advanced Topic courses. Students are encouraged to integrate into their answers information covered during their Junior Sophister year. The fourth paper **(MIU44005)** is problem-based and will be examined during the **Semester 2 examination period**.

The marking guidelines for Sophister essays and exams can be found in **Appendix D.**

On completion of the examinations, some students will be called to sit an in-person ***viva voce*** **examination with the External Examiner, Professor Marguerite Clyne**. Students are called for a *viva* with the external examiner for one of two reasons:

- Some students are called for a *viva* because their degree mark is in the middle of a grade boundary and the *viva* is for quality control purposes.
- Some students are called to *viva* because they have an overall borderline grade (within 1% of the next grade), and the *viva* is an opportunity for their grade to potentially be elevated.

However, students who are called for a *viva* will not know which group they are in. **All students are requested to be available in-person on Tuesday 19th May (to be confirmed) for interview with the external examiner**. *Vivas* will be held in-person only so please ensure you are in the country and available if called. Requests for remote online *vivas* will not be granted.

Students that are called for a *viva* with the external examiner may be asked questions on any aspect of the Microbiology Moderatorship programme, including the research project, literature review, Senior Sophister modules and general microbiology knowledge. It is important to remember that a *viva* is a conversation

to explore a student's knowledge and that a student's grade cannot go down due to their *viva* performance.

Senior Sophister Course Overview

The Moderatorship Examination - *Senior Sophister Year*					
Module	**Title (semester)**	**ECTS**	**Examination Components**	**% Module Component**	**% Final Degree**
MIU44001	Research in Microbiology (S2)	20	Lit. Review (3ECTS), Lab. Performance (8ECTS), Scholarly Performance (9ECTS)	15; 40; 45	23.33
MIU44002	Microbial Molecular and Cellular Biology (S1)	10	Paper 1	100	11.67
MIU44003	Microbial Pathogenicity (S1)	10	Paper 2	100	11.67
MIU44004	Advanced Topics in Microbiology (S1)	10	Continuous assessment (1.5ECTS), Paper 3 (8.5ECTS)	15; 85	11.67
MIU44005	Data Handling (S2)	10	Paper 4	100	11.67
Total Senior Sophister		60			70.00
Junior Sophister					30.00
Total Moderatorship					100.00

The Moderatorship degree in Microbiology is awarded based on a student's performance over the two Sophister years. 70% of the final degree marks derive from the Senior Sophister year marks and 30% derive from the Junior Sophister year marks.

1 ECTS credit represents 20-25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time and assessments.

1.6 Key Dates 2025-2026

The academic timetable can always be found on the Calendar website: **Academic Year Structure**

15.09.25	Michaelmas Term (Semester 1) teaching begins • **10:00 Welcome session with Dr. Marta Martins** • **10:15 Information session with Dr. Kim Roberts** The following should be emailed to Jayne Vance (magoverj@tcd.ie) • Nomination of Class Representative
18.09.24	**Careers Support** • **15:00 John Wynne,** Careers Advisory Service This session will take a practical look at postgrad research, further education, jobs, deadlines, what you should be thinking about and when in the form of an Online Q & A Session.
1.10.25	11:00 Project discussion coffee morning
6.10.25	The following should be emailed to Jayne Vance (magoverj@tcd.ie) • Project Choices; to be organised by Class Rep., compiled in an Excel File.
08.10.25	• The gradireland Undergraduate Fair 2026, RDS https://gradireland.com/events/gradireland-graduate-careers-fair-25
10.10.25	The following should be emailed to Jayne Vance (magoverj@tcd.ie) • Advanced Topic Choices; to be organised by Class Rep., compiled in an Excel File.
LIBRARY HITS	**"Library HITS" – how to get the best from the Library"** https://www.tcd.ie/library/support/skills-training.php **(Students are asked to follow their emails on Library announcements)**
27.10.25	Study/Review Week (Monday, Public Holiday)
Week of 01.12.25	Meet with project supervisor to discuss project and literature review
05.12.25	Michaelmas Term (Semester 1) teaching ends
11.12.25 to 22.12.25	**Semester 1 assessment session:** Exams for MIU44002, MIU44003 and MIU44004
19.01.26	Hilary Term (Semester 2) teaching begins. Start of 9 week Capstone Project. Note, projects run through study/reading week.
03.02.26	Submission deadline for Literature Review
20.03.26	Final day of Capstone Project
27.03.26	Festival of Research. Poster should be emailed to Jayne Vance (magoverj@tcd.ie) for printing no later than 5pm 25th March.
10.04.26	**Thesis submission deadline**
13.04.26	**Revision Week Semester 2:** Monday 13 April to Friday 17 April 2026
20.04.26	Trinity Term begins

	Trinity week: Monday 20 April to Friday 24 April 2026
20.04.26 to 24.04.26	Project vivas
31.05.26	Trinity Term ends
21.04.26 to 01.05.26	**Semester 2 assessment session:** Exam for MIU44005
Note that College is closed on the following dates 2025-26:	
27.10.25	Public Holiday during Study/review Week
23.12.25-19.01.26	Christmas Period
02.02.26	St Brigid's Day
17.03.26	St Patrick's Day
01.04.26	Good Friday
06.04.26	Easter Monday
04.05.26	Public Holiday
01.06.26	Public Holiday
	Project activity dates; Semester 2 • Monday 19th January – 20 March 2026 (9 Weeks)
To Be Confirmed (T.B.C)	**Problem Solving, data analysis and interpretation in Microbiology** • The schedule of the session delivered by the Microbiology Academic Staff will be circulated in Semester 2. {12noon on Thursdays, Wks 22-30 (TBC)} **Projects 2025-26** • **Project Thesis Information Session** • **Project presentation** • **Project Submission Deadline** • **Project Vivas** (Supervisor and Chosen Markers)

1.7 Timetables 2025-2026

The following timetables can be subject to minor changes. Please ensure you check your emails on a daily basis.

Core Course Lecture Timetable

MIU44002 Lecture Timetable

SENIOR SOPHISTER					SEMESTER 1, 2025-26	
MIU44002 (MOLECULAR AND CELL BIOLOGY) TIMETABLE						
WEEK	DAY/DATE/TIME			LECTURERS	LECTURES	
4	Monday	15-Sept	10:15	**Kim Roberts**	**Information Session**	NLR
			14:00	Alastair Fleming	The Eukaryotic genome	NLR
	Tuesday	16-Sept	14:00	Alastair Fleming	Chromatin modifications and remodeling I	NLR
	Thursday	18-Sept	12:00	Alastair Fleming	Chromatin modifications and remodeling II	NLR
	Friday	19-Sept	11:00	Alastair Fleming	Chromatin modifications and remodeling III	NLR
			12:00	Anna Ershova	Getting Started: Initiation, promoter recognition and patterns	NLR
5	Monday	22-Sept	14:00	Anna Ershova	The Machine: The Structure and regulation of RNA polymerase II	NLR
	Tuesday	23-Sept	14:00	Anna Ershova	Moving Along: Transcription elongation and linked events	NLR
	Wednesday	24-Sept	12:00	Anna Ershova	Getting to the end. 3'end formation and transcription termination	NLR
	Thursday	25-Sept	12:00	Anna Ershova	Controlling the Levels: Make and degrade	NLR
	Friday	26-Sept	11:00	Kim Roberts	Mechanisms of viral transcription	NLR
			12:00	Kim Roberts	Mechanisms of viral translation	NLR
6	Monday	29-Sept	12:00	Anna Ershova	The world of Non-coding RNAs: Roles in viral infection	NLR
	Tuesday	30-Sept	12:00	Alastair Fleming	Metabolic Engineering in yeast	NRL
	Friday	03-Oct	11:00	Carsten Kröger	Next-Generation Sequencing	NLR
			12:00	Anna Ershova	COVID19 vaccine: transcribing our knowledge of mRNA	NLR
7	Monday	06-Oct	12:00	Carsten Kröger	Omics in bacteria	NLR
	Tuesday	07-Oct	12:00	Anna Ershova	The dynamic genome I	NLR
	Friday	10-Oct	12:00	Anna Ershova	The dynamic genome II	NLR
8	Monday	13-Oct	12:00	Carsten Kröger	CRISPR-Cas9	NLR
			14:00	Alastair Fleming	Bacterial Biotechnology I	
	Tuesday	14-Oct	12:00	Carsten Kroger	Post-transcriptional regulation in Bacteria	NLR
	Wednesday	15-Oct	12:00	Anna Ershova	Nucleoid structuring proteins I	NLR
	Thursday	16-Oct	12:00	Alastair Fleming	Bacterial Biotechnology II	NLR
	Friday	17-Oct	12:00	Maire Ni Leathlobhair	Applied Microbial Genomics (TBC)	NLR
9	Monday	20-Oct	12:00	Anna Ershova	Nucleoid structuring proteins II	NLR
	Tuesday	21-Oct	14:00	Anna Ershova	Nucleoid structuring proteins III	NLR
	Wednesday	22-Oct	12:00	Anna Ershova	Nucleoid structuring proteins IV	NLR
	Thursday	23-Oct	11:00	Gary Moran	The Genomes of Pathogenic Fungi	NLR
			14:00	Anna Ershova	The next level of complexity: DNA methylation	NLR
	Friday	24-Oct	12:00	Maire Ni Leathlobhair	Applied Microbial Transcriptomics (TBC)	NLR

