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**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 bring to bear in whatever employment they enter, 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 2017-18, General Regulations and Information, pg 26-28
The Senior Sophister Year in Microbiology

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.

*Students may attend and complete the work for a fourth advanced topics course if they wish, although they will only be assessed on three advanced courses in the examination paper.

Data Handling/Problem Solving (MIU44005)

Students also receive tutorials in data handling, data interpretation and problem solving to complement the lectures in the core themes.

Students are expected to devote at least 20 hours of self-directed study per ECTS credit (at least 200 hours per module), which is guided through reading material provided by each lecturer.

Research in Microbiology (MIU44001)

Research Project

Each student undertakes a chosen project in research labs of academic staff over a nine-week period. The research project accounts for 13 ECTS credits of the Senior Sophister year. Following consultation with their project supervisor, students prepare a short Powerpoint presentation on their proposed research, which is presented to the research group. Students produce a thesis of their research project when completed. Projects are assessed under three categories, Laboratory Performance (40%), Scholarly Performance (40%) and Thesis Production (20%). The project is also presented as a poster at a Festival of Science to which parents, staff, postgrads and other interested parties are invited. Please note that project presentations, including the poster presentation, are assessed within the Laboratory Performance component.

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 at the beginning of Michaelmas semester and submit the essays at the beginning of the Hilary semester. The review essay accounts for 7 ECTS of the Senior Sophister year.
Microbiology Seminar Series

National and International speakers are invited to deliver seminars on the most current topics in Microbiology. Seminars are held on Thursdays at either 1pm or 4pm and **attendance is compulsory**. Students are encouraged to 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.

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 in 3 three-hour exams. Students are encouraged to integrate into their answers information covered during their Junior Sophister year. A fourth three-hour paper is problem-based. Students may also be asked to attend an oral examination by an External Examiner after the written examinations. It is essential that students are available for this oral examination. The marking guidelines for Sophister essays and exams can be found in Appendix D.

### The Moderatorship Examination

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>ECTS</th>
<th>Examination components</th>
<th>% module component</th>
<th>% Final degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIU44001</td>
<td>Research in Microbiology</td>
<td>20</td>
<td>Project (13 ECTS) Essay (7 ECTS)</td>
<td>67, 33</td>
<td>26.67</td>
</tr>
<tr>
<td></td>
<td>Microbial Molecular and Cellular biology</td>
<td>10</td>
<td>Paper 1</td>
<td>100</td>
<td>13.33</td>
</tr>
<tr>
<td>MIU44002</td>
<td>Microbial Pathogenicity</td>
<td>10</td>
<td>Paper 2</td>
<td>100</td>
<td>13.33</td>
</tr>
<tr>
<td>MIU44003</td>
<td>Advanced Topics in Microbiology</td>
<td>10</td>
<td>Paper 3</td>
<td>100</td>
<td>13.33</td>
</tr>
<tr>
<td>MIU44004</td>
<td>Data Handling</td>
<td>10</td>
<td>Paper 4</td>
<td>100</td>
<td>13.33</td>
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<tr>
<td>MIU44005</td>
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<td></td>
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<td>60</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Junior Sophister component</td>
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<td></td>
<td></td>
<td>20.00</td>
</tr>
<tr>
<td></td>
<td>Total Moderatorship</td>
<td></td>
<td></td>
<td></td>
<td>100.00</td>
</tr>
</tbody>
</table>

The Moderatorship degree in Microbiology is awarded based on a student’s performance over the two Sophister years. 80% of the final degree marks derive from the Senior Sophister year final marks and 20% derive from the Junior Sophister year marks.
The moderatorship in science is available in each of the following subjects: biochemistry, chemistry, comparative biology, environmental sciences, genetics, geography, geology, immunology, microbiology, molecular medicine, neuroscience, physics, physics and astrophysics, physiology, plant sciences and zoology.

