



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

Department of Microbiology

# Senior Sophister Handbook 2023–2024



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# ***Welcome***

Welcome to Microbiology at Trinity College Dublin, the University of Dublin. This 2023-2024 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!

## ***Regulation notification***

This handbook applies to students taking the Moderatorship in Microbiology. It provides a guide to what is expected of you on this course and the academic and personal support available to you. 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 Calendar (<http://www.tcd.ie/calendar/>) and this handbook, the provisions of the General Regulations will prevail.



# ***General Course information***

**Senior Sophister Course Advisor: Prof Sinéad Corr**

**corrsc@tcd.ie**

## **Introduction**

Microbiology is a branch of the life sciences which deals with the biology of prokaryotic and eukaryotic microorganisms - bacteria, fungi (moulds and yeasts), protozoa and viruses. In terms of basic molecular and cell biology, microbiology has many elements in common with biochemistry and genetics. Aspects of these subjects form important parts of undergraduate and postgraduate teaching in Microbiology.

The Department of Microbiology has an establishment of seven full-time academic staff and has teaching and research links with the Department of Clinical Microbiology, School of Medicine at St. James's Hospital [http://www.medicine.tcd.ie/clinical\\_microbiology/](http://www.medicine.tcd.ie/clinical_microbiology/). The Department occupies the Moyne Institute of Preventive Medicine, a building presented to the College in 1953 by Grania Guinness (now the dowager Marchioness of Normanby) in memory of her father, the first Baron Moyne.

## **What will you study in the Microbiology Department:**

Topics include:

- Microbial Evolution & Community Ecology
- Microbial and Molecular Genetics
- Microbial Physiology
- Biomembranes and Cell Surfaces
- Virology
- Molecular Biotechnology
- Microbial Genome Structure & Gene Regulation
- Bacterial Pathogenicity
- Applied & Environmental Microbiology
- Molecular Protozoology
- Molecular Biology of Yeast
- Medical & Clinical Microbiology
- Antimicrobial Agents & Antibiotics
- The Human Microbiome
- Immunology of Infection

In the Senior Sophister (4th) year, all students take two core courses that cover molecular and cell biology, and microbial pathogenicity, and a third course on problem solving and data analysis in Microbiology. In addition, students select three optional courses which offer focussed study of selected cutting edge research topics. These advanced topics courses cover such diverse areas as:

- Genome structure, gene regulation and expression in bacteria and eukaryotic microbes
- Molecular and cellular biology of microbial pathogens
- Molecular pathogenesis (disease mechanisms) and control of viral, bacterial and protozoal infections
- Host-pathogen interactions
- Using yeasts as models for understanding human diseases
- Regulation, issues and standards in current microbiological practice.
- Microbial Evolution and Community Ecology

## ***Teaching and Learning***

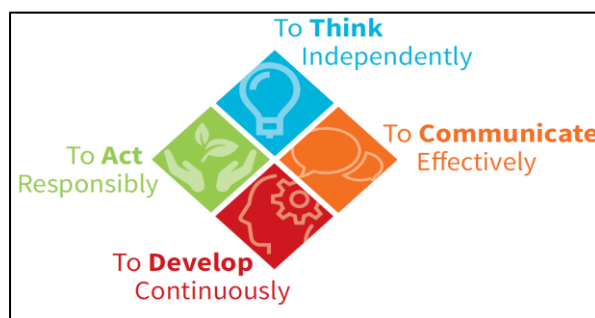
### **The Educational Objective of Your Degree**

#### **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 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?**

The Capstone 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 2022-23, General Regulations and Information, pg 27-29*

## ***The Senior Sophister Year in Microbiology***

### **Module Descriptors**

#### **The Core Curriculum (MIU44002, MIU44003)**

Students in their fourth year have an opportunity to explore, in 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**. Each 10 ECTS module requires lecture attendance by students, self-directed study guided by recommended reading material and further reading beyond the course.

#### **Advanced Topic Courses (MIU44004)**

Students are provided an opportunity to choose **three** areas of Microbiology for advanced study. Each component consists of 10 one-hour sessions, 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 topics is capped at approximately 14-16 students. Students will return a sheet ranking each option in order of preference. Advanced topic options will then be assigned using a lottery system.

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

**Students are expected to devote at least 20 hours of self-directed study per ECTS credit (at least 200 hours per module)** over the course of the academic year, which is guided through material provided by each lecturer over the course of the entire 2-year moderatorship. Students will also receive tutorials in data handling, data interpretation and problem solving to complement the lectures in the core themes.

### **Research in Microbiology (MIU44001)**

This comprises a Research project and Research Essay to be completed by the student, and attendance at research seminars given by invited international and national research leaders.

#### **Research Project**

Each student undertakes a chosen research project under the supervision of an academic member of staff over a nine-week period. The research project accounts for **13 ECTS** credits of the Senior Sophister year. Students will receive a list of dry and wet-lab research projects later in the Michaelmas semester. Students will return a sheet, ranking each option in order of preference. Projects will then be assigned according to the JS class ranking. Students produce a thesis of their research project when completed. Students will also present the main findings from their thesis to their class and academic staff. This may take the form of a 5min “flash” powerpoint presentation plus Q&A session or a poster symposium (specific details to follow). In addition, students will undergo a short *viva* examination with the project supervisor and a second academic assessor.