*** Venue: New Lecture Room (NLR), Microbiology Department**

****Some lecture titles and lecturers may vary**

MIU44003 Lecture Timetable

SENIOR SOPHISTER					SEMESTER 1, 2025-26	
MIU44003 (MICROBIAL PATHOGENICITY) TIMETABLE						
WEEK	DAY/DATE/TIME			LECTURERS	LECTURES	
4	Tuesday	16-Sept	11:00	Siobhan O'Brien	Polymicrobial interactions in health and disease	NLR
			12:00	Siobhan O'Brien	Bacterial secretion systems 1	NLR
	Wednesday	17-Sept	12:00	Siobhan O'Brien	Bacterial secretion systems 2	NLR
			14:00	Carsten Kröger	Gram-negative pathogens: *Acinetobacter baumannii*	NLR
	Thursday	18-Sept	11:00	Carsten Kröger	Gram-negative pathogens: *Salmonella enterica*	NLR
5	Monday	22-Sept	11:00	Julie Renwick	Respiratory infection and CF Part I	NLR
			Cont./	Julie Renwick	Respiratory infection and CF Part II	NLR
	Tuesday	23-Sept	12:00	Marta Martins	Keeping positive: *S. aureus and Methicillin-Resistant S. aureus (MRSA)*	NLR
	Wednesday	24-Sept	11:00	Marta Martins	Surface proteins of *S. aureus*	NLR
			14:00	Sinead Smith	*Helicobacter pylori* pathogenesis	NLR
	Thursday	25-Sept	11:00	Marta Martins	*Mycobacterium tuberculosis (Mtb)*	NLR
6	Tuesday	30-Sept	11:00	Marta Martins	TB or Not TB - Atypical Mycobacteria in infection and disease	NLR
7	Monday	06-Oct	14:00	Derek Doherty	Cellular Immunology	NLR
			Cont./	Derek Doherty	Cellular Immunology	NLR
	Tuesday	07-Oct	14:00	Derek Sullivan	Pathogenesis of fungal infections	NLR
			Cont./	Derek Sullivan	Pathogenesis of fungal infections	NLR
	Thursday	09-Oct	12:00	Derek Doherty	Cellular Immunology	NLR
			14:00	Nicky O'Boyle	Evasion of GI Immunity- *Salmonella*	
	Friday	10-Oct	11:00	Nicky O'Boyle	Evasion of GI Immunity- *Listeria monocytogenes*	NLR
8	Monday	13-Oct	11:00	Nicky O'Boyle	Enterohaemorrhagic *E. coli* - A sensitive beast	NLR
	Tuesday	14-Oct	11:00	Siobhan O'Brien	Genomic approaches to vaccine design	NLR
			14:00	Marta Martins	Immune evasion by *S. aureus*	NLR
	Wednesday	15-Oct	11:00	Marta Martins	The Antibiotic Resistance Crisis	NLR
			14:00	Marta Martins	Platforms for antibacterial drug discovery in the resistance era	NLR
	Thursday	16-Oct	11:00	Marta Martins	New drugs for old bugs	NLR
			14:00	Nicky O'Boyle	Uropathogenic *E. coli* - A sticky situation	NLR
	Friday	17-Oct	11:00	Marta Martins	What's in the pipeline? Alternatives to antibiotics: I	NLR
9	Monday	20-Oct	11:00	Marta Martins	What's in the pipeline? Alternatives to antibiotics: II	
	Tuesday	21-Oct	11:00	Kim Roberts	Viral manipulation of apoptosis	NLR
			12:00	Kim Roberts	Viral induction of oncogenesis	NLR
	Wednesday	22-Oct	11:00	Kim Roberts	Oncolytic Viruses	NLR
	Thursday	23-Oct	12:00	Kim Roberts	Antiviral vaccines	NLR
	Friday	24-Oct	11:00	Kim Roberts	Antiviral drugs	NLR

*** Venue: New Lecture Room (NLR), Microbiology Department**

1.8. Advanced Topics in Microbiology

Advanced Topics in Microbiology 2025-2026

Students are <u>required</u> to complete 3 Advanced Topics courses which will be held between weeks 11-14 of Semester 1. Courses will be capped at 16 students. Please note, courses with three students or fewer may not run at the lecturer's discretion.

Assessment for this module is 15% in-course assessment (5% per Topic) and 85% written exam at the end of semester 1.

LESSONS FROM YEAST: CHROMATIN, EPIGENETICS AND DISEASE

Dr. Alastair Fleming

The yeast *Saccharomyces cerevisiae* has long been used as a model system for the study of eukaryotic cells. Recent developments have seen this model system used as a powerful experimental tool to understand complex biological processes, particularly those associated with human diseases. The first part of this course will explore the experimental approaches offered by yeast as a model biological system. With this background information, you will review how many of the fundamental chromatin-mediated cellular processes were first identified in yeast and were then found to exist in human cells. Finally, we will discuss how using yeast as a model organism has offered insight into when chromatin-mediated processes become aberrant and the relevance of this failure of function to cellular aging and cancer.

Topics discussed in first 7 lectures:

1: Yeast as a Model Organism

2: The Yeast Deletion Library: Looking for Phenotypes

3: A brief history of chromatin research: from obscurity to the cutting edge

4 & 5: Early studies in yeast which first demonstrated chromatin regulates transcription

6: Chromatin and aging

7: Chromatin and cancer

Sessions 8, 9 and 10 will involve class discussion of topical papers (to be selected).

In-course assessment: 5% Presentation of a recent scientific paper relevant to the topic.

SMALL RNA-MEDIATED GENE REGULATION IN GRAM-NEGATIVE BACTERIA

Carsten Kröger

To respond to environmental changes, the gene expression programs in bacteria must be tightly controlled. In addition to gene regulation by transcription factors or DNA topology, small, non-coding RNA molecules have been established as a class of regulatory elements in the bacterial cell. Throughout the course of this class, we will discuss current knowledge such as the identification, mechanism of action and biological functions of selected small RNAs and their RNA-binding proteins in Gram-negative bacteria. Guided by selected research articles, we will follow the cellular path of a regulatory sRNA from expression to target interaction and subsequent degradation. The course involves in-depth reading of primary literature as a group and discussions on experimental design and interpretation.

In-course assessment: 5% MCQ.

