Maynooth University Department of Biology

Third Year Handbook 2024-2025

Maynooth University
National University of Ireland Maynooth

Maynooth University Biology Department:

Aims of the department

To enhance students' knowledge and understanding of important concepts in the Biological Sciences and to develop their analytical, practical and communication skills and appreciation of environmental and other bioethical issues.

Our department's commitment to equality, diversity, and inclusion:

The Maynooth University Biology department is committed to equality, diversity and inclusion. We are proud to have been the first department in the University to receive an externally validated Athena Swan Silver Department Award for our work toward promoting gender equality, diversity and inclusion within the Department of Biology.

Our goals in this area include supporting and advancing women's careers in Biology, promoting work-life balance in the department and address any gender equity or diversity issues within the department. We look forward to engaging with all members (students and staff) of the department as we implement our Gender Equality Action Plan. As part of this we will continue to seek input from the student population (through surveys and focus groups) and will endeavor to keep you informed of our progress in this area.

For more information on the Department of Biology's Gender Equality Action Plan, please see https://www.maynoothuniversity.ie/biology/athena-swan or contact Dr Mark Robinson (Biology Athena Swan Chair): Mark.Robinson@mu.ie

Biology Department Athena SWAN Committee.

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Dear 3rd year Students,

Welcome back for the 3rd year of your studies!

We hope that you will enjoy your 3rd year course in the Department of Biology.

Please read this 3rd year Information Handbook carefully and keep a copy readily to hand, so that you can refer to the information in the handbook if required during the year. This handbook also contains a lot of practical information to support you during your studies this year.

We remind you that the marks you obtain for your 3rd year contribute 20% of your final degree mark awarded in 4th year. Your ranking in 3rd year will also influence the allocation of final year capstone projects. It is therefore very important that you engage with all 3rd year lecturing material, continuous assessment and exams to give yourself the best chance to do well in your degree.

We wish you all the best for your studies in Biology this year,

Department of Biology

MAYNOOTH UNIVERSITY DEPARTMENT OF BIOLOGY

INFORMATION FOR THIRD YEAR STUDENTS 2024-2025

Calendar 2024– 2025

FIRST SEMESTER

Thursday 12th September	Third Year Online Registration
Monday 23rd September	Lectures commence
Monday 28th October to Friday 1st November	Study Week
Monday 4th November	Resumption of Lectures
Friday 20th December	Conclusion of First Semester Lectures
Monday 23rd December to Friday 3rd January	Christmas Vacation
Monday 6th January to Thursday 9th January	Study Period
Not before Friday 10th January	Examination period commences

SECOND SEMESTER

Tuesday 3rd February	Lectures resume
Monday 17th March to Friday 21st March	Study Week
Monday 21st April to Friday 25th April	Easter Vacation
Monday 28th April	Resumption of Lectures
Friday 9th May	Conclusion of Second Semester
Monday 12th to Thursday 15th May	Study Period
Not before Friday 16th May	Examination period commences

Students can change their **First Semester Selections in the first THREE weeks of Semester 1 and in the first TWO weeks of Semester 2 for all Second Semester selections.**

Changes **cannot be made after these deadlines** and students will have to take the modules they initially registered for on the University System.

3rd Year Teaching Resource Charge

- **Biology/Science Education/Biological & Geographical Sciences: €15.00 field course, manuals & handouts.**
- **Biological & Biomedical Science: €20.00 Field course, manuals & handouts.**
- **Biotechnology/Pharmachem: €10.00 manuals & handouts.**

Please pay online through "Biology Shop" any time before 4th October with a credit or debit card.

You will receive your practical manual during your first laboratory session. Please ensure you have paid online in advance of this.