#### **Review Essay**

Each student undertakes an independent, in-depth review of current research on a specific area of Microbiology. Students are provided with a choice of essay titles. More detailed instruction will follow regarding the essay, including the submission date. The review essay accounts for **7 ECTS** of the Senior Sophister year.

### **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 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**

All examinations are held during the **Semester 2 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. A fourth paper is problem-based.

On completion of the semester two examinations, some students are called to sit an in-person **viva voce examination with the External Examiner**. Students who are considered borderline between grades will be called to attend the viva voce interview. However, not all who are called to a viva voce interview would be at a grade boundary, additional students will be included as controls as the external examiner is tasked to assess the overall quality of our degree- which includes our graduates, the moderatorship curricula and assessment types. You will not be told which category you are in. You cannot be marked down by a viva. You will not know your mark before sitting the viva. All students are requested to be available for interview during the visit of 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. Viva voce with the External Examiner are usually held in the period following completion of examinations but before release of results. You must be available to attend during this period should you be requested.

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

<b>The Moderatorship Examination - <i>Senior Sophister Year</i></b>					
<b>Module</b>	<b>Title</b>	<b>ECTS</b>	<b>Examination components</b>	<b>% module component</b>	<b>% Final degree</b>
MIU44001	Research in Microbiology	20	Project (13 ECTS) Essay (7 ECTS)	65,35	23.33
MIU44002	MicrobialMolecular and Cellular biology	10	Paper 1	100	11.67
MIU44003	Microbial Pathogenicity	10	Paper 2	100	11.67
MIU44004	Advanced Topics in Microbiology	10	Paper 3	100	11.67
MIU44005	Data Handling	10	Paper 4	100	11.67
Total SS	60				70.00
Junior Sophister component					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 final marks and 30% derive from the Junior Sophister year marks.

## ***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 2022-23 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 (pg 44).

Academic progress/Progression regulations: Bachelor programmes

59 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 compensatable (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.

The end of year or degree result moderated by the court of examiners must be returned and recorded on the student record.

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 failed components of 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 39)

# Key Dates 2023-2024

The academic timetable can always be found on the Calendar website -

<https://www.tcd.ie/calendar/academic-year-structure/>

11.09.23	Michaelmas Term (Semester 1) teaching begins <ul style="list-style-type: none"> <li>• <b>Information Session with Dr. Sinead Corr from 10:00am</b></li> </ul>
20.09.23	<b>Careers Support</b> <ul style="list-style-type: none"> <li>• <b>John Wynne, Careers Advisory Service Time: 15:00</b></li> </ul> <p>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 &amp; A Session.</p>
25.09.23	The following should be emailed to Jayne Vance ( <a href="mailto:magoverj@tcd.ie">magoverj@tcd.ie</a> ) <ul style="list-style-type: none"> <li>• Nomination of Class Representative</li> <li>• Advanced Topic Choices; to be organised by Class Rep., compiled in an Excel File and sent to <a href="mailto:magoverj@tcd.ie">magoverj@tcd.ie</a></li> </ul>
<b>LIBRARY HITS</b> (Students are asked to follow their emails on Library announcements)	<b>“Library HITS” – how to get the best from the Library”</b> <a href="https://www.tcd.ie/library/news/library-hits-how-to-get-the-best-from-the-library/">https://www.tcd.ie/library/news/library-hits-how-to-get-the-best-from-the-library/</a>
23.10.22	Reading/Study Week
01.12.23	Michaelmas Term (Semester 1) teaching ends
22.01.24	Hilary Term (Semester 2) teaching begins
04.03.24	Reading/Study Week
15.04.24	<b>Revision Week Semester 2:</b> Monday 15 April to Friday 19 April 2024
22.04.24	Trinity Term begins <b>Trinity week:</b> Monday 22 April to Friday 26 April 2024
23.08.24	Trinity Term ends
<b>Formal Assessment weeks</b> Semester 1 examinations Monday 11 December to Friday 15 December 2023 Semester 2 examinations Thursday 2 <sup>nd</sup> May to Wednesday 8 <sup>th</sup> May 2024 <b>Note that the dates of formal assessment weeks may extend to begin earlier or run later – examination schedules have not yet been finalised.</b>	
<b>Note that College is closed on the following dates 2023-24:</b>	

30.10.23	Public Holiday
22.12.23-01.01.24	Christmas Period
05.02.24	St Brigid's Day
17/18.03.24	St Patrick's Day
29.03.24	Good Friday
01.04.24	Easter Monday
06.05.24	Public Holiday
03.06.24	Public Holiday
	<p><b>Project activity dates</b></p> <ul style="list-style-type: none"> <li>Monday 13<sup>th</sup> November -1<sup>st</sup> December 2023 (3 Weeks)</li> <li>Monday 22<sup>nd</sup> January – 1<sup>st</sup> March 2024 (6 Weeks).</li> </ul>
<b>To Be Confirmed (T.B.C)</b>	<p><b>Problem Solving, data analysis and interpretation in Microbiology</b></p> <ul style="list-style-type: none"> <li>The schedule of the session delivered by the Microbiology Academic Staff will be circulated in Semester 2.</li> </ul> <p><b>Projects 2023-24</b></p> <ul style="list-style-type: none"> <li><b>Project Thesis Information Session</b></li> <li><b>Project presentation</b></li> <li><b>Project Submission Deadline</b></li> <li><b>Project Vivas</b> (Supervisor and Chosen Markers)</li> </ul>

# MIU44002 Lecture Timetables 2023-2024

The following timetables can be subject to minor changes.