THE PANDEMIC POTENTIAL OF HIGHLY PATHOGENIC H5N1 INFLUENZA A VIRUSES

Kim Roberts

At irregular intervals *Influenza A virus* causes pandemics of varying severity. The 2009 "swine 'flu" pandemic had a mortality rate similar to seasonal influenza A viruses, whilst the pandemic in 1918 is thought to have infected a third of the world's population with 50-100 million deaths. It is impossible to predict which influenza A virus will cause the next pandemic, however since its first emergence in 1996, highly pathogenic avian influenza (HPAI) H5N1 virus has been considered a virus with pandemic potential. This concern has significantly increased with the spread of HPAI H5N1 into cattle in the USA in 2024.

In this course we will explore the emergence of HPAI H5N1, the outbreaks it has caused amongst people, and its evolution to become a panzootic virus that is currently causing global infection amongst a wide variety of wild and domesticated animals. Using primary research papers and reviews, we will investigate the viral mutations that have allowed this virus to broaden its host tropism, as well as mutations of concern that may allow HPAI H5N1 to cause a pandemic in humans. We will discuss routes of transmission and methods for controlling HPAI outbreaks.

The course will be divided into five 2-hour classes. Recommended multi-media resources will be available before each class. Each class will be comprised of a mixture of lecture

material, followed by a class discussion. All students are expected to engage with the material provided before the classes and to participate in the class discussions.
In-course assessment: 5% Question-led summaries of the class material that will form the foundation for revision for the exam.

"THE SILENT PANDEMIC OF ANTIBIOTIC RESISTANCE IN ESKAPE PATHOGENS – FROM NEW DRUGS TO NOVEL THERAPEUTICS"

Marta Martins

The rapid emergence of multidrug resistance in bacteria occurring worldwide is jeopardizing the efficacy of available antibiotics, which for decades have saved millions of lives. In addition, the development of new drugs continues to decline with pharmaceutical companies curtailing their anti-infective research programs. The "silent pandemic" of antimicrobial resistance (AMR) is a neglected global crisis that requires urgent attention and action. Appropriate prescription and optimised use of antimicrobials guide the principles of antimicrobial stewardship activities, together with quality diagnosis and treatment. However, there are several threats that can affect antimicrobial stewardship activities and continue to drive antimicrobial resistance. Furthermore, hospital admissions increase the risk of health-care-associated infections and the transmission of multidrug-resistant organisms, which in turn leads to increased antimicrobial use. Due to this concerning situation, in 2017, the WHO published a list of pathogens for which new antimicrobial development is urgently needed. Within this list, ESKAPE (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species) pathogens were designated "priority status". This highlights the urgency in the development and discovery of new drugs or the repurpose of existing ones. This course will discuss the lack of new antimicrobial compounds to treat multidrug resistant infections caused by ESKAPE pathogens, as well as the (still) problematic (mis)use of antibiotics. We will focus on the process of discovery and development of new drugs and the reason why thousands of new molecules never reach the market. We will also discuss the use of potential alternative therapeutics that are focused on shifting the current drug discovery paradigm from "finding new drugs" to "combining existing agents". Some examples of the approaches to be discussed will include host-directed therapeutics; bacteriophage-based therapies; anti-virulence strategies; development of biofilm inhibitors/disruptors; among others. Using this background information, we will review cutting-edge papers where these approaches are

discussed, opening the way to the discovery of new drugs or to the repurpose of existing ones. The students will have the opportunity to read and discuss fundamental papers in this area as well as to work with their peers in critically presenting their view about antimicrobial resistance. Group work will be focused on potential solutions to tackle this public health issue and discover/design a new antimicrobial. The students will also be challenged to be the next Antimicrobial Resistance Ambassadors for public engagement and to develop new ideas and solutions to engage with the public to raise awareness of this Global Public Health Issue.

In course assessment: 5% Presentation of a scientific paper on novel drugs/treatments to treat MDR ESKAPE pathogens and preparation of Flash cards with summary information on AMR to be distributed during AMR awareness week (18-24 November 2025).

BACTERIAL STRESS RESPONSES

Anna Ershova

Learning Aims

Students will develop an understanding of the molecular mechanisms underlying bacterial stress responses, and how these mechanisms contribute to bacterial pathogenicity, survival, and evolution.

Module Content

This module will consist of 10 lectures dedicated to exploring the diverse strategies bacteria use to sense and respond to stress. While humans face exams, deadlines, and bills, bacteria experience very different stresses in their environments, from nutrient limitation and oxidative stress to host immune defenses and antibiotic pressure.

- In this course, we will systematically examine:
- The molecular mechanisms of stress sensing and regulation.
- Specific examples of stress responses in clinically and environmentally relevant bacteria.
- The role of stress responses in pathogenicity and antibiotic resistance.
- The importance of population heterogeneity as a survival strategy under stress.

As part of the module, students will take part in a mini-conference on recent discoveries in bacterial stress responses. Active participation will form part of the in-course assessment, giving students the chance to critically evaluate primary research and share their findings in a supportive, conference-style setting.

This course will be particularly valuable for students interested in bacterial regulation, antibiotic resistance, and microbial evolution.

Learning Outcomes

By the end of the course, students will be able to:

- Describe the diversity of bacterial stress response mechanisms.
- Explain the genetic and molecular regulation of bacterial stress responses.
- Discuss the connections between stress responses, pathogenicity, and bacterial evolution.

In course assessment: 5% Presentation and discussion in a conference-style setting

METABOLISM MEETS VIRULENCE

Nicky O'Boyle

An individual's appearance, behaviours and lifestyles are shaped by the foods they eat. The same is true in many respects for bacteria. Bacterial virulence mechanisms are often metabolically costly to produce, and their expression must be controlled precisely to ensure activity in the appropriate infection niche. A plethora of signals from the environment, the host, the diet, and endogenous sources therefore converge on virulence factor-encoding genes and their regulators to facilitate niche-specific virulence control.

This course will focus on clinically relevant bacterial pathogens, aiming to build an understanding of how diverse virulence factors are regulated in response to the sensing and breakdown of metabolites during infection. You will learn about how host-associated environments vary in their metabolite profiles and the strategies employed by pathogens to exploit these variations to optimise infection. The experimental methodologies used to analyse alterations in metabolism and dissect how this affects specific virulence factors will also be discussed. A problem-based learning activity focused on response to an emerging pandemic threat will be conducted alongside the course. Students will be tasked with analysing relevant literature and preparing a group presentation to inspire discussion.

In-course assessment: 5% Problem-based learning activity assessed by group presentation.

AN INTRODUCTION TO EVOLUTIONARY MICROBIOLOGY

Siobhán O'Brien

Microbes show a remarkable ability to rapidly adapt to harsh and changing environments. Such rapid evolution can have direct consequences for our health and wellbeing.

Antimicrobial resistance, vaccine escape and the switch from acute to chronic infection are all driven by the evolution and spread of adapted strains.

This course introduces the principles of microbial evolution through discussion of cutting-edge literature and real-time experimental evolution studies. These "living fossil records" allow us to trace evolutionary dynamics, identify novel genomic changes, and quantify the fitness advantages that underpin microbial adaptation. We will examine the factors that influence the rate and likelihood of evolutionary change and explore strategies for leveraging—or redirecting—evolution to reduce the impact of pathogens on their hosts. A central case study will be Lenski's long-term E. coli experiment, which has tracked over 50,000 bacterial generations and provided unprecedented insight into evolutionary processes. Expect fitness conflicts, trade-offs, bacterial warfare and invasions.