Annual examinations

To pass the Sophister years, students must achieve an overall credit-weighted average mark of at least 40 per cent (grade III) and accumulate 60 credits either by (a) passing all modules outright or (b) passing by compensation or aggregation. Whether passing by compensation or aggregation students must pass outright modules totalling at least 40 credits in addition to achieving a 40 per cent (grade III) credit-weighted average, or higher, for the year. Compensation will be permitted in modules totalling a maximum of 20 credits provided that a minimum mark of 30 per cent has been attained in any failed module(s). Further, passing by aggregation will be permitted if a mark of less than 30 per cent has been achieved in a module or modules carrying up to a maximum of 10 credits provided that a mark of at least 30 per cent has been achieved in any remaining failed module(s). The designation of certain modules, or module components, as non-compensatable may reduce the level of compensation or aggregation permitted in either Sophister year. There are no supplemental examinations in the Sophister years.

To qualify to proceed to the Senior Sophister year, students sitting the Junior Sophister examination must achieve an overall credit-weighted average mark of 45 per cent or higher in the overall examination.

Students who achieve an overall mark of 35 per cent or higher, but who do not qualify to proceed to moderatorship, can, as provided under general College regulations, repeat the Junior Sophister year in order to improve their performance.

21 Students whose overall mark is 34 per cent or lower in their annual examinations and supplemental examinations (if applicable) are not permitted to repeat their year and must withdraw from science.

Ordinary degree of B.A.

22 Students who pass the Junior Sophister annual examinations may have the ordinary B.A. degree conferred if they do not choose, or are not allowed, to proceed to the Senior Sophister year. Students who fail the Senior Sophister year will be awarded the ordinary B.A. degree. Except by special permission of the University Council, on the recommendation of the Science Course Director, the ordinary degree of B.A. may normally be conferred only on candidates who have spent at least three years in the University.
Moderatorship examination

23 The Junior and Senior Sophister examinations constitute part I and part II of the moderatorship examination. **There are no supplemental examinations.** Students unavoidably absent from the moderatorship examination in their final year may apply to the Senior Lecturer to present themselves for the moderatorship examination in the following year. If students are permitted by the Senior Lecturer to do so, without having to repeat lectures or classes, they must give notice by consulting with their school, department/discipline or course office before the end of Michaelmas term to confirm their examination and/or assessment requirements while off-books.

24 Various forms of teaching and learning are a feature of the Sophister years and formal lectures will not necessarily be given in every term.

25 The scheme of distribution of marks between papers and practical work at the moderatorship examination will be published by individual schools or departments/disciplines.

26 The final moderatorship result is calculated by aggregating the Junior and Senior Sophister examination results as per Table II.

**TABLE II — CALCULATION OF MODERATORSHIP RESULTS**

<table>
<thead>
<tr>
<th>Moderatorship</th>
<th>Junior Sophister 20 per cent, Senior Sophister 80 per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Junior Sophister 35 per cent, Senior Sophister 65 per cent</td>
</tr>
<tr>
<td>Comparative biology</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Environmental sciences</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Genetics</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Geography</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Geology</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Immunology</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Microbiology</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Molecular medicine</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Physics</td>
<td>Junior Sophister 35 per cent, Senior Sophister 65 per cent</td>
</tr>
<tr>
<td>Physics and astrophysics</td>
<td>Junior Sophister 35 per cent, Senior Sophister 65 per cent</td>
</tr>
<tr>
<td>Physiology</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Plant sciences</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
<tr>
<td>Zoology</td>
<td>Junior Sophister 20 per cent, Senior Sophister 80 per cent</td>
</tr>
</tbody>
</table>