DEPARTMENT OF BIOLOGY STAFF CONSULTATION TIMES

Teaching Staff	Phone ext*	Room	E-mail	Consultation Time
Prof. Paul Moynagh *Head of Department*	6105	B3.15	fidelma.byrne@mu.ie	By Appointment Only
Dr. Özgür Bayram	6879	2.31	ozgur.bayram@mu.ie	Tuesday 11.00-13.00
Dr. Marion Butler	3856	B3.18	marion.butler@mu.ie	Monday 11.30-13.30
Dr. Jim Carolan	6367	2.29	james.carolan@mu.ie	Monday 11.00-14.00
Dr. Noreen Curran	3834	1.18	noreen.curran@mu.ie	Friday after lecture
Dr. John Devaney	7496	2.27	john.devaney@mu.ie	Wednesday 11.00 - 13.00
Dr. Tara Dirilgen	7261	F2	tara.dirilgen@mu.ie	Thursday 14:00-16:00
Dr. Paul Dowling	6368	2.35	paul.dowling@mu.ie	Tuesday 11.00-13.00
Prof. Sean Doyle	3858	1.24**	sean.doyle@mu.ie	Tuesday 10.00-11.30
Prof. Karen English	6290	B3.17	karen.english@mu.ie	Monday 14.00-16.00
Dr. David Fitzpatrick	Teams	1.26**	david.fitzpatrick@mu.ie	Monday 10.00-11.00
Dr. Emmanuelle Graciet	6255	B1.25	emmanuelle.graciet@mu.ie	Tuesday 10.00-12.00
Dr. Andy Hogan	6118	B2.16	andrew.e.hogan@mu.ie	Monday 11.00-12.00
Dr. Grace Hoysted	Teams	2.25	grace.hoysted@mu.ie	Tuesday 10.00-12.00
Prof. Kevin Kavanagh	3859	2.39	kevin.kavanagh@mu.ie	Monday 14.00–16.00
Dr. Lorna Lopez	Teams	2.36	lorna.lopez@mu.ie	Monday 10.00-11.30
Dr. Abigail Maher	6117	F6	abigail.maher@mu.ie	Tuesday 11.00-12.00
Dr. Joanne Masterson	6369	B2.17	joanne.masterson@mu.ie	Monday 14.00-16.00
Dr. Eoin McNamee	6148	B2.19	eoin.n.mcnamee@mu.ie	Monday 10.00-11.30
Dr. Conor Meade	6386	2.34	conor.meade@mu.ie	Monday 12.00-13.00
Dr. Sinead Miggin	3855	B3.14	sinead.miggin@mu.ie	Tuesday 12.00-13.00
Dr. Dania Movia	Teams	F1	dania.movia@mu.ie	Tuesday 12.00-13.00
Dr. Jackie Nugent	3857	B1.23	jackie.nugent@mu.ie	Tuesday 10.00-12.00
Dr. Shirley O'Dea	6480	F7	shirley.odea@mu.ie	Monday 10.00-11.30
Dr. Diarmuid O'Maoileidigh	Teams	B3.08	diarmuid.s.omaoileidigh@mu.ie	Monday 10:00-12:00
Prof. Kay Ohlendieck	3842	2.33	kay.ohlendieck@mu.ie	Monday 12.00-13.00
Dr. Rebecca Owens	3839	2.30	rebecca.owens@mu.ie	Wednesday 10.00-12.00
Dr. Mark Robinson	Teams	B1.21	mark.robinson@mu.ie	Wednesday 14.00-16.00
Dr. Martina Schroeder	6853	B2.18	martina.schroeder@mu.ie	Monday 10.00-11.00
Prof. Fiona Walsh	7246	B1.24	fiona.walsh@mu.ie	Thursday 11.30-12.30

*Phone prefix: **(01) 708 *except*** numbers in **red which are prefixed by (01) 474…**

**=Located on ground floor Callan Building; F=Located in Foyer, 1st floor Callan Building; B=Biosciences & Electronic Engineering Building

The times when staff are normally available for consultation are given above. Appointments for other times must be arranged with individual lecturers. Staff with Teams listed under Phone No. can be contacted via Microsoft Teams.
Administrative Offices 2.40, 2.41 open daily: 9.30am-12.30pm; 2.30-4.30pm e-mail: biology.department@mu.ie

Programme Coordinators:

OMNIBUS SCIENCE:	Dr. Jackie Nugent
BIOTECHNOLOGY:	Dr. Shirley O'Dea
SCIENCE EDUCATION:	Dr. Jackie Nugent
BIOLOGICAL & BIOMEDICAL SCIENCES:	Prof. Kevin Kavanagh
BIOLOGICAL & GEOGRAPHICAL SCIENCES:	Dr. Conor Meade
INTERNATIONAL COORDINATOR	Dr. Paul Dowling
MAP (MATURE AND ACCESS STUDENTS) ACADEMIC ADVISOR:	Dr. Joanne Masterson
POSTGRADUATE COORDINATOR:	Dr. Martina Schroeder
MSC IN IMMUNOLOGY & GLOBAL HEALTH:	Dr. Sinead Miggin

For urgent matters please contact biology.department@mu.ie to make an appointment with the relevant Programme Coordinators.