- Lecture 1: Introduction to Evolutionary Biology
- Lecture 2: Experimental Evolution 1
- Lecture 3: Experimental Evolution 2: Criticisms and Caveats
- Lecture 4: Evolution of Microbial Cooperation
- Lecture 5: Mobile Genetic Elements in Evolution
- Lecture 6: Guest speaker, Dr Kaitlin Schall, University of Liverpool (double period)
- Lecture 7: Clinical Evolutionary Microbiology
- Lecture 8: Group Presentations (double period)

In course assessment: 5% Oral presentations

ENTERIC DISEASE GENOMICS AND EPIDEMIOLOGY

Matthew Dorman

Bacterial pathogens cause a range of enteric and diarrhoeal disease across the globe, with particularly high mortality and morbidity in low-middle income countries and amongst the immunocompromised and children under the age of five. The advent of relatively inexpensive whole-genome sequencing (WGS) has expanded our understanding of how these pathogens evolve, cause disease, and transmit worldwide. This advanced course will examine the population biology and genome dynamics of several bacterial aetiological agents of enteric and diarrhoeal disease. Using case studies, we will build on basic biological

and molecular pathogenesis concepts introduced earlier in the moderatorship, and explore how these relate directly to modern disease control strategies. We will focus on real-world examples of how WGS has informed, evolved, and accelerated public health microbiology and surveillance. The course is dynamic and highly applied, and will involve active discussion of real genomic, epidemiological, and phylogenetic data, applying theoretical concepts to real-life disease outbreak scenarios, and understanding how population-level surveillance genomics can complement and reinforce bacteriology, functional molecular biology, and genomic data. Guidance will be provided to support students' independent learning through selected articles, discussion, and the structured in-course assessment design.

In-course assessment (5%): Students will be provided with data describing a fictional disease outbreak, and through guided independent learning time, will produce a two-page summary of the scenario. Assessment will consist of the two-page document submitted, and a 5-10 minute verbal discussion of the document with the lecturer, held after the final session (dates TBC).

2. Prizes in Microbiology

Cyril J. Smyth Prize in Microbiology

This prize was founded in 2008 by the donation of the Provost's Lifetime Achievement Award in Teaching and Learning to Professor Cyril J. Smyth (Previous Professor in Microbiology at the Moyne Institute). It is awarded annually, on the recommendation of the Professor of Microbiology, to the student achieving the highest marks in the research project in the moderatorship examination in microbiology. Value, €100.

F.S. Stewart Prize in Microbiology

This prize was founded in 1977 by a gift from F.S. Stewart, Professor of Bacteriology and Preventive Medicine, 1950-75. It is awarded annually, on the recommendation of the Professor of Microbiology, to the science or medical student achieving the highest marks in the moderatorship examination in microbiology. Value, €100.

Gold Medals

Gold medals are awarded by the Board to candidates of the first class who have shown exceptional merit in assessments for their honours bachelor degree. To be eligible, candidates must pass each year which counts towards their degree result, on the basis of a single annual attempt (which includes deferrals), and achieve the overall degree mark specified for their programme, which is set at 75 per cent or above. Please note that submission for a gold medal do not always guarantee a physical medal to be attributed at the graduation ceremony.

Various studentships, scholarships, exhibitions, and other prizes are awarded to students on the results of honour and other examinations, provided that sufficient merit is shown. Monetary awards are sent directly to prize winners unless otherwise stated under the regulations for the particular prize.

3. The Educational Objective of Your Degree

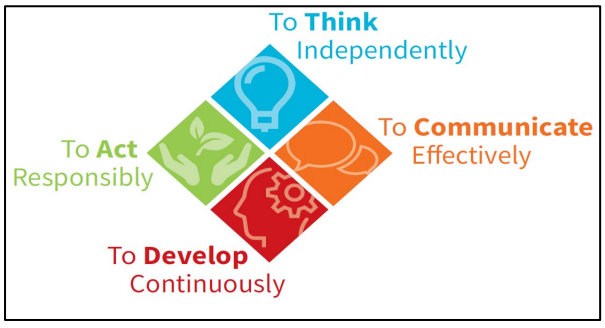
Graduate Attributes

https://student-learning.tcd.ie/assessments/graduate-attributes/

The Trinity Graduate Attributes represent the qualities, skills and behaviours that you will have the opportunity to develop as a Trinity student over your entire university experience, in other words, not only in the classroom, but also through engagement in co- and extra-curricular activities (such as summer work placements, internships, or volunteering).

The four Trinity Graduate Attributes are:

- To Think Independently
- To Act Responsibly
- To Develop Continuously
- To Communicate Effectively



Why are the Graduate Attributes important?

The Trinity Graduate Attributes will enhance your personal, professional and intellectual development. They will also help to prepare you for lifelong learning and for the challenges of living and working in an increasingly complex and changing world. The Graduate Attributes will enhance your employability. Whilst your degree remains fundamental, also being able to demonstrate these Graduate Attributes will help you to differentiate yourself as they encapsulate the kinds of transversal skills and abilities, which employers are looking for.

How will I develop these Graduate Attributes?

Many of the Graduate Attributes are 'slow learned', in other words, you will develop them over the four or five years of your programme of study. They are embedded in the curriculum and in assessments, for example, through undertaking independent research for your final year project, giving presentations and engaging in group work. You will also develop them through the co-curricular and extra-curricular activities. If you help to run a club or society you will be improving your leadership skills, or if you play a sport you are building your communication and team-work skills.

In the fourth year the student, having acquired a solid grasp of the fundamental elements and methodology of the particular discipline and a broad base of knowledge, is in a position to undertake advanced, intellectually demanding work, requiring extensive independent research, the critical evaluation of data, the search for new interpretations, and the rigour, discipline and independence of effort that are designed to develop the mental capacities and creative skills. Students typically do much of their formal work in this fourth year in tutorials, in seminars or in the laboratory, where they are required to present reports on particular problems and have to deal with the criticism of their peers and lecturers. They also have to write extended essays or dissertations, which are elaborate exercises in independent research, analysis, argumentation and presentation. Their examinations require them not merely to reproduce facts but to show understanding and to make sense of what they have learned.

What is the Capstone Research Project?

The Capstone project is a substantial independent research project that you will carry out in the final year of your undergraduate degree programme. It enables you to showcase

the skills and knowledge that you have acquired over your programme of study and also to demonstrate how you have developed the Graduate Attributes.

What are the benefits of doing a Capstone Project?

The Capstone project will provide you with an opportunity to work and to think independently, to motivate yourself and to take responsibility, and to communicate effectively through the tools of your discipline. Students who have completed a substantial piece of independent work as part of their degree tend to be more employable as well as more prepared for further advanced study. It will therefore add to the value of your Trinity degree.

The object of this fourth year is to ensure that students emerge with a high level of expertise in a chosen field and with versatile skills of a high order that equip them to proceed at once to advanced research or to whatever employment they enter, and the capacity to master quickly new areas of expertise, to solve problems, to generate ideas and to communicate well.

How your degree is categorized

The Pass degree B.A. Junior Sophister Year

Ordinary Bachelor's degree = (Level 7, National Framework of Qualifications)

Honours Degree B.A. (Mod.) = Moderatorship = Senior Sophister Year

Honours Bachelor's degree (Level 8, National Framework of Qualifications)

Awarded to students who have completed a course of study which enables them to show:
(a) a comprehension (that builds on and supersedes their general secondary education) of the theory, concepts, methods and processes pertaining to a field or (in the case of joint degrees) fields of learning;
(b) a detailed knowledge, supported by the use of advanced textbooks, of one or more specialised areas, some of it at the current boundaries of the subjects;
(c) that they can apply this knowledge and comprehension in a manner that indicates a thorough and informed approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments, and formulating and solving problems within their field or fields of study;

(d) that they have a mastery of a number of specialised skills and tools which they can use selectively to address complex problems, including design problems, or to conduct closely guided research;
(e) that they have the ability to devise data gathering experiments, and to gather and interpret relevant data to inform independent judgements which include reflection on relevant social, scientific or ethical issues;
(f) that they can act effectively, under the guidance of qualified practitioners, in a peer relationship within multiple, complex and heterogeneous groups;
(g) that they can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences
(h) that they have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.

Adapted from Calendar 2024-25, General Regulations and Information, pg 27-29

4.College Calendar and Regulations

It is the student's responsibility to familiarize themselves with College regulations, particularly on attendance, illness and examinations, as stipulated in the College Calendar. Please note, as of 2018, Senior Sophister students can sit supplemental exams during the reassessment period. The following are some important excerpts pertaining to Senior Sophister, taken from the 2023-24 General regulations and information.

Degree of ordinary B.A.