*Excerpts from 2017-18 Calendar, Undergraduate Studies, Faculty of Engineering, Mathematics and Science, pg 266, 270-272*
The following timetables can be subject to minor changes.
Please ensure you check your emails on a daily basis.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DAY/DATE/TIME</th>
<th>LECTURERS</th>
<th>LECTURES</th>
<th>VENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday 10 Sept 12.00</td>
<td>Kim Roberts</td>
<td>Information Session</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td></td>
<td>14.00</td>
<td></td>
<td>Getting Started: Initiation, promoter recognition and patterns</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td>3</td>
<td>Tuesday 11 Sept 11.00</td>
<td>Ursula Bond</td>
<td>The Machine: The Structure and regulation of RNA polymerase II</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td></td>
<td>12 Sept 11.00</td>
<td></td>
<td>Moving Along: Transcription elongation and linked events</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td></td>
<td>13 Sept 11.00</td>
<td></td>
<td>Getting to the end. 3'end formation and transcription termination</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td></td>
<td>Wednesday 14 Sept 11.00</td>
<td>Ursula Bond</td>
<td>Controlling the Levels: Make and degrade</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td></td>
<td>14.00</td>
<td></td>
<td>The world of Non-coding RNAs: Roles in viral infection</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td>4</td>
<td>Monday 17 Sept 14.00</td>
<td>Alastair Fleming</td>
<td>The Eukaryotic genome</td>
<td>Moyne Lecture</td>
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<tr>
<td></td>
<td>Tuesday 18 Sept 11.00</td>
<td>Alastair Fleming</td>
<td>Chromatin modifications and remodeling I</td>
<td>Moyne Lecture</td>
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<td></td>
<td>Wednesday 19 Sept 11.00</td>
<td>Alastair Fleming</td>
<td>Chromatin modifications and remodeling II</td>
<td>Moyne Lecture</td>
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<tr>
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<td>Thursday 20 Sept 12.00</td>
<td>Alastair Fleming</td>
<td>Chromatin modifications and remodeling III</td>
<td>Moyne Lecture</td>
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<tr>
<td></td>
<td>14.00</td>
<td>Gary Moran</td>
<td>The Genomes of Pathogenic Fungi</td>
<td>Moyne Lecture</td>
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<tr>
<td>5</td>
<td>Monday 24 Sept 10.00</td>
<td>Charles Dorman</td>
<td>The dynamic genome I</td>
<td>Moyne Lecture</td>
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<tr>
<td></td>
<td>12.00</td>
<td>Ursula Bond</td>
<td>Metabolic engineering in yeast II</td>
<td>Moyne Lecture</td>
</tr>
<tr>
<td></td>
<td>14.00</td>
<td>Alastair Fleming</td>
<td>Yeast Biotechnology</td>
<td>Moyne Lecture</td>
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<td>15.00</td>
<td>Ursula Bond</td>
<td>Metabolic engineering in yeast I</td>
<td>Moyne Lecture</td>
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<td>Tuesday 25 Sept 11.00</td>
<td>Charles Dorman</td>
<td>The dynamic genome II</td>
<td>Moyne Lecture</td>
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<tr>
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<td>Wednesday 26 Sept 11.00</td>
<td>Charles Dorman</td>
<td>Nucleoid structuring proteins I</td>
<td>Moyne Lecture</td>
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<tr>
<td></td>
<td>Thursday 27 Sept 10.00</td>
<td>Charles Dorman</td>
<td>Nucleoid structuring proteins II</td>
<td>Moyne Lecture</td>
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<tr>
<td></td>
<td>14.00</td>
<td>Charles Dorman</td>
<td>Nucleoid structuring proteins III</td>
<td>Moyne Lecture</td>
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<tr>
<td></td>
<td>Friday 28 Sept 11.00</td>
<td>Charles Dorman</td>
<td>Nucleoid Structuring proteins IV</td>
<td>Moyne Lecture</td>
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<td>14.00</td>
<td>Carsten Kröger</td>
<td>Next-Generation Sequencing</td>
<td>Moyne Lecture</td>
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<td>6</td>
<td>Monday 1 Oct 14.00</td>
<td>Carsten Kröger</td>
<td>Omics in bacteria</td>
<td>Moyne Lecture</td>
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<td>16.00</td>
<td>Carsten Kröger</td>
<td>CRISPR-Cas9</td>
<td>Moyne Lecture</td>
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<td></td>
<td>Tuesday 2 Oct 12.00</td>
<td>Kim Roberts</td>
<td>Mechanisms of viral transcription</td>
<td>Moyne Lecture</td>
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<td>Kim Roberts</td>
<td>Mechanisms of viral translation</td>
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<td>Wednesday 3 Oct 10.00</td>
<td>Kim Roberts</td>
<td>Viral manipulation of apoptosis</td>
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<td>Thursday 4 Oct 11.00</td>
<td>Kim Roberts</td>
<td>Viral induction of oncogenesis</td>
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<td>14.00</td>
<td>Kim Roberts</td>
<td>Oncolytic Viruses</td>
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<td>Friday 5 Oct 11.00</td>
<td>Kim Roberts</td>
<td>Antiviral vaccines</td>
<td>Moyne Lecture</td>
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<td>14.00</td>
<td>Kim Roberts</td>
<td>Antiviral Drugs</td>
<td>Moyne Lecture</td>
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<tr>
<td>WEEK</td>
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<tr>
<td>3</td>
<td>Monday</td>
<td>10 Sept</td>
<td>15:00</td>
<td>Carsten Kröger</td>
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<td>Carsten Kröger</td>
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<td>Marta Martins</td>
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<td>Wednesday</td>
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<td>Joan Geoghegan</td>
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<td>4</td>
<td>Monday</td>
<td>17 Sept</td>
<td>12:00</td>
<td>Tim Foster</td>
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<td>Tuesday</td>
<td>18 Sept</td>
<td>12:00</td>
<td>Tim Foster</td>
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<td>Joan Geoghegan</td>
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<td>Tim Foster</td>
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<td>21 Sept</td>
<td>11:00</td>
<td>Derek Doherty</td>
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<td>Derek Doherty</td>
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<tr>
<td>5</td>
<td>Tuesday</td>
<td>25 Sept</td>
<td>12:00</td>
<td>Derek Sullivan</td>
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<td>15:00</td>
<td>Ciaran Finn</td>
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<td>Wednesday</td>
<td>26 Sept</td>
<td>12:00</td>
<td>Ciaran Finn</td>
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<td>Thursday</td>
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<td>Stephen Smith</td>
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<td>Friday</td>
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<td>Ciaran Finn</td>
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<td>Monday</td>
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<td>Thursday</td>
<td>4 Oct</td>
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<td>Marta Martins</td>
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<td>7</td>
<td>Clinical To be confirmed</td>
<td>Clinical Group</td>
<td></td>
<td>The microbiome in health and disease</td>
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<td>Pneumonia</td>
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<td>Surveillance of MRSA in Ireland</td>
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# Data Handling 2019