BIOLOGY DEPARTMENT – COMMUNICATION GUIDELINES FOR STUDENTS

This document is designed to clarify:
- how your lecturers and module coordinators will communicate with the class
- how your lecturers and module coordinators will communicate with individual students
- how students can best communicate with lecturing staff and with each other

1. General guidelines
- you should **indicate your name and student number** in any e-mail you send to a lecturer.
- you should always check that your question(s) has/have not already been answered in documents posted on Moodle and Teams, or in a previous e-mail or module announcement.
- regarding general questions on module content, you should seek to find module information on Course Finder first.
- unless it is an emergency, you should seek to contact your lecturers and module coordinators during normal working hours and days.
- members of staff will do their best to answer new queries within 48 hours (during working days). Please allow at least 48 hours for a reply to your e-mail before contacting the same person or a different staff member in relation to the same query. If your query has already been answered in a previous e-mail or post, it may take longer to reply to your e-mail.

2. Class announcements by lecturers and module coordinators

Class announcements can be done using three platforms:
- e-mails to the class. We will always use your MU e-mail address.
- and/or Lecturers announcements on a specific module's Moodle page
- and/or using the chat function in a specific module page on Teams

Class announcements can be used by your lecturers to send reminders, but also to answer queries received by e-mail from individual students, if the query is relevant to the whole class. In this case, you may not receive an individual reply to your original e-mail.

It is your responsibility to check e-mails regularly, Moodle and Teams as well. Each of these platforms have the option of sending notifications. We encourage you to **turn on these automatic notifications**.

A lecturer or module coordinator may not prioritize replying to your e-mail if the answer is already available to the class.

3. Lecturing staff communication with individual students

If a query received by e-mail does not regard the whole class, lecturing staff will do their best to answer the student individually in a timely manner (e.g. within a couple of days). While we are happy to help you study and ensure that we provide an environment that promotes learning, some queries are not acceptable and cannot be answered.

<u>What queries are NOT acceptable?</u>
- asking for answers or corrections to previous exam questions. This query is not acceptable, because it is your work that is assessed and so your submissions need to reflect your own writing, ideas and thoughts.

- asking for details of calculation, answers or corrections for lab-write ups before these are handed in. This query is not acceptable, because it is your work that needs to be assessed. Practical-related questions should be asked to demonstrators or lecturers during the lab sessions.
- demonstrators should not be asked to provide details of calculations or to pre-correct your lab write ups at any time. All questions to demonstrators should be asked during the lab sessions.
- asking for slides or lecture notes of a module that you are not registered for.

4. Communication among students in a class

Students in a class can use multiple 'official' platforms to communicate among themselves. We encourage these because they foster group work and mutual help. Posts and communications on different platforms (Moodle, Teams, e-mails) should be linked to the course/module, courteous and respectful. Note that these platforms are accessible to the whole class, including lecturers.

Platforms available:

- Class discussion forum on a specific module's page on Moodle
- Teams chat on a specific module's Teams group