Please ensure you check your emails on a daily basis.

SENIOR SOPHISTER			SEMESTER 1, 2023-24			
MIU44002 (MOLECULAR AND CELL BIOLOGY) TIMETABLE						
WEEK	DAY/DATE/TIME	LECTURERS	LECTURES			
3	Monday	11-Sep	11:00	Sinead Corr	Information Session	MLT
			14:00	Alastair Fleming	The Eukaryotic genome	MLT
			16:00	Alastair Fleming	Chromatin modifications and remodeling I	MLT
	Tuesday	12-Sep	11:00	Alastair Fleming	Chromatin modifications and remodeling II	MLT
			16:00	Alastair Fleming	Chromatin modifications and remodeling III	MLT
	Wednesday	13-Sep	14:00	Anna Ershova	Getting Started: Initiation, promoter recognition and patterns	MLT
			16:00	Anna Ershova	The Machine: The Structure and regulation of RNA polymerase II	MLT
Friday	15-Sep	12:00	Kim Roberts	Mechanisms of viral transcription	MLT	
4	Monday	18-Sep	10:00	Kim Roberts	Mechanisms of viral translation	MLT
			12:00	Anna Ershova	Moving Along: Transcription elongation and linked events	MLT
	Tuesday	19-Sep	10:00	Anna Ershova	Getting to the end. 3'end formation and transcription termination	MLT
	Thursday	21-Sep	11:00	Anna Ershova	Controlling the Levels: Make and degrade	MLT
	Friday	22-Sep	12:00	Anna Ershova	The world of Non-coding RNAs: Roles in viral infection	MLT
5	Monday	25-Sep	11:00	Alastair Fleming	Metabolic Engineering in yeast	MLT
			14:00	Alastair Fleming	Bacterial Biotechnology I	MLT
	Tuesday	26-Sep	10:00	Gary Moran	The Genomes of Pathogenic Fungi	MLT
			11:00	Carsten Kröger	Next-Generation Sequencing	MLT
			15:00	Anna Ershova	COVID19 vaccine: transcribing our knowledge of mRNA	MLT
	Wednesday	27-Sep	14:00	Carsten Kröger	Omics in bacteria	MLT
Thursday	28-Sep	11:00	Carsten Kröger	CRISPR-Cas9	MLT	
6	Monday	02-Oct	14:00	Anna Ershova	The dynamic genome I	MLT
	Tuesday	03-Oct	11:00	Anna Ershova	The dynamic genome II	MLT
			16:00	Carsten Kroger	Post-transcriptional regulation in Bacteria	MLT
	Wednesday	04-Oct	10:00	Anna Ershova	Nucleoid structuring proteins I	MLT
14:00			Alastair Fleming	Bacterial Biotechnology II	MLT	
Thursday	05-Oct	11:00	Maire Ni Leathlobhair	Applied Microbial Genomics	MLT	
7	Monday	09-Oct	11:00	Anna Ershova	Nucleoid structuring proteins II	MLT
	Tuesday	10-Oct	15:00	Anna Ershova	Nucleoid structuring proteins III	MLT
	Wednesday	11-Oct	11:00	Anna Ershova	Nucleoid structuring proteins IV	MLT
			14:00	Anna Ershova	The next level of complexity: DNA methylation	MLT
Thursday	12-Oct	11:00	Maire Ni Leathlobhair	Applied Microbial Transcriptomics	MLT	

\* Venue: Moynes Lecture Theatre, Microbiology Department

\*\*Some lecture titles and lecturers may vary

# MIU44003 Lecture Timetables 2023-2024

The following timetables can be subject to minor changes.

Please ensure you check your emails on a daily basis.