**MOYNE LECTURE THEATRE**

<table>
<thead>
<tr>
<th>Data Handling Sessions – MIU44005</th>
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</thead>
<tbody>
<tr>
<td><strong>29th March, Friday</strong></td>
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<tr>
<td>11:00</td>
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<td>12:00</td>
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<tr>
<td>Charles Dorman</td>
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<td>Ciaran Finn</td>
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<td><strong>1st April, Monday</strong></td>
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<td>Ursula Bond</td>
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<tr>
<td>Carsten Kröger</td>
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<td><strong>3rd April, Wednesday</strong></td>
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<td>Kim Roberts</td>
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<td>15:00</td>
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<tr>
<td>Alastair Fleming</td>
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<td><strong>4th April, Thursday</strong></td>
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<tr>
<td>Joan Geoghegan</td>
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<td>Marta Martins</td>
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</tbody>
</table>

*The Data Handling/Problem Booklet will be available via Blackboard. Students will be notified.*
Students are required to select 3 Advanced Topics which will be held between weeks 7-11 of Michaelmas Semester. Please note, courses with three students or fewer may not run at the lecturer’s discretion.

LESSONS FROM YEASTS:
*Ursula Bond*

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. This course will explore the experimental approaches used to set up a model biological system as well discuss project “Yeast 2.0”, which aims to create an “artificial microorganism” using synthetic chromosomes. With this background information, we will then review some of the seminal papers where studies in yeasts have led to important discoveries into the nature of human diseases such as Huntington’s disease and Parkinson’s disease. Additionally, we will discuss how yeasts such as *Saccharomyces cerevisiae* and *Saccharomyces pastorianus* have evolved into ideal fermentative microorganisms for use in brewing, baking and wine-making industries.

REGULATION OF BACTERIAL GENE EXPRESSION
*Charles Dorman*

By examining critically the primary literature, this course introduces students to the key breakthrough in the development of current concepts of gene regulation in the prokaryotes. The course will focus on transcription initiation and the factors that modulate it. It will encompass promoter coupling, the global and local effects of DNA supercoiling, the role of the factor for inversion stimulation in transcription and the means by which these regulatory influences are integrated with the stringent response. The relevance of these concepts to bacterial infection will be discussed using specific bacterial pathogens as examples. The impact of genomics technology on current views of global control of gene expression will also be considered. This is a literature-based course and students will have the opportunity to read and discuss the key papers and to assess the experimental evidence on which current understanding of these topics is founded.