MODULE COORDINATOR CONTACT DETAILS

CODE	NAME	Coordinator	e-mail address
BI203	Animal Physiology	Paul Dowling	paul.dowling@mu.ie
BI301	Introduction to Immunology	Sinead Miggin	sinead.miggin@mu.ie
BI302	Microbiology	Rebecca Owens	rebecca.owens@mu.ie
BI303	Ecology	John Devaney	John.devaney@mu.ie
BI304	Molecular Biology 2	Martina Schroeder	martina.schroeder@mu.ie
BI305	Dissertation	Conor Meade	conor.meade@mu.ie
BI306	Plant Responses to the Environment	Emmanuelle Graciet	Emmanuelle.graciet@mu.ie
BI308	Proteomics	David Fitzpatrick	david.fitzpatrick@mu.ie
BI309	General Methodology	Sinead Miggin	sinead.miggin@mu.ie
BI310	Animal Behaviour & Comparative Physiology	Abigail Maher	abigail.maher@mu.ie
BI311	Microbial Biotechnology	Kevin Kavanagh	kevin.kavanagh@mu.ie
BI312	Scientific Writing	Kevin Kavanagh	kevin.kavanagh@mu.ie
BI314	Scientific Communication	Sean Doyle	sean.doyle@mu.ie
BI315	Bioinformatics	David Fitzpatrick	david.fitzpatrick@mu.ie
BI316	Molecular Pharmacology and Toxicology	Kay Ohlendieck	kay.ohlendieck@mu.ie
BI317	Inquiry Based Teaching and Learning	Jackie Nugent	Jackie.nugent@mu.ie
BI320	Field Course in Ecology	John Devaney	John.devaney@mu.ie
BI352	Scientific Writing (Biology & Environment)	Grace Hoysted	grace.hoysted@mu.ie
BI403	Plant Biotechnology	Noreen Curran	noreen.curran@mu.ie
BI405	Advanced Immunology	Martina Schroeder	martina.schroeder@mu.ie
BI406	Behavioural Ecology	Abigail Maher	abigail.maher@mu.ie
BI411	Bioethics & Biotechnology	Sean Doyle	sean.doyle@mu.ie
BI435	Molecular Ecology and Biogeography	Conor Meade	conor.meade@mu.ie
BI437	Neuromuscular Biology	Kay Ohlendieck	kay.ohlendieck@mu.ie
BI440	Control of Protein Activity	Emmanuelle Graciet	emmanuelle.graciet@mu.ie
BI441	Fungal & Bacterial Secondary Metabolism	Ozgur Bayram	ozgur.bayram@mu.ie
BI443	Clinical Proteomics: Discovery, Validation & Medical Utility	Paul Dowling	paul.dowling@mu.ie

Third Year Committee: terms and conditions to be decided. Also, the Biology department's gender equality steering committee may engage with the student reps in focus groups during the academic year.

The members may include:

- Programme coordinators and the 3rd year Biology coordinator and
- elected third year student academic reps (MSU to hold elections):

Problems and matters of interest will be discussed.

If you have issues which you would like to be considered, you should tell your representative

LABORATORY PRACTICAL ARRANGEMENTS

Information on Laboratory Practical Arrangements will be posted on Module Moodle Pages.

Registration for Modules

SUBJECT: BIOLOGY - BL3DM **Year of Study:** 3rd
Qualification: BSc Science (Honours);
BSc Physics with Astrophysics

Registration will take place on line, as instructed by the Registrar's Office. This document is for information only.

You must take **ALL** compulsory modules listed below. You must take a total of **30** Credits.

Module name	*Credits*	Semester	Module code	Compulsory Modules are ticked
Semester 1 – Compulsory Modules **You are required to take all compulsory modules**				
Introduction to Immunology	5	1	BI301	√
Ecology	5	1	BI303	√
Dissertation	5	1	BI305	√
Semester 2 – Compulsory Modules **You are required to take all compulsory modules**				
Microbiology	5	2	BI302	√
Molecular Biology 2	5	2	BI304	√
Semester 2 – Optional Modules **Select one of the following modules**				
Plant Responses to the Environment	5	2	BI306	
Bioinformatics	5	2	BI315	

Latest Dates for Changing Optional Modules:

The latest date for change of optional modules in Semester 2 is the Friday of Week 2 of Semester 2.

No changes allowed after these dates. It is your responsibility to inform the Student Records Office of all changes to your module selection.

SUBJECT: **BIOTECHNOLOGY - BL3T35** **Year of Study:** **3rd**
Qualification: **BSc (Biotechnology)**

Registration will take place on line, as instructed by the Registrar's Office. This document is for information only.

You must take all compulsory modules listed below. You must take a total of **35** Credits.