SENIOR SOPHISTER				SEMESTER 1, 2023-24		
MIU44003 (MICROBIAL PATHOGENICITY) TIMETABLE						
WEEK	DAY/DATE/TIME	LECTURERS	LECTURES			
3	Monday	11-Sep	15:00	Marta Martins	Tuberculosis (TB)	*MLT
	Tuesday	12-Sep	15:00	Carsten Kröger	Gram-negative pathogens: Acinetobacter baumannii	MLT
	Wednesday	13-Sep	11:00	Carsten Kröger	Gram-negative pathogens: Salmonella enterica	MLT
15:00			Siobhan O'Brien	Polymicrobial interactions in health and disease	MLT	
4	Monday	18-Sep	14:00	Siobhan O'Brien	Bacterial secretion systems 1	MLT
	Tuesday	19-Sep	11:00	Siobhan O'Brien	Bacterial secretion systems 2	MLT
	Wednesday	20-Sep	10:00	Kim Roberts	Viral manipulation of apoptosis (TBC)	MLT
			14:00	Siobhan O'Brien	Genomic approaches to vaccine design	MLT
	Friday	22-Sep	14:00	Derek Doherty	Cellular Immunology	MLT
15:00			Derek Doherty	Cellular Immunology	MLT	
5	Wednesday	27-Sep	11:00	Kim Roberts	Viral induction of oncogenesis	MLT
	Thursday	28-Sep	12:00	Sinead Corr	GI Mucosal Immunity	MLT
			14:00	Sinead Corr	Evasion of GI Immunity- Listeria monocytogenes	MLT
	Friday	29-Sep	12:00	Kim Roberts	Oncolytic Viruses	MLT
14:00			Derek Sullivan	Pathogenesis of fungal infections (90 Min Lecture)	MLT	
6	Monday	02-Oct	10:00	Kim Roberts	Antiviral vaccines	MLT
			12:00	Kim Roberts	Antiviral drugs	MLT
			15:00	Marta Martins	Streptococcus pyogenes	MLT
	Tuesday	03-Oct	15:00	Marta Martins	Staphylococcus aureus. Commensal and pathogen	MLT
	Wednesday	04-Oct	11:00	Marta Martins	The Antibiotic Resistance Crisis	MLT
			15:00	Tim Foster	Methicillin-resistant Staphylococcus aureus (MRSA) TBC	MLT
			16:00	Clinical Group	Infection and Antimicrobial Resistance (Anna Rose Prior)	MLT
	Thursday	05-Oct	12:00	Sinead Corr	Evasion of GI Immunity- Salmonella	MLT
	Friday	06-Oct	12:00	Marta Martins	Platforms for antibacterial drug discovery in the resistance era	MLT
14:00			Marta Martins	New drugs for old bugs	MLT	
15:00			Derek Doherty	Cellular Immunology	MLT	
7	Monday	09-Oct	12:00	Sinead Corr	GI Mucosal Immunity: Phagocytes & Bacterial Evasion	MLT
			14:00	Sinead Corr	Mucosal Immunity & the Microbiome	MLT
	Tuesday	10-Oct	11:00	Marta Martins	What's in the pipeline? Alternatives to antibiotics: I	MLT
			14:00	Marta Martins	What's in the pipeline? Alternatives to antibiotics: II	MLT
	Wednesday	11-Oct	15:00	Clinical Group	Respiratory infection and CF Part I & II (Julie Renwick) - 2hrs	MLT
Thursday	12-Oct	12:00	Clinical Group	Helicobacter pylori pathogenesis (Sinead Smith)	MLT	
8	Monday	16-Oct	12:00	Sinead Corr	Mucosal Immunity & the Microbiome	MLT
			14:00	Free Slot		MLT

\* Venue: Moyne Lecture Theatre, Microbiology Department

\*\*Some lecture titles and lecturers may vary



# Advanced Topics in Microbiology 2023-2024

Students are **required** to complete 3 Advanced Topics courses which will be held between 6-11 of Michaelmas Semester. Courses will be capped at 14-16 students. Please note, courses with three students or fewer may not run at the lecturer's discretion.

## 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).

## **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.

## **TRANSMISSION OF RESPIRATORY VIRUSES**

**Kim Roberts**

There has been considerable debate about the routes of transmission of respiratory viruses, such as influenza A and SARS-CoV-2. During the COVID19 pandemic, many people have questioned the evidence, definitions, and biological relevance of fomite vs respiratory droplet vs airborne transmission, creating a new body of work investigating this topic.

In this course we will explore and compare the range of different types of viruses that can cause respiratory infection, from common cold-causing adenovirus and rhinovirus to viruses with pandemic potential like SARS-CoV-2 and Nipha virus. We will discuss the biological properties of viruses that impact the efficiency of their transmission. For example, using SARS-CoV-2 and influenza A variants we will explore how mutations in viral receptor binding proteins increase (or decrease) infection and transmission efficiency. We will also explore host adaptations that enable viruses to cause zoonotic outbreaks. We will examine environmental factors that can affect transmission efficiency, such as temperature, humidity and ventilation. Finally, we will discuss the evidence for/against different non-pharmaceutical interventions that are used to reduce respiratory virus transmission. Throughout the course we will work together to identify general principles that could help prepare society for future respiratory virus pandemics.

The course will be divided into five 2-hour (2x 45 minutes with a break in the middle) classes:

- 1) Viruses that cause respiratory infections
- 2) Routes of respiratory virus transmission and their impact on disease
- 3) Viral adaptations that affect transmission and pandemic potential
- 4) Environmental factors that affect transmission
- 5) Non-pharmaceutical interventions to reduce respiratory virus transmission

Each class will be comprised of a mixture of lecture material, recommended multimedia resources, as well as critique and discussion of review and primary papers. All students are expected to engage with the material provided ahead of the classes and to participate in the class discussions.