CHROMATIN, EPIGENETICS AND DISEASE
*Alastair Fleming*

It is now accepted that chromatin plays key roles in all aspects of DNA biology including DNA repair, recombination, replication and gene transcription. Arguably one of the hottest topics in biological science today is the area of ‘epigenetics’. Indeed, current research in this area is proving pivotal to our understanding of cancer and stem cell biology. Due to its amenability to genetic manipulation, the yeast *Saccharomyces cerevisiae*, has served as an excellent model organism for the study of eukaryotic chromatin. In this course we will examine the history of the use of this organism in the study of eukaryotic chromatin. The course will critically cover the primary literature describing the research in yeast that has led to our current understanding of chromatin and epigenetics and its relevance to human disease. We will focus on yeast research in the area of gene transcription in the context of chromatin. The course will be literature-based, and at the end of the course students will have the opportunity to read and discuss current publications at the cutting edge of chromatin research.
THE MOLECULAR BASIS OF IMMUNE EVASION BY *STAPHYLOCOCCUS AUREUS*
*Joan Geoghegan*
This course will deal with the strategies used by *S. aureus* to thwart the human immune system with particular focus on the arsenal of molecules produced by the bacterium to inhibit phagocytosis and neutrophil-mediated killing. The topic will be introduced with two lectures and the remainder of the course will involve student-led discussion sessions. Primary research articles will form the basis of class discussion of the experimental evidence on which our understanding of staphylococcal immune evasion is based. Elements of scientific research practices will be incorporated into the sessions to encourage students to develop skills in experimental design, analysis and interpretation.

DRUG REPURPOSING TO MEET THE CHALLENGE OF ANTIMICROBIAL RESISTANCE - “A BATTLE OF THE TITANS”
*Marta Martins*
Antimicrobial drug resistance (AMR) is an urgent global health problem. The rapid emergence of AMR in bacteria occurring worldwide is jeopardizing the efficacy of available antibiotics, which for decades have saved millions of lives. New antimicrobial drug development is increasingly viewed as a priority by National and International bodies. Pharmaceutical companies are curtailing their anti-infective research programs. Adding to this, there are relatively few agents in developmental pipelines and a paucity of identified microbiological targets that can be exploited for drug development. In order to tackle this issue there is the need to re-enforce the repurpose of existing drugs that were set aside through the years due to the enormous availability of antibiotics. This course will discuss the problematic lack of new antimicrobial compounds to fight multidrug resistant infections. Two main areas will be the subjects of discussion: 1. Drug repurposing: the process of repurpose the use of “old drugs” and the reason why thousands of these molecules were left behind and aren’t able to reach the market; 2. Alternative therapeutics: shifting of the current drug discovery paradigm from “finding new drugs” to “using existing ones” or “combining existing agents”. Some examples of the novel 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 repurposing of existing drugs. The students will have the opportunity to read and discuss fundamental papers in this area and to critically present their view on this subject.

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. Through the course of this class, we will discuss the current knowledge about identification, mechanisms and functions of selected small RNAs 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 presentation of primary literature by the students and discussion about experimental design and interpretation.
VIRAL PATHOGENESIS  
Kim Roberts

How do viruses cause disease? Why are some strains of a virus more virulent and cause more severe disease than other strains? How do viruses inhibit the innate immune response and what is a virus induced “cytokine storm”? What makes some people more susceptible (or resistant) to viral infection? Viruses are a diverse group of molecular machines and so there are many answers to these questions. In this course we will discuss a range of virus examples to explore viral pathogenesis and consider some of the experimental techniques being used to dissect this fascinating field of study. This course is delivered through interactive lectures and critical, group discussions of primary research papers.