Module name	***Credits***	**Semester**	**Module code**	**Compulsory Modules are ticked**
Semester 1 – Compulsory Modules **You are required to take all compulsory modules**				
Animal Physiology	5	1	BI203	√
Introduction to Immunology	5	1	BI301	√
Dissertation	5	1	BI305	√
Scientific Communication	5	1	BI314	√
Semester 2 – Compulsory Modules **You are required to take all compulsory modules**				
Microbiology	5	2	BI302	√
Molecular Biology 2	5	2	BI304	√
Proteomics	5	2	BI308	√

SUBJECT: BIOLOGY - BL3F20 **Year of Study:** 3rd
Qualification: BSc (Science Education)

Registration will take place on line, as instructed by the Registrar's Office. This document is for information only.

You must take all of the modules listed below. You must take a total of **20** Credits.

Module name	*Credits*	Semester	Module code
Semester 1 – Compulsory Modules **You are required to take all compulsory modules**			
Ecology	5	1	BI303
Inquiry Based Biology Teaching & Learning	5	1	BI317
Semester 2 – Compulsory Modules **You are required to take all compulsory modules**			
Microbiology	5	2	BI302
Plant Responses to the Environment	5	2	BI306

SUBJECT: Pharmaceutical Chemistry **Year of Study:** 3rd
Qualification: BSc (Pharmaceutical and Biomedical Chemistry)

Registration will take place online, as instructed by the Registrar's Office. This document is for information only.

You must take all of the modules listed below which are compulsory. You must take a total of **15** Credits from Biology options.

Module name	*Credits*	Semester	Module code
Semester 1 – Compulsory Modules **You are required to take all compulsory modules**			
Introduction to Immunology	5	1	BI301
Semester 2 – Compulsory Modules **You are required to take all compulsory modules**			
Molecular Biology 2	5	2	BI304
Proteomics	5	2	BI308

SUBJECT: **BIOLOGICAL & GEOGRAPHICAL SCIENCES - BG3SM** **Year of Study:** **3rd**
Qualification: BSc (Biological and Geographical Sciences)

Registration will take place online, as instructed by the Registrar's Office. This document is for information only.

MH203 Biological and Geographical Sciences students (both streams) must take all the compulsory modules listed below, comprising **20** Credits. Optional modules are also available, based on guidelines below.

Module name	*Credits*	Semester	Module code	Compulsory Modules are ticked
Semester 1 – Compulsory Modules **You are required to take all compulsory modules**				
Ecology	5	1	BI303	√
Dissertation	5	1	BI305	√
Scientific Writing Biology & Environment	5	1	BI352	√
Semester 1 – Optional Module				
Animal Behaviour & Comparative Physiology	5	1	BI310	
Semester 2 – Compulsory Modules **You are required to take all compulsory modules**				
Field course in ecology MH203 biological and geographical sciences	5	2	BI320	√
Semester 2 – Optional Modules				
Microbiology	5	2	BI302	
Plant Responses to the Environment	5	2	BI306	

Notes for registration

1. MH203 students following the **Data Science** pathway take 4 compulsory Biology modules (There are no optional Biology modules for this stream in 3rd year).
2. *MH203 Students following the **Laboratory Science/Junior Cycle Teaching** Pathway must select **TWO** options in **Biology** (10 optional credits in total).

SUBJECT: **BIOLOGY BL3LDM** **Year of Study:** **3rd**
Qualification: **BSc (Biological & Biomedical Sciences)**

Registration will take place on line, as instructed by the Registrar's Office. This document is for information only.

You must take all compulsory modules listed below. Select 2 optional modules, one from Semester 1 and one from Semester 2. You must take a total of **30** Credits.

Module name	***Credits***	**Semester**	**Module code**	**Compulsory modules are ticked**
Semester 1 – Compulsory Modules **You are required to take all compulsory modules**				
Ecology	5	1	BI303	√
Dissertation	5	1	BI305	√
Semester 1 – Optional Modules **Select ONE module from the following Group:**				
Plant Biotechnology	5	1	BI403	
Advanced Immunology	5	1	BI405	
Bioethics & Biotechnology	5	1	BI411	
Fungal & Bacterial Secondary Metabolism	5	1	BI441	
Semester 2 – Compulsory Modules **You are required to take all compulsory modules**				
Microbiology	5	2	BI302	√
Molecular Biology 2	5	2	BI304	√
Semester 2 – Optional Modules **Select ONE module from the following Group:**				
Plant Responses to the Environment	5	2	BI306	
Bioinformatics	5	2	BI315	

Latest Dates for Changing Optional Modules:

Latest date for change of optional modules in Semester 1 is the Friday of Week 3 of Semester 1 and the latest date for change of optional modules in Semester 2 is the Friday of Week 2 of Semester 2.