### **“THE SILENT PANDEMIC: TACKLING ANTIBIOTIC RESISTANCE ON ESKAPE PATHOGENS BY EXPLORING NEW TRENDS IN DRUG DISCOVERY AND 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 is still declining with pharmaceutical companies curtailing their anti-infective research programs. Antimicrobial resistance is a “silent pandemic” constituting 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 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. 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 ‘old ones’. This course will discuss the lack of new antimicrobial compounds to treat multidrug resistant infections (namely the ones caused by ESKAPE pathogens), as well as the

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 can 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 old 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.

## **EMERGING MECHANISMS OF HOST-MICROBIOME INTERACTION & THERAPEUTIC APPLICATION**

*Sinéad Corr*

An appreciation of the importance of interactions between the human microbiome and the host organism is currently driving research in biology and biomedicine. Microbiome research has gained momentum in recent years, driven by technological advances and improved cost efficiency for analysis. It is widely accepted that the gut microbiome plays a fundamental role in human health and well-being. The constituents of the microbiome have been shown to interact with one another and with the host immune system in ways that influence the development of disease. Models and methods used to evaluate and study the microbiome are critical to developing an accurate understanding of microbiome composition and dynamics and the impact of these for human health. The knowledge gained will enable development of new strategies which leverage applications of the microbiome for new diagnostic techniques and interventional strategies such as personalized medicine. Importantly, as new tools are developed for probing the microbiome and our knowledge grows, a wealth of new questions will arise. This module will take a student-led approach to discuss technological approaches for investigating host-microbiome interactions, as well as recent advances in our understanding of host immunity and microbial influence and arm the student with a broad understanding of the priorities and challenges in microbiome research today. Students will be provided the

opportunity to examine cutting-edge research articles and view recommended online resources, present the key research findings and critically discuss the implications for the field.

## **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. Our understanding of microbial evolution has been transformed by real-time experimental evolution in the laboratory. This “living fossil record” allows us to examine the drivers of evolutionary change in pathogens, identify novel genomic mutations over evolutionary timescales and quantify the “fitness advantages” conferred by them.

This course will introduce you to the concept of microbial evolution by way of examining and discussing the most recent and cutting-edge literature in the field. You will learn about what drives the rate and likelihood of evolutionary change as well as how we might leverage or “hijack” evolution to minimise the negative effect a pathogen may have on their host. We will take a closer look at one of the longest running evolution experiments in history – twelve flasks of *E. coli* evolving for over 50,000 bacterial generations by Rich Lenski’s lab at Michigan State University. Expect fitness conflicts, trade-offs, bacterial warfare and invasions.

## **ARMS RACE IN MICROBIOLOGY: COEVOLUTION OF BACTERIAL DEFENCE AND PHAGE COUNTER-DEFENCE MECHANISMS**

**Anna Ershova**

**Learning aims:** To expand student knowledge of bacteria-phage coevolution in microbial communities.

**Module content:**

This module will include 10 lectures on bacterial defence and phage counter-defence mechanisms and their effects on community structure and evolution. Many different systems protect bacteria from foreign DNA invasion. Bacteriophages developed various



mechanisms to avoid bacterial defence systems. Together, these mechanisms shape bacterial communities and gene flow in the population.

**Learning outcomes:**

- To understand the diversity of bacterial and bacteriophage defence mechanisms
- To understand the effect of bacterial defence and bacteriophage counter-defence mechanisms on the evolution of microbial communities

**CLONAL EVOLUTION: INSIGHTS FROM MICROBES, CANCER, AND INFECTIOUS DISEASE**

**Máire Ní Leathlobhair**

Clonal or asexual reproduction stands as one of the most ancient and widespread mechanisms of cellular propagation. Its scope extends from unicellular microorganisms like viruses, bacteria, and parasites to complex multicellular eukaryotes, including animals and even cancers. This advanced topic delves into the fundamental evolutionary principles and processes that underlie clonal evolution across diverse organisms. By leveraging this evolutionary framework, we can link the fields of microbiology, cancer biology, and infectious disease.

Cancers arise via somatic clonal evolution and a large part of this course will explore the dynamics of cancer cell populations. We will see how experimental microbial systems can be used to understand these complex dynamics. We will consider the consequences of clonality on population and genome structure over long versus short time scales. Finally, we will look at rare clonally transmissible cancers that have the innate ability to be communicable and pass horizontally from host to host, behaving more like infectious unicellular parasites than conventional cancer cells.

Throughout this module, we'll engage in a dynamic exploration of classical papers and cutting-edge research on clonal evolution. Our discussions will be motivated by the presentation of recent papers to peers, promoting a collaborative environment, insightful conversations and a nuanced understanding of this subject.

# Research Review Essay

The Research Review Essay in Senior Sophister year is a self-guided assessment which should be accomplished without any input from staff members. Details of the members of staff providing the essay titles, and who will mark the essays, are not given to students.

Students are provided with a choice of essay titles. More detailed instruction will follow regarding the essay, including the submission date. Unlike in JS year, there will be no initial meeting with members of staff, and no starter references will be provided. All research and writing of the essay is the sole responsibility of the student. Essays will be anonymously marked by at least two members of staff and the final result will be incorporated into the annual end of year results.