CELL BIOLOGY OF ‘SELECT AGENTS’  
Ciaran Finn

In the early 2000s, the US Federal Select Agent Program (FSAP) was established in the light of an increasing risk of bioterrorist attacks. Encompassing biological agents and toxins with the potential to pose a severe threat to public health and safety, the current ‘select agent’ list contains approximately 70 agents and/or toxins. While threats such as smallpox, anthrax and bubonic plague are well known, this course will focus on 3 lesser known bacterial agents on the list, namely those responsible for the diseases Brucellosis (Brucella spp.), Q Fever (Coxiella burnetii) and Tularaemia (Francisella tularensis). The module will take a student-led approach to explore the history of these bacterial pathogens, aspects of pathogenesis and disease that establish these organisms as select agents, alongside the Select Agent Program itself. Students will be provided with primary research articles and scientific reviews and, in a group format, present and discuss these with the class.
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 must choose an essay from the list provided in the handbook. 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.

2018-19 Essay titles:
1. Quorum sensing in Gram-negative bacteria
2. Autophagy in Saccharomyces cerevisiae
3. FNR, a global transcriptional regulator in the Enterobacteriaceae
4. The contribution of efflux to colistin resistance in multidrug resistant Acinetobacter baumannii
5. Invasive non-typhoidal Salmonellosis in Africa: origins, incidence and current outlook
6. Eradication of measles virus
7. Microsporidia: an obligate intracellular parasite
8. Interactions between Staphylococcus aureus and Pseudomonas aeruginosa; consequences for pathogenicity.

Essay Instructions
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.
Essay Submission

Two hard copies of the completed essay must be submitted to the departmental office by 4pm on Monday 21st January 2019. Students are urged to save “back-up” files regularly in case of computer problems.

An electronic copy of the completed essay should be submitted to the Departmental Secretary on the same day. Use the filename SS Research_Essay18_19_username.doc and include this name in the subject line of the email.

In addition, essays should be uploaded to Turnitin. To access Turnitin students are required to create a user account.

The essay Class ID is: 19005766, the Enrolment Password is: HS8nGa

You can upload your essay to Turnitin at any time and as many times as you like before the essay submission deadline. Turnitin will generate an Originality Report and guidelines to interpreting the report are posted on Blackboard. Students will not be able to view instructor comments or grades in GradeMark. Please note that when uploading your essay for the second and subsequent times it can take 24 hours for Turnitin to produce the Originality Report.

It is strongly recommended that you familiarize yourself with Turnitin through the student tutorials before the essay submission date.
http://www.turnitin.com/en_us/training/student-training For more information see Appendix C

Declaration

When submitting the review, you must sign the essay sign-in sheet and have it countersigned by the secretary. Since essays are anonymously marked, do not put your name on any page of the essay. Instead create a separate “cover page” containing your Name & Student Number only.

Following the “cover page” and on a new sheet include 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 http://tcd-ie.libguides.com/plagiarism/ready-steady-write

The statement should be signed and dated.

The “title page” should ONLY have the title of the review essay. The order of pages should be (a) Cover Page (b) Declaration Page (c) Title Page (d) Abstract (e) Introduction, etc. Expensive covers are not required, just a single staple will suffice.

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**

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.

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 [http://tcd-ie.libguides.com/plagiarism](http://tcd-ie.libguides.com/plagiarism)

It includes the following:

(i) The 2017-18 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 [http://tcd-ie.libguides.com/plagiarism/ready-steady-write](http://tcd-ie.libguides.com/plagiarism/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

23 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 faculty, school or 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. Further details of procedures for reporting a student as non-satisfactory are given on the College website at https://www.tcd.ie/undergraduate-studies/academic-progress/attendance-course-work.php

(Above Abstracted from the College Calendar – www.tcd.ie/calendar)

B. PLAGIARISM

The College Calendar has been updated for 2017-18. 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 2017-18 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 http://tcd.ie.libguides.com/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 2017-18 Calendar entry on plagiarism

82 Plagiarism is interpreted by the University as the act of presenting the work of others as one’s own work, without acknowledgement. Plagiarism is considered as academically fraudulent, and an offence against University discipline. The University considers plagiarism to be a major offence, and subject to the disciplinary procedures of the University.

83 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.

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) quoting directly, without acknowledgement, from books, articles or other sources, either in printed, recorded or electronic format;

(d) paraphrasing, without acknowledgement, the writings of other authors.

Examples (c) and (d) 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.

Students should 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, work submitted which is the product of collusion with other students may be considered to be plagiarism.