88 In the majority of undergraduate degree courses, students who have passed the Junior Sophister year may have the degree of ordinary B.A. conferred if they do not proceed to the Senior Sophister year or if they do not pass the Senior Sophister year/final degree assessments. Except by special permission of the University Council, on the recommendation of the court of examiners and, in some cases, of school executive committees, the ordinary degree of B.A. may normally be conferred only on candidates who have spent at least three years in the University. In the case of advanced entry into the Senior Freshman or Junior Sophister year of a student's degree course, the degree of ordinary B.A. may be conferred only on candidates who have spent at least two years in the University subject always to the successful completion of the Junior Sophister year. (pg 45).

Academic progress/Progression regulations: Bachelor programmes

In order to rise with their class, students must obtain credit for the academic year by satisfactory attendance at lectures and tutorials and by carrying out, submitting and sitting the required assessment components. In addition, students must pass the year by achieving, at a minimum, an overall credit-weighted average pass mark for the year **(40 per cent or 50 per cent, as per programme regulations)** and either:

(a) accumulate 60 credits by achieving at least the pass mark in all modules

or

(b) pass by compensation. All modules and components within modules are compensable (except in particular professional programmes where compensation does not apply).

To pass a year by compensation, in programmes that locate the pass mark at 40 per cent, a student must achieve the pass mark in modules carrying a minimum of 50 credits and obtain a module mark of at least 35 per cent in any remaining module(s). A student may accumulate a maximum of 10 credits at qualified pass where the mark lies between 35-39 per cent.

To pass a year by compensation, in programmes that locate the pass mark at 50 per cent, a student must achieve the pass mark in modules carrying a minimum of 50 credits and obtain a module mark of at least 45 per cent in any remaining module(s). A student may accumulate a maximum of 10 credits at qualified pass where the mark lies between 45-49 per cent.

60 Progression is on an annual basis. Within a year students may carry failed modules from one semester to the next but not from one academic year to another; that is, they will not be able to rise to the next year of their programme until they have successfully completed the preceding year(s). Students who have not passed their year are required to present for reassessment when:

(a) they obtain in excess of 10 credits at qualified pass (i.e. marks between 35-39 per cent where the pass mark is 40 per cent; or 45-49 per cent where the pass mark is 50 per cent);

(b) they fail any module (i.e. achieving marks below 35 per cent where the pass mark is 40 per cent; or below 45 per cent where the pass mark is 50 per cent);

(c) they do not obtain an overall pass mark for the year; (d) any combination of (a) - (c) occurs.

61 If a student has achieved both fail and qualified pass grades at the first sitting or has

exceeded the 10 credit limit allowed for compensation and is not permitted to rise with their year, they must present for reassessment in all modules for which they obtained a fail and/or a qualified pass.

62 Different modalities of assessment to the first sitting are permitted in the reassessment session, as determined by the programme.

63 The same progression and compensation regulations as outlined above apply at the reassessment session. The overall credit-weighted average for the academic year will be calculated using the most recent marks achieved.

64 Students who fail to satisfy the requirements of their year at the reassessment session are required to repeat the year in full (i.e. all modules and all assessment components).

65 Students are permitted to repeat any year of an undergraduate programme subject to not repeating the same year more than once and not repeating more than two academic years within a degree course, except by special permission of the University Council.

66 The maximum number of years to complete an undergraduate degree is six years for a standard four-year programme and seven years for a five-year programme. (pg 38)

5.Appendices

A. Attendance

21 Students who find themselves incapacitated by illness from attending lectures (or other forms of teaching) should immediately see their medical adviser and request a medical certificate for an appropriate period. Such medical certificates should be copied to the department office, as appropriate, by the student's tutor.

Non-satisfactory attendance and course work

24 All students must fulfil the requirements of the faculty, school or department, as appropriate, with regard to attendance and course work. Where specific requirements are not stated, students may be deemed non-satisfactory if they miss more than a third of their course of study or fail to submit a third of the required course work in any term.

25 At the end of the teaching term, students who have not satisfied the school or department requirements, may be reported as non-satisfactory for that term. Students reported as non-satisfactory for the Michaelmas and Hilary terms of a given year may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat their year.

Reference/Source:
Calendar Part II, B: General Regulations and Information, 'Attendance'

B. Academic Integrity (Plagiarism)

The College Calendar has been updated for 2024-25 it sets out the steps for the summary procedure and describes the levels of plagiarism and the sanctions. The central repository for all information on plagiarism also contains the 2024-25 Calendar entry, the matrix outlining the different levels of plagiarism and the sanctions, as well as the online tutorial 'Ready, Steady, Write'. It is located at https://libguides.tcd.ie/academic-integrity/. Students are required to complete the online tutorial on plagiarism 'Ready, Steady, Write' and to sign a declaration that they have done so when submitting course work for assessment.

The 2024-25 Calendar entry on plagiarism;[11]

Academic Integrity (Plagiarism and AI in Teaching, Learning, Assessment & Research)

96 General

It is clearly understood that all members of the academic community use and build on the work and ideas of others. However, it is essential that we do so with integrity, in an open and explicit manner, and with due acknowledgement.

Any action or attempted action that undermines academic integrity and may result in an unfair academic advantage or disadvantage for any member of the academic community or wider society may be considered as academic misconduct. Examples of academic misconduct include, but are not limited to:

(i) plagiarism - presenting work/ideas taken from other sources without proper acknowledgement. Submitting work as one's own for assessment or examination, which

has been done in whole or in part by someone else, or submitting work which has been created using artificial intelligence tools, where this has not been expressly permitted;

(ii) self-plagiarism - recycling or borrowing content from the author's own previous work without citation and submitting it either for an assignment or an examination; (iii) collusion - undisclosed collaboration of two or more people on an assignment or task, or examination, which is supposed to be completed individually;

(iv) falsification/fabrication;

(v) exam cheating - action or behaviour that violates examination rules in an attempt to give one learner an unfair advantage over another;

(vi) fraud/impersonation - actions that are intended to deceive for unfair advantage by violating academic regulations. Using intentional deception to gain academic credit;

(vii) contract cheating - form of academic misconduct in which a person uses an undeclared and/or unauthorised third party to assist them to produce work for academic credit or progression, whether or not payment or other favour is involved. Contract cheating is any behaviour whereby a learner arranges to have another person or entity ('the provider')

complete (in whole or in part) any assessment (e.g. exam, test, quiz, assignment, paper, project, problems) for the learner. If the provider is also a student, both students are in violation. Further examples of the above available at https://www.tcd.ie/teaching-learning/academic-integrity/.

97 Academic misconduct in the context of group work

Students should normally submit assessments and/or examinations done in co-operation with other students only when the co-operation is done with the full knowledge and permission of the lecturer concerned. Without this permission, submitting assessments and/or examinations which are the product of collaboration with other students may be considered to be academic misconduct.

When work is submitted as the result of a group project, it is the responsibility of all students in the group to ensure, so far as is possible, that no work submitted by the group is plagiarised, or that any other academic misconduct has taken place. In order to avoid academic misconduct in the context of collaboration and group work, it is particularly important to ensure that each student appropriately attributes work that is not their own. Should a module co-ordinator suspect academic misconduct in a group assignment, the procedure in cases of suspected academic misconduct must be followed for each student.

98 Avoiding academic misconduct

Students should ensure the integrity of their work by seeking advice from their module co-ordinator, tutor or supervisor on avoiding academic misconduct. All schools and departments must include, in their handbooks or other literature given to students, guidelines on the appropriate methodology for the kind of work that students will be expected to undertake. In addition, a general set of guidelines for students on avoiding academic misconduct is available at https://libguides.tcd.ie/academic-integrity.

99 Procedure in cases of suspected academic misconduct

If academic misconduct as referred to in §96 above is suspected, in the first instance, the module co-ordinator may choose to arrange an informal meeting with the student to discuss the instance of concern. Following this informal meeting, or if a meeting is not necessary, the module co-ordinator must complete the academic integrity form (accessed via www.tcd.ie/teaching-learning/academic-integrity), which will provide an indicative score and level, as below.