## 2023-24 Essay titles:

1. Physiological and Evolutionary Responses of *Escherichia coli* to Thermal Stress
2. Modulation of the intestinal innate immune system by tryptophan-derived metabolites
3. Motility in ESKAPE pathogens: The role and mechanisms
4. RNA-binding proteins in bacteria other than Hfq: The FinO-domain proteins.
5. Looking for the lost gold - Environmental microbiomes as new sources of antibacterial drugs.
6. Exploring Microbial Ecosystems using Computational Approaches: From Big Data to Deep Learning.
7. Flocculation in *Saccharomyces cerevisiae*: from brewing to heavy metal.
8. Discuss the genetic changes that have been identified in SARS-CoV-2 between 2019 to the present and their impacts on pathogenesis.

There are no limits to the number of students that can choose each essay title. Essays should be no longer than 4,000 words (excluding tables, figure legends and references). Include a word count after the abstract. The essay should be written in the style adopted by the journals *Molecular Microbiology* and *Cellular Microbiology*. **References:** The system adopted by *Molecular Microbiology* and *Cellular Microbiology* **must** be used for citation and listing of references. A complete listing of references must be compiled at the

end of the essay. These should be listed in alphabetical order of the first author. Papers with two authors should follow those of the first named author, arranged in alphabetical order according to the name of the second author. Articles with more than two authors should follow those of the first named author in chronological order. For papers with eight or more authors, the first six should be listed followed by “*et al*”. The title of the article must be included in all cases.

**You are expected to compile your bibliography using EndNote.**

The inclusion of diagrams and other illustrations is strongly encouraged and figure legends must be included. Students should consult the journal for figure styles and formatting of figure legends. Sources of figures must be fully acknowledged.

All essays must be typed, using 1.5 or double line spacing and page numbers should be included. An abstract of 200 words summarising the essay should be included ahead of the Introduction. It is up to the individual students to show initiative in researching the relevant field. The marking guidelines used to grade the essays is included in Appendix D.

## **Declaration**

Please create a **separate** word document to accompany your essay submission which contains **your Name & Student Number** and the following **DECLARATION** information;

**I have read and I understand the plagiarism provisions in the General Regulations of the University Calendar for the current year, found at: <http://www.tcd.ie/calendar>**

**I have also completed the Online Tutorial on avoiding plagiarism ‘Ready, Steady, Write’, located at <https://libguides.tcd.ie/academic-integrity/ready-steady-write>**

The statement should be signed (electronic signature will suffice) and dated. Please save the document as a pdf and names as

**SS Research\_EssayDeclaration23\_24\_username.pdf** (insert your own username).

## Essay Submission

Since essays are anonymously marked, **do not put your name on any page of the essay**. The “title page” should **ONLY** have the title of the review essay. The order of pages should be (a) **Title Page** (b) **Abstract** (c) **Introduction, etc.**

The completed essay and declaration form must be submitted electronically as two separate pdf documents in the **one email** to the departmental secretary, details on submission to follow.

Use the filenames **SS Research\_Essay23\_24\_username.pdf**. Include **SS Research\_Essay23\_24\_username** in the subject line of the email. (Students are urged to save “**back-up**” files regularly in case of computer problems.)

Your essay will be submitted as a Turnitin assignment on Blackboard. The Department will use this sensitive anti-plagiarism tool to screen essays and other forms of formal assessed work. 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. Turnitin reports can be used as evidence if plagiarism is suspected. **Accordingly, you are strongly recommended to synthesize your own language at all times.**

For more information see Appendix C.

The essays will be marked by two or more members of staff and will account for 10% of the marks of the Moderatorship Examination. **(The essays will not be returned, so you may want to retain a copy for future reference.)**

### **Late submission & Penalty**

There will be a penalty of 10% per week or part thereof for late submission of **any** course material including research project theses and research essays. Students please note that submission of material even one day late will incur a penalty of 10%.

## **Plagiarism**

Plagiarism is regarded as a serious offence by the University and could result in censure by the Junior Dean. Proven instances of plagiarism will result in heavy penalties.

A full statement of the College's position on plagiarism can be found in the College Calendar **and is reproduced in Appendix B.**

**All students** are required to access the **online central repository** in which all information and resources on plagiarism have been consolidated. This facility explains what plagiarism is, and how it can be avoided. The central repository is being hosted by the Library and is located at <https://libguides.tcd.ie/academic-integrity>

It includes the following:

- (i) The 2022-23 Calendar entry on plagiarism for undergraduate and postgraduate students;
- (ii) The matrix explaining the different levels of plagiarism outlined in the Calendar entry and the sanctions applied;
- (iii) Information on what plagiarism is and how to avoid it;
- (iv) 'Ready, Steady, Write', an online tutorial on plagiarism which must be completed by all students;**
- (iv) The text of a declaration which must be inserted into all cover sheets accompanying all assessed course work;
- (v) Details of software packages that can detect plagiarism, e.g. Turnitin.

**All students must complete the online tutorial** on avoiding plagiarism '**Ready, Steady, Write**', located at <https://libguides.tcd.ie/academic-integrity/ready-steady-write>.

Plagiarism can occur in many forms, for example copying another student's work, or quoting directly from published sources without acknowledgement, or using as your own slightly modified versions of the published work of others. Thus, in writing essays or other project work you are warned against copying verbatim, or copying and making



minor modifications to, phrases, sentences, paragraphs, sections or illustrations from other published work.