84 It is clearly understood that all members of the academic community use and build on the work of others. It is commonly accepted also, however, that we build on the work of others in an open and explicit manner, and with due acknowledgement. Many cases of plagiarism that arise could be avoided by following some simple guidelines:

(i) Any material used in a piece of work, of any form, that is not the original thought of the author should be fully referenced in the work and attributed to its source. The material should either be quoted directly or paraphrased. Either way, an explicit citation of the work referred to should be provided, in the text, in a footnote, or both. Not to do so is to commit plagiarism.

(ii) When taking notes from any source it is very important to record the precise words or ideas that are being used and their precise sources.

(iii) While the Internet often offers a wider range of possibilities for researching particular themes, it also requires particular attention to be paid to the distinction between one's own work and the work of others. Particular care should be taken to keep track of the source of the electronic information obtained from the Internet or other electronic sources and ensure that it is explicitly and correctly acknowledged.

85 It is the responsibility of the author of any work to ensure that he/she does not commit plagiarism.

86 Students should ensure the integrity of their work by seeking advice from their lecturers, tutor or supervisor on avoiding plagiarism. All schools and departments should include, in their handbooks or other literature given to students, advice on the appropriate methodology for the kind of work that students will be expected to undertake.

87 If plagiarism as referred to in §82 above is suspected, in the first instance, the head of school, or designate, will write to the student, and the student’s tutor advising them of the concerns raised and inviting them to attend an informal meeting with the head of school, or designate, (The director of teaching and learning (undergraduate) may also attend the meeting as appropriate. As an alternative to their tutor, students may nominate a representative from the Students’ Union to accompany them to the meeting) 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 the student to attend. If the student does not in this manner agree to attend such a meeting, the head of school, 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.

88 If the head of school, 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 head of school, or designate. If the facts of the case are in dispute, or if the head of school, 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.

89 If the offence can be dealt with under the summary procedure, the head of school, or designate, will recommend to the Senior Lecturer one of the following penalties:

(a) that the piece of work in question receives a reduced mark, or a mark of zero; or
(b) if satisfactory completion of the piece of work is deemed essential for the student to rise with his/her year or to proceed to the award of a degree, the student may be required to re-submit the work. However the student may not receive more than the minimum pass mark applicable to the piece of work on satisfactory re-submission.

90 Provided that the appropriate procedure has been followed and all parties in §87 above are in agreement with the proposed penalty, the Senior Lecturer may approve the penalty and notify the Junior Dean accordingly. The Junior Dean may nevertheless implement the procedures as referred to under Conduct and College Regulations §2.


C. TURNITIN

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 http://tcd-ie.libguides.com/plagiarism/detecting-plagiarism and to access the student training tutorial, see http://www.turnitin.com/en_us/training/student-training

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.

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<tr>
<th>Mark Range</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>I 90-100</td>
<td>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.</td>
</tr>
<tr>
<td>80-89</td>
<td>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.</td>
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<tr>
<td>70-79</td>
<td>MAINLY OUTSTANDING ANSWER; falls short on presentation and reading or thought beyond the course, but retains insight and originality typical of first class work.</td>
</tr>
<tr>
<td>II-1 65-69</td>
<td>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.</td>
</tr>
<tr>
<td>60-64</td>
<td>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.</td>
</tr>
<tr>
<td>II-2 55-59</td>
<td>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.</td>
</tr>
<tr>
<td>50-54</td>
<td>INCOMPLETE ANSWER; suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail.</td>
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</table>
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/

If you are experiencing problems with accessing your lecture notes on the Microbiology website, Please contact Departmental Office.

F. STUDENT LOCKERS
All Students must use lockers located in the Department. Students are required to pay €20.00 with a €10.00 refund when the key is returned at the end of the year. Students should go to the Microbiology Departmental Office to arrange this.

G. 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
Room: 2054 Arts Building
Phone: 01 896 3111
Email: klewis@tcd.ie

For further information please follow the link below to access the Student Handbook:
H. Health and Safety

Please read and familiarise yourself with the Faculty Health & Safety Guidance Manual available online at


You will be provided with Health and Safety forms by the Department. Please complete and return as appropriate.

The white forms (Health and Safety Declaration AND confidential safety questionnaire MUST be returned to the Microbiology Departmental Office no later than noon on Friday 14th September 2018.