(i) Level 1: (0 - 200) poor academic practice/conduct

(ii) Level 2: (201 - 350) academic misconduct (minor)

(iii) Level 3: (351 - 500) academic misconduct (major)

(iv) Level 4: (501+) academic misconduct (severe)

Levels 1 - 3 are normally managed by the School, and all level 4 cases will be referred directly to the Junior Dean.

Level 1 (0 - 200): Scores in the range 0 - 200 are considered to reflect poor academic practice and level 1 consequences should apply. The module co-ordinator must inform their School's Director of Teaching and Learning (Undergraduate), or their designate, who will either approve the outcome, or if they form the view that the misconduct is more serious, agree an alternative level with the module co-ordinator.
Levels 2 - 3 (201 - 500): The module co-ordinator must inform their School's Director of Teaching and Learning (Undergraduate), or their designate, of the suspected infringement and proposed consequence. If the Director or designate approves the recommended consequences, the module co-ordinator will write to the student advising them of the suspected infringement of academic integrity, offering them the option of an appropriate consequence should they admit that misconduct has taken place.
If the Director or designate forms the view that the alleged misconduct requires further investigation, or if the student disputes the academic misconduct or the consequence, it will proceed to the academic integrity meeting.

100 Academic integrity meeting

The Director of Teaching and Learning (Undergraduate), or their designate, writes to the student and the student's tutor indicating the nature of the suspected academic misconduct and the evidence for it, and inviting the student to:
(i) respond to the suspicions by completing and submitting the academic integrity response form (accessed via www.tcd.ie/teaching-learning/academic-integrity) within an appropriate timeline determined by the School;
(ii) indicate whether or not they (and a representative) plan to attend an academic integrity meeting on a specified date.
If the student and or/representative is unable to attend, or chooses not to attend, the meeting will take place as planned. The academic integrity response form will be the student's submission to the meeting.
The academic integrity meeting is attended by a Director of Teaching and Learning (Undergraduate) or their designate (Chair); two academic colleagues from the School (at least one from the discipline to which the module belongs); the student and their tutor (or a representative of the Students' Union), if they wish; the co-ordinator of the module, if they wish, but only to present additional evidence.
The academic integrity meeting considers the assessment or examination(s) in question; the academic integrity form (and any verbal submissions by the module co-

ordinator, if present); the student's academic integrity response form (and any verbal submissions by the student and/or tutor, if present).

The academic integrity meeting assesses the abovementioned evidence in order to determine at what level (if at all) academic misconduct has occurred and selects a consequence appropriate to that level, giving due consideration to any mitigating circumstances. Minutes of the meeting must be recorded. The Chair completes the academic integrity meeting decision form (accessed via www.tcd.ie/teaching-learning/academic-integrity), which is submitted for approval to the Senior Lecturer/Dean of Undergraduate Studies. The Senior Lecturer may approve, reject, or vary the recommended consequence, or seek further information before making a decision. If the Senior Lecturer considers that the consequences provided for under the above procedure are inappropriate given the circumstances of the case, he/she may also refer the matter directly to the Junior Dean who will interview the student and may implement the procedures as referred to under CONDUCT AND COLLEGE REGULATIONS §2. If the Senior Lecturer/Dean of Undergraduate Studies approves the recommended consequence, the Chair communicates the decision to the student and their tutor.

101 Consequences in cases of suspected academic misconduct

If the instance of concern can be dealt with under the above procedure, one of the following consequences will be recommended:

(i) Level 1: (0 - 200): poor academic practice/conduct

- Mandatory academic integrity training is required
- Informal warning – a record is kept for the duration of the learner's enrolment on the programme of study to inform any future instances of concern
- The work must be corrected. The student is required to amend all elements identified as poor academic practice. Other content may or may not be altered as appropriate to the assessment and as determined by the School. The corrected work will be assessed. In the case of examinations, the work must be reassessed. The mark for the component/ assessment/examination may or may not be reduced;

(ii) Level 2: (201 - 350): academic misconduct (minor infringement)

- Mandatory academic integrity training is required
- Formal warning – a written warning is issued by the Director of Teaching and Learning (Undergraduate) or designate, and the instance of academic misconduct is recorded for the duration of the learner's enrolment on the programme of study

- The work must be resubmitted. The student is required to amend all elements identified as breaching academic integrity. Other content may or may not be altered as appropriate to the assessment and as determined by the School. The resubmitted work will be assessed.

In the case of examinations, the work must be reassessed. The component/assessment/examination mark will be reduced or capped at the pass mark and might not be confirmed until the reassessment Court of Examiners;

(iii) Level 3: (351 - 500): academic misconduct (major infringement)

- Mandatory academic integrity training is required
- Formal warning – a written warning is issued by the Director of Teaching and Learning (Undergraduate) or designate, and the instance of academic misconduct is recorded for the duration of the learner's enrolment on the programme of study
- The work must be resubmitted at the reassessment session. The student is required to amend all elements identified as breaching academic integrity. Other content may or may not be altered as appropriate to the assessment and as determined by the School. In the case of examinations, the work must be reassessed. The mark for the module will be capped at the pass mark and will not be confirmed until the reassessment Court of Examiners;

(iv) Level 4: (501 - 615): severe academic misconduct

- The case will be referred directly to the Junior Dean.

102 If the facts of the case are in dispute, or if the Director of Teaching and Learning (Undergraduate), or designate, feels that the consequences provided for under the academic misconduct procedure are inappropriate given the circumstances of the case, they may refer the case directly to the Junior Dean, who will interview the student and may implement the procedures as referred to under under CONDUCT AND COLLEGE REGULATIONS §2. Nothing provided for under the summary procedure diminishes or prejudices the disciplinary powers of the Junior Dean under the 2010 Consolidated Statutes.

[1] UG: Calendar Part II, General Regulations, Academic Progress, Paragraphs 96 and following.

College Statement on Artificial Intelligence and Generative (GenAI)

AI in Teaching, Learning, Assessment & Research has been published online here.

Aligned with the College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research (2024), the use of GenAI is permitted unless otherwise stated. Where the output of GenAI is used to inform a student's document or work output, this usage should be acknowledged and appropriately cited, as per Library guidelines on acknowledging and reference GenAI. From an academic integrity perspective, if a student generates content from a GenAI tool and submits it as his/her/their own work, it is considered plagiarism, which is defined as academic misconduct in accordance with College Academic Integrity Policy.

Where module coordinators have placed restrictions on the use of generative Ai it will be explicitly stated within the module description in the Blackboard VLE and/or in Programme Handbooks.

C. Turnitin – Blackboard

Turnitin is an online software program that aids plagiarism prevention. It allows students and lecturers to check students' work for academic integrity by searching for text that is improperly cited or potentially plagiarised. Once uploaded to Turnitin, assignments are compared to millions of books, journal articles, web pages and student papers, identifying any unoriginal material within the essay. The software then creates an Originality Report which highlights and quantifies unoriginal content.

For more information, see https://libguides.tcd.ie/academic-integrity and to access the student training tutorial, see Blackboard tutorials.

Guidelines for interpreting the Originality Report will be posted on Blackboard in the MIU44001 Research in Microbiology section.

D. Guidelines on Awarding Grades

For Essays & Examination Answers in the Sophister Years

<u>Note</u> that these guidelines are for use as a general reference. Differences may occur between disciplines.