Students and staff have access to Turnitin computer software (see Appendix C) that can readily detect plagiarism. The Department will use this sensitive anti-plagiarism tool to screen essays and other forms of formal assessed work and Turnitin reports can be used as evidence if plagiarism is suspected. **Accordingly, you are strongly recommended to synthesize your own language at all times.** A full statement of the College's position on plagiarism can be found in the College Calendar **and is reproduced in Appendix B.**

# Appendices

## A. Attendance

**20** 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*

**22** 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.

**23** 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.

(Above Abstracted from the College Calendar - [www.tcd.ie/calendar](http://www.tcd.ie/calendar) )

## B. Plagiarism

The College Calendar has been updated for 2022-23 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 2022-23 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/what-is-plagiarism>. 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 2022-23 Calendar entry on plagiarism;[1]**

### **Plagiarism**

#### **95 General**

It is clearly understood that all members of the academic community use and build on the work and ideas of others. It is commonly accepted also, however, that we build on the work and ideas of others in an open and explicit manner, and with due acknowledgement. Plagiarism is the act of presenting the work or ideas of others as one's own, without due acknowledgement. Plagiarism can arise from deliberate actions and also through careless thinking and/or methodology. The offence lies not in the attitude or intention of the perpetrator, but in the action and in its consequences. It is the responsibility of the author of any work to ensure that he/she does not commit plagiarism. Plagiarism is considered to be academically fraudulent, and an offence against academic integrity that is subject to the disciplinary procedures of the University.

#### **96 Examples of Plagiarism**

Plagiarism can arise from actions such as:

- (a) copying another student's work;
- (b) enlisting another person or persons to complete an assignment on the student's behalf;
- (c) procuring, whether with payment or otherwise, the work or ideas of another;
- (d) quoting directly, without acknowledgement, from books, articles or other sources, either in printed, recorded or electronic format, including websites and social media;
- (e) paraphrasing, without acknowledgement, the writings of other authors.

Examples (d) and (e) in particular can arise through careless thinking and/or methodology where students: (i) fail to distinguish between their own ideas and those of others; (ii) fail to take proper notes during preliminary research and therefore lose track of the sources from which the notes were drawn; (iii) fail to distinguish between information which needs no acknowledgement because it is firmly in the public domain, and information which might be widely known, but which nevertheless requires some sort of acknowledgement; (iv) come across a distinctive methodology or idea and fail to record its source. All the above serve only as examples and are not exhaustive.

#### **97 Plagiarism in the context of group work**

Students should normally submit work done in co-operation with other students only when it is done with the full knowledge and permission of the lecturer concerned. Without this, submitting work which is the product of collaboration with other students

may be considered to be plagiarism. 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. In order to avoid plagiarism in the context of collaboration and groupwork, it is particularly important to ensure that each student appropriately attributes work that is not their own.

### **98 Self plagiarism**

No work can normally be submitted for more than one assessment for credit. Resubmitting the same work for more than one assessment for credit is normally considered self-plagiarism.

### **99 Avoiding plagiarism 24**

Students should ensure the integrity of their work by seeking advice from their lecturers, tutor or supervisor on avoiding plagiarism. 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 plagiarism is available on <http://tcd-ie.libguides.com/plagiarism>.

**101** If plagiarism as referred to in §82 above is suspected, in the first instance, the Director of Teaching and Learning (Undergraduate), or their designate, will write to the student, and the student's tutor advising them of the concerns raised. The student and tutor (as an alternative to the tutor, students may nominate a representative from the Students' Union) will be invited to attend an informal meeting with the Director of Teaching and Learning (Undergraduate), or their designate, and the lecturer concerned, in order to put their suspicions to the student and give the student the opportunity to respond. The student will be requested to respond in writing stating his/her agreement to attend such a meeting and confirming on which of the suggested dates and times it will be possible for them to attend. If the student does not in this manner agree to attend such a meeting, the Director of Teaching and Learning (Undergraduate), or designate, may refer the case 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 Director of Teaching and Learning (Undergraduate), or designate, forms the view that plagiarism has taken place, he/she must decide if the offence can be dealt with under

the summary procedure set out below. In order for this summary procedure to be followed, all parties attending the informal meeting as noted in §87 above must state their agreement in writing to the Director of Teaching and Learning (Undergraduate), or designate. If one of the parties to the informal meeting withholds his/her written agreement to the application of the summary procedure, or if the facts of the case are in dispute, or if the Director of Teaching and Learning (Undergraduate), or designate, feels that the penalties provided for under the summary procedure below are inappropriate given the circumstances of the case, he/she will refer the case directly to the Junior Dean, who will interview the student and may implement the procedures as referred to under CONDUCT AND COLLEGE REGULATIONS §2.