If you answer yes to questions 1, 2 or 3 on the confidential safety questionnaire then you must bring the green form to the College Health Centre or your GP no later than Monday 17th September. Completion and return of the Health and Safety Forms is mandatory and failure to do so by the dates indicated above may prevent you from participating in the first laboratory practical session.

I. LIST OF DATES TO REMEMBER

- To be completed by 10th September
  Elect Class Representative and Inform Jayne Vance (magoverj@tcd.ie)

- Thursday 13th September, 14:00
  Careers talk by Ms. Karina Septore, (Moyne Lecture Theatre)

- To be completed by 20th September
  Advanced Topic Course choices – form to be submitted to the Departmental Office

- To be completed by Monday 1st October
  Project allocation - Class Representative to prepare Excel files for project choice against student names and e-mail to the Departmental Office (magoverj@tcd.ie)

- Wednesday 10th & Thursday 11th October, 09:00 – 11:00
  Library talk by Margaret Rooney, Science Librarian (East End 4, EE4 {EE PC Lab 2})

- 12th, 15th, 16th October at 9am
  Interviews with Prof. Charles Dorman (Please wait in the Foyer)

- Tuesday 16th October at 11:00am
  Postgraduate studies, Charles Dorman

- Navigating the job application process, Joan Geoghegan & Vivienne Mahon TBC
• Study/Review Week:
  Monday 22 October to Friday 26 October 2018

• Project lab activity dates
  Monday 12th Nov - Friday 30th Nov 2018
  Monday 21st Jan - Friday 1st March 2019
All Lab presentations to be discussed with Supervisors before and after the projects (Booklet To Follow).

• Revision Week Semester 1:
  Monday 3 December to Friday 7 December 2018

• Monday 21st January
  Essay submission deadline

• Friday, February 8th at 12noon
  Project Information Session (Moyne Lecture Theatre) with Prof. Charles Dorman

• Study/Review Week:
  Monday 4 March to Friday 8 March 2019

• Friday 8th March @3pm
  Poster Session “Festival of Research”
A PPT and PDF of your poster to be emailed to magoverj@tcd.ie by 10am
Wednesday 27th February and NO LATER (Booklet to Follow).

• Tuesday 25th March
  Project submission deadline

• Revision Week Semester 2:
  Monday 15 April to Friday 19 April 2019

• Monday 15th – Friday 19th April
  Pre-Exam Vivas (Dates may change)

• Trinity week:
  Monday 29 April to Friday 3 May 2019

Formal Assessment weeks
  Semester 1 examinations  Saturday 8 December to Friday 14 December 2018
  Semester 2 examinations  Tuesday 23 to Saturday 27 April 2019
  (and Tuesday 30 April and Thursday 2 May 2019 if required)

• May 2019
  Post Examinations Vivas – TBC
  Information session on Examinations – TBC
J. 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.

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

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

MyCareer: mycareerconnect.tcd.ie
www.tcd.ie/Careers/students/postgraduate/

TCD.Careers.Service
@TCDCareers
TCDCareers

Opening Hours

During term: 9.30am - 5.00pm, Monday - Friday

Out of Term: 9.30am - 12.30pm & 2.15 - 5.00pm, Monday - Friday
Advanced Topic Course (MIU44004)

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<thead>
<tr>
<th>Course Title</th>
<th>Lecturer</th>
<th>Choose by ticking box</th>
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<tbody>
<tr>
<td>Lessons from yeasts</td>
<td>Ursula Bond</td>
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<td>Regulation of bacterial gene expression</td>
<td>Charles Dorman</td>
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<td>Chromatin, epigenetics and disease</td>
<td>Alastair Fleming</td>
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<td>The molecular basis of immune evasion by <em>Staphylococcus aureus</em></td>
<td>Joan Geoghegan</td>
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<td>Drug repurposing to meet the challenge of antimicrobial resistance - “A Battle of the Titans”</td>
<td>Marta Martins</td>
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<td>Small rna-mediated gene regulation in gram-negative bacteria</td>
<td>Carsten Kröger</td>
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<td>Viral Pathogenesis</td>
<td>Kim Roberts</td>
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<td>Cell Biology of ‘Select Agents’</td>
<td>Ciaran Finn</td>
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Please return to Departmental Office by Thursday 20th September