	Mark Range	Criteria
I	**90-100**	IDEAL ANSWER; **showing insight and originality and wide knowledge. Logical, accurate and concise presentation. Evidence of reading and thought beyond course content. Contains particularly apt examples. Links materials from lectures, practicals and seminars where appropriate.**
	80-89	OUTSTANDING ANSWER; **falls short of the 'ideal' answer either on aspects of presentation or on evidence of reading and thought beyond the course. Examples, layout and details are all sound.**
	70-79	MAINLY OUTSTANDING ANSWER; **falls short on presentation and reading or thought beyond the course, but retains insight and originality typical of first class work.**
II-1	**65-69**	VERY COMPREHENSIVE ANSWER; **good understanding of concepts supported by broad knowledge of subject. Notable for synthesis of information rather than originality. Sometimes with evidence of outside reading. Mostly accurate and logical with appropriate examples. Occasionally a lapse in detail.**
	60-64	LESS COMPREHENSIVE ANSWER; **mostly confined to good recall of coursework. Some synthesis of information or ideas. Accurate and logical within a limited scope. Some lapses in detail tolerated.**
II-2	**55-59**	SOUND BUT INCOMPLETE ANSWER; **based on coursework alone but suffers from a significant omission, error or misunderstanding. Usually lacks synthesis of information or ideas. Mainly logical and accurate within its limited scope and with lapses in detail.**
	50-54	INCOMPLETE ANSWER; **suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail.**

III	**45-49**	WEAK ANSWER; **limited understanding and knowledge of subject. Serious omissions, errors and misunderstandings, so that answer is no more than adequate.**
	40-44	VERY WEAK ANSWER; **a poor answer, lacking substance but giving some relevant information. Information given may not be in context or well explained, but will contain passages and words, which indicate a marginally adequate understanding.**
F-1	**35-39**	MARGINAL FAIL; **inadequate answer, with no substance or understanding, but with a vague knowledge relevant to the question.**
	30-34	CLEAR FAILURE; **some attempt made to write something relevant to the question. Errors serious but not absurd. Could also be a sound answer to the misinterpretation of a question.**
F-2	**0-29**	UTTER FAILURE; **with little hint of knowledge. Errors serious and absurd. Could also be a trivial response to the misinterpretation of a question.**
U.G.		Ungraded

E. Blackboard

The Microbiology Department is using Blackboard for accessing your student notes. You can locate your notes at the following link: **https://tcd.blackboard.com/**

1. Go to https://tcd.blackboard.com/webapps/login/
2. Click TCD login
3. Enter your student name and password.
4. Click on modules for relevant student notes.

If you are experiencing problems with accessing your lecture notes, please contact Departmental Office.

F. Student Disability Services

If you have dyslexia, pain, phobias, physical ailments or problems which make it difficult to study or sit exams, talk to the disability service early. They can assess the problem and arrange ways to help you.

Disability Officer, School Contact
Web: www.tcd.ie/disability

Name: *Kieran Lewis*
Occupational Therapy Manager
Email: askds@tcd.ie

For further information please follow the link below to access the Student Handbook: https://sway.office.com/USsnZGFNCAOuYFkf?ref=Link

G. Health and Safety

Students should stay up-to-date with the guidelines issued by College, Trinity College Dublin.

H. Microbiology Moderatorship Learning Outcomes

Upon successful completion of this programme, students will be able to:

- Demonstrate in written and oral form a foundation level of knowledge and understanding of the biological, physical and quantitative sciences underpinning microbiology.
- Demonstrate in written and oral form an advanced level of knowledge and understanding of the principles of microbiology, including:
  - the nature and diversity of microorganisms and the methods of studying them
  - the genetic, biochemical and physiological processes occurring in some of the best-characterised microorganisms
  - the interactions between some of the best-characterised pathogenic microorganisms and their hosts
  - the roles, uses and manipulation of microorganisms in health and disease, agriculture, biotechnology and the environment
  - the roles of microorganisms as model systems in related fields
  - the scientific method of investigation and testing of hypotheses and the distinction between scientific and unscientific arguments.
- Demonstrate in written and oral form a detailed, critical knowledge and understanding, supported by the use of advanced textbooks, journal articles and data sets, of one or more specialist areas, some of it at the current boundaries of the field.
- Apply the knowledge and understanding gained to the critical analysis of experimental data, to sustaining evidence-based arguments on microbiological hypotheses, to solving microbiological problems and to designing microbiological experiments.
- Pursue with a degree of independence an original microbiological research project including project planning; identification, appraisal and safe application of the appropriate experimental techniques; accurate recording and presentation of

data; identification of the limitations of and sources of error in experiments; analysis and interpretation of complex data; formulation of logical conclusions; and appraisal of the project outcome in the context of related, published work.

- Demonstrate proficiency in the application of computers to such problems as the searching of literature databases, analysis of biological sequence data, visualisation of biological macromolecules and analysis of experimentally acquired data.
- Demonstrate recognition of the value of scientific inquiry and an understanding of the ethical responsibilities of scientists.
- Demonstrate the capacity to apply international standards and practices within the discipline.
- Act effectively, under the guidance of senior scientists as necessary, as an individual, as part of a team, and/or in a multidisciplinary environment.
- Communicate information and ideas at a high level to both specialist and non-specialist audiences.
- Show that they have acquired the learning skills necessary to update their knowledge and to undertake further study with a high degree of autonomy.

I. General College Information

Administration, health and wellbeing

Please remember that there are supports in place for you at Trinity if you need help. In the case of administrative questions, please contact the Course Advisor, Dr. Kim Roberts (kroberts@tcd.ie) or Jayne Vance, Executive Officer (magoverj@tcd.ie). Module-related information will be available on your module outlines and on Blackboard.

If you are ill and unable to attend any face-to-face teaching activities, **please submit a medical certificate to the departmental office within 10 days of your illness.** Medical certification or other evidence of extenuating circumstances must support absence from class. Attendance and participation are assessed

Student Services

You will find information on the full range of support services available to you, including the Health Centre, Student Counselling Services, Student Learning Development and Student Disability Service at the following link: http://www.tcd.ie/students/supportsservices/ and Student Services Handbook.

If your cohort shares any concerns (around deadlines for instance), please communicate these to us via your class rep.

Tutors

All undergraduate students are assigned a tutor when they are admitted to College. Your tutor, who is a member of the teaching staff, will give confidential advice on courses, discipline, examinations, fees and other matters and will represent you before the College authorities should the need arise. For more information please see https://www.tcd.ie/Senior_Tutor/faq/

Support Provision for Students with Disabilities

Trinity has adopted a Reasonable Accommodation Policy that outlines how supports are implemented in Trinity. Student seeking reasonable accommodation whilst studying in Trinity **must register online with the Disability Service in their student portal my.tcd.ie.**

Based on appropriate evidence of a disability and information obtained from the student on the impact of their disability and their academic course requirements, the Disability Staff member will identify supports designed to meet the student's disability support needs. Following the Needs Assessment, the student's Disability Officer prepares an Individual Learning Educational Needs Summary (LENS) detailing the Reasonable Accommodations to be implemented. The information outlined in the LENS is communicated to the relevant School via the student record in SITS.

Student responsibilities for departmental assessments/course tests:

• Students are required to initiate contact with the School/Department and request reasonable accommodations as per their LENS report, or email received following their needs assessment for particular assessments for School/Department administered assessment. Students are advised to make contact at least two weeks prior to the assessment date to

enable adjustments to be implemented. Please note - no reasonable accommodation can be provided outside the procedures outlined in the Trinity Reasonable Accommodation Policy.

Societies and Activities

College offers over 100 societies across the University. From arts, culture, politics and debating to gaming, advocacy and music, you're sure to find your niche. You can find a list of all student societies here: http://trinitysocieties.ie. College has 50 sports clubs in a range of disciplines, from Basketball to Archery. Further details available at https://www.tcd.ie/Sport/student-sport/.

Student Union

TCDSU

The Trinity College Students Union is a union for students, by students. They represent the undergraduate student body at College level. You can find further information about the union, and how to get involved, here: https://www.tcdsu.org/ and can find information on the student representation structures here: https://www.tcdsu.org/aboutus

Emergency Procedure

In the event of an emergency, dial Security Services on extension 1999 or 01 8961999 from a mobile phone. Security Services provide a 24-hour service to the college community, 365 days a year. They are the liaison to the Fire, Garda and Ambulance services. Should you require any emergency or rescue services on campus, you must contact Security Services. This includes chemical spills, personal injury or first aid assistance. It is recommended that all students save at least one emergency contact in their phone under ICE (in case of emergency). It is also recommended that students download the SafeZone app to access alerts for closures in inclement weather, etc.