**102** If the offence can be dealt with under the summary procedure, the Director of Teaching and Learning (Undergraduate), or designate, will recommend one of the following penalties: (a) Level 1: Student receives an informal verbal warning. The piece of work in question is inadmissible. The student is required to rephrase and correctly reference all plagiarised elements. Other content should not be altered. The resubmitted work will be assessed and marked without penalty; (b) Level 2: Student receives a formal written warning. The piece of work in question is inadmissible. The student is required to rephrase and correctly reference all plagiarised elements. Other content should not be altered. The resubmitted work will receive a reduced or capped mark depending on the seriousness/extent of plagiarism; (c) Level 3: Student receives a formal written warning. The piece of work in question is inadmissible. There is no opportunity for resubmission with corrections. Instead, the student is required to submit a new piece of work as a supplemental assessment during the next available session. Provided the work is of a passing standard, both the assessment mark and the overall module mark will be capped at the pass mark. Discretion lies with the Senior Lecturer in cases where there is no standard opportunity for a supplemental assessment under applicable course regulations. 25

**103** Provided that the appropriate procedure has been followed and all parties in §87 above are in agreement with the proposed penalty, the Director of Teaching and Learning (Undergraduate) should in the case of a Level 1 offence, inform the course director and where appropriate the course office. In the case of a Level 2 or Level 3 offence, the Senior Lecturer must be notified and requested to approve the recommended penalty. The Senior Lecturer may approve, reject, or vary the recommended penalty, or seek further

information before making a decision. If the Senior Lecturer considers that the penalties provided for under the summary 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. Notwithstanding his/her decision, the Senior Lecturer will inform the Junior Dean of all notified cases of Level 2 and Level 3 offences accordingly. The Junior Dean may nevertheless implement the procedures as referred to under CONDUCT AND COLLEGE REGULATIONS §2.

**104** If the case cannot normally be dealt with under the summary procedures, it is deemed to be a Level 4 offence and will be referred directly to the Junior Dean. 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.**

### **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/what-is-plagiarism> 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

**Note** that these guidelines are for use as a general reference. Differences may occur between disciplines.

	Mark Range	Criteria
I	<b>90-100</b>	<b>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.</b>
	<b>80-89</b>	<b>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.</b>
	<b>70-79</b>	<b>MAINLY OUTSTANDING ANSWER; falls short on presentation and reading or thought beyond the course, but retains insight and originality typical of first class work.</b>
II-1	<b>65-69</b>	<b>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.</b>
	<b>60-64</b>	<b>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.</b>
II-2	<b>55-59</b>	<b>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.</b>



	<b>50-54</b>	<b>INCOMPLETE ANSWER; suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail.</b>
III	<b>45-49</b>	<b>WEAK ANSWER; limited understanding and knowledge of subject. Serious omissions, errors and misunderstandings, so that answer is no more than adequate.</b>
	<b>40-44</b>	<b>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.</b>
F-1	<b>35-39</b>	<b>MARGINAL FAIL; inadequate answer, with no substance or understanding, but with a vague knowledge relevant to the question.</b>
	<b>30-34</b>	<b>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.</b>
F-2	<b>0-29</b>	<b>UTTER FAILURE; with little hint of knowledge. Errors serious and absurd. Could also be a trivial response to the misinterpretation of a question.</b>
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 Student and Staff 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**

**Name:** *Kieran Lewis*

**Web:** [www.tcd.ie/disability](http://www.tcd.ie/disability)

**Room:** 2054 Arts Building

**Phone:** 01 896 3111

**Email:** [klewis@tcd.ie](mailto:klewis@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

### ***General 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 Director, Dr Sinéad Corr ([corrsc@tcd.ie](mailto:corrsc@tcd.ie)) or Jayne Vance, Executive Officer ([magoverj@tcd.ie](mailto: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 med cert 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 is assessed.

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/>.

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/](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).

## ***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/](https://www.tcd.ie/info_compliance/data-protection/student-data/)

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/>
- 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 – [www.tcd.ie/student-services](http://www.tcd.ie/student-services), [http://www.tcd.ie/students/assets/pdf/Student\\_Services\\_Booklet\\_\(web\\_version\).pdf](http://www.tcd.ie/students/assets/pdf/Student_Services_Booklet_(web_version).pdf)
- Senior Tutor and Tutorial Service - <https://www.tcd.ie/seniortutor/>
- Trinity Disability Service - <http://www.tcd.ie/disability/>

# **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](mailto: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.

## 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.

### 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

#### 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



MyCareer:  
[mycareerconnect.tcd.ie](http://mycareerconnect.tcd.ie)



TCD.Careers.Service



TCDCareers



[www.tcd.ie/  
Careers/students/postgraduate/](http://www.tcd.ie/Careers/students/postgraduate/)

[www.tcd.ie/](http://www.tcd.ie/)



@TCDCareers



[tinyurl.com/LinkedIn-TCD-  
Connecting](http://tinyurl.com/LinkedIn-TCD-Connecting)

# Contact information

Address: Department Microbiology, Moyne Institute of Preventive Medicine,  
Trinity College, the University of Dublin  
Dublin 2  
Republic of Ireland  
Web: <https://www.tcd.ie/Microbiology/>  
Email: [magoverj@tcd.ie](mailto:magoverj@tcd.ie)

You may email to arrange an appointment with a member of staff to discuss matters related to their modules. Staff contact details can be found:

<https://www.tcd.ie/Microbiology/people/>

# Key locations

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



If you need to navigate campus, please use <https://www.tcd.ie/Maps/>