Data Protection

Please note that due to data protection requirements Staff in the Department of Microbiology cannot discuss individual students with parents/guardians or other family members.

We are careful to comply with our obligations under data protection laws, you can find further information on how we obtain, use and disclose student data here: https://www.tcd.ie/info_compliance/data-protection/student-data/

Explanation of ECTS Weighting

The European Credit Transfer and Accumulation System (ECTS) is an academic credit system based on the estimated student workload required to achieve the objectives of a module or programme of study. It is designed to enable academic recognition for periods of study, to facilitate student mobility and credit accumulation and transfer. The ECTS is the recommended credit system for higher education in Ireland and across the European Higher Education Area.

The ECTS weighting for a module is a measure of the student input or workload required for that module, based on factors such as the number of contact hours, the number and length of written or verbally presented assessment exercises, class preparation and private study time, laboratory classes, examinations, clinical attendance, professional training placements, and so on as appropriate. There is no intrinsic relationship between the credit volume of a module and its level of difficulty.

The European norm for full-time study over one academic year is 60 credits. Within Undergraduate courses 1 credit represents 20-25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations. Within Postgraduate courses, 1 credit represents 25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations.

ECTS credits are awarded to a student only upon successful completion of the programme year. Progression from one year to the next is determined by the programme regulations. Students who fail a year of their programme will not obtain credit for that year even if they have passed certain component. Exceptions to this rule are one-year and part-year visiting students, who are awarded credit for individual modules successfully completed.

Supports and Services

The Programme Administrator is your first port of call for all general queries. College also provides a range of administrative, academic and wellbeing supports and services to help smooth your route through college, these include the College Tutorial Service, Student-2-Student, College Health, the Disability Service and a range of other activities. You can find further information at the links below:

- Supports and Services in College: https://www.tcd.ie/students/supports-services/ and Student Services Handbook.pdf (tcd.ie)
- Student Counselling http://www.tcd.ie/Student_Counselling/
- Health Centre http://www.tcd.ie/collegehealth/
- Sport http://www.tcd.ie/Sport/ Clubs http://www.tcd.ie/Sport/student-sport/ Societies http://trinitysocieties.ie/
- Student2Student http://student2student.tcd.ie/
- Student Learning Development http://student-learning.tcd.ie/
- Careers Advisory Service - http://www.tcd.ie/Careers/
- Graduate Studies Office - http://www.tcd.ie/graduatestudies/
- Mature Student Office - https://www.tcd.ie/maturestudents/
- Student Services Website and Information booklet – https://www.tcd.ie/students/assets/pdf/Student%20Services%20Booklet%20(web%20version).pdf
- Senior Tutor and Tutorial Service - https://www.tcd.ie/seniortutor/
  Remember, you can ask your Tutor for advice and guidance about anything and they will point you in the right direction
  http://www.tcd.ie/seniortutor/students/undergraduate/financial-assistance/
- Trinity Disability Service - http://www.tcd.ie/disability/
- The Library http://www.tcd.ie/library/
- Academic Registry http://www.tcd.ie/academicregistry/

Online resources

Virtual learning environment (VLE)

Online resources for all modules that students are enrolled in, including full module descriptors and compulsory reading lists, are stored in Blackboard available at https://tcd.blackboard.com/.

Student Information System (SITS) – Access via *my.tcd.ie*

Timetables are available online via your online portal https://my.tcd.ie. All communications from College will be sent to you via this portal which will give you access to an 'in-tray' of your messages. Details about modules may also be read on SITS. All fee invoices/payments, student levies and commencement fees will be issued online and all payments will be carried out online. You may view your personal details in the system, some sections of which you will be able to edit yourself. You will be able to check your examination results online via SITS.

For help with the system contact the Academic Registry
https://www.tcd.ie/academicregistry/contact/

- Monday, Wednesday, Friday 9.30 – 5.00
- Tuesday and Thursday 9.30 – 6.00
- Email: academic.registry@tcd.ie
- Tel: **+353 (0) 1 896 4500**

Email

You are required to check your Trinity email address regularly as this is the primary mode of communication between staff and students outside of scheduled meetings.
Staff members deal with very high volumes of email correspondence so please include your name in the subject line and a phrase that makes the purpose of the email clear. If the matter is urgent, make sure to explain the reason for the urgency.

It is reasonable to expect a response from teaching staff between three and five working days after an email has been sent. If you have not received a reply by then a follow-up email or telephone call to the departmental office may be useful. Please note that emails that require careful consideration may take longer to process.

Library Holdings and Resources

Books and Articles

It is essential to equip yourself with books and you must acquire copies of set texts: you will not be able to depend on the library for such texts. Reading lists for each module are available from the beginning of term and you should start reading the texts that figure in the early weeks as soon as possible. Individual lecturers will give more information about the texts they assign. Occasionally, lecturers will post copies of key articles on Blackboard.

Photographs and Material

We are seeking permission to use photos/material from various Departmental events for the purpose of our website, social media, media screen in School. Would you be willing to grant us permission to use this material, please email magoverj@tcd.ie indicating your consent.

PLEASE KEEP THE DEPARTMENT INFORMED OF THE GROUP GRADUATION DAY for coffee get together in the department. Please have your gowns picked up before the coffee get together.

Performance Discussion

The final assessment results are scheduled to be published on Thursday 21st May 2026 (TBC).

College has regulations that relate to discussing your performance with lecturers:

Once results are published, you can request to discuss your examination or other assessment performance in a module with your lecturer to understand why a specific mark was awarded. If you wish to do this, you should email Jayne Vance, Executive Officer (magoverj@tcd.ie) providing your:

1.Name,

2.Student ID,

3.Degree programme and year

4.Module code

for which you wish to discuss your results. Your request will then be sent on to the relevant lecturer so that a meeting can be arranged.

During a meeting with a lecturer to discuss your performance, you are entitled to view your examination script and other assessment material that you have submitted. Please

note the purpose of these discussions are to establish why a particular mark was awarded. It is not an opportunity to negotiate the mark.

Requests for rechecks and/or remark of examination scripts or other assessed work will only be considered after the student has reviewed their performance in the module. All recheck requests must be requested by the tutor and are only available under the below conditions

(a) that the grade is incorrect because of an error in calculation of results;

(b) that the examination paper or other assessment specific to the student's course contained questions on subjects which were not part of the course prescribed for the examination or other assessment; or

(c) that bias was shown by an examiner in marking If you have any queries, please do not hesitate to contact me.

If you have any queries please contact the teaching unit (teaching-unit@rt.scss.tcd.ie)

Career Opportunities

Graduates in Microbiology find employment in pharmaceutical and medical research laboratories, as quality control officers in the preparation of drugs, in food processing and packaging, science publications, science journalism, and in public utilities. Such employment may involve working with the newer biotechnologies and using microorganisms for the commercial production of drugs, enzymes, antibiotics, vaccines and agricultural products. Many graduates go on to study for a higher research degree.

If you require written references: you should obtain these from your Research Project supervisor in the first instance. If you worked in a laboratory during the summer, the head of that lab would be a good second referee.

MyCareer from Careers Advisory Service

An online service that you can use to:

- Apply for opportunities which match your preferences - vacancies including research options
- Search opportunities- postgraduate courses and funding
- View and book onto employer and CAS events
- Submit your career queries to the CAS team
- Book an appointment with your Careers Consultant

Simply login to MyCareer using your Trinity username and password and personalise your profile.

Careers Advisory Service

Connect with us

Opening Hours
During term: 9.30am - 5.00pm, Monday - Friday
Out of Term: 9.30am - 12.30pm & 2.15 - 5.00pm, Monday – Friday

Trinity College Dublin, 7-9 South Leinster Street, Dublin 2
01 896 1705/1721 | Submit a career query through MyCareer

Instagram: www.instagram.com /trinity.careers.service

Twitter: @tcdcareers

Podcast: Graduate Stories Podcast