No changes allowed after these dates. It is your responsibility to inform the Student Records Office of all changes to your module selection.

SUBJECT: **BIOLOGICAL & BIOMEDICAL SCIENCES BL3BDM** **Year of Study:** **3rd**
Qualification: **BSc (Biological & Biomedical Sciences)**

Registration will take place on line, as instructed by the Registrar's Office. This document is for information only.

You must take all compulsory modules listed below. Select 1 optional module for Semester 2. You must take a total of **30** Credits.

Module name	***Credits***	***Semester***	**Module code**	**Compulsory modules are ticked**
Semester 1 – Compulsory Modules ***You are required to take all compulsory modules***				
Animal Behaviour and Comparative Physiology	5	1	BI310	√
Microbial Biotechnology	5	1	BI311	√
Scientific Writing	5	1	BI312	√
Semester 2 – Compulsory Modules ***You are required to take all compulsory modules***				
General Methodology	5	2	BI309	√
Molecular Pharmacology & Toxicology	5	2	BI316	√
Semester 2 – Optional Modules **Select ONE module from the following Group*:***				
Behavioural Ecology	5	2	BI406	
Molecular Ecology and Biogeography	5	2	BI435	
Neuromuscular Biology	5	2	BI437	
Control of Protein Activity	5	2	BI440	
Clinical Proteomics: Discovery, Validation & Medical Utility	5	2	BI443	

Latest Dates for Changing Optional Modules:

Latest date for change of optional modules in Semester 1 is the Friday of Week 3 of Semester 1 and the latest date for change of optional modules in Semester 2 is the Friday of Week 2 of Semester 2.

No changes allowed after these dates. It is your responsibility to inform the Student Records Office of all changes to your module selection.

SUBJECT: **BIOLOGICAL & BIOMEDICAL SCIENCES** **Year of Study:** **4th**
Qualification: BSc (Biological Sciences)

This page is for the information of 3rd Biological Science & Biomedical students only, as they will be choosing optional modules this year which are listed below. This will enable them to see what modules will be left for them to choose from next year if they wish to graduate with a Biological Science Degree.

Module name	*Credits*	*Semester*	Module code	Tick Selection here
Semester 1 – Compulsory Modules ***You are required to take all compulsory modules***				
Seminar Series	5	Year long	BI420	√
Research Methodology 1	5	1	BI421	√
Compulsory Modules (Capstone Project) **You are required to take *either:*** **BI423 and BI425 *OR* BI445 *OR* BI448 *OR* BI447.**				
Literature Project 1	10	Year long	BI423	
Advanced Practicals/Professional Modules 1	5	Year long	BI425	
Biological Science Research Project	15	1 OR 2	BI445	
Prior Research Project	15		BI448	
Sandbox Project	20	Year long	BI447	
Semester 1 – Optional Modules. **Select *either 3 or 4* modules from the following Group*:***				
Plant Biotechnology*	5	1	BI403	
EITHER Advanced Immunology **OR**	5	1	BI405	
Fungal & Bacterial Secondary Metabolism*	5	1	BI441	
EITHER Tumour Biology **OR**	5	1	BI407	
Bioethics & Biotechnology*	5	1	BI411	
Translational Clinical Research	5	1	BI433	
Human Nutrition & Metabolic Disease	5	1	BI444	
Semester 2 – Optional Modules. **Select *either 3 or 4* modules from the following Group*:***				
EITHER Behavioural Ecology* **OR**	5	2	BI406	
Clinical Proteomics: Discovery, Validation & Medical Utility	5	2	BI443	
Plant Developmental Biology*	5	2	BI410	
Applied Immunology	5	2	BI418	
Molecular Ecology and Biogeography*	5	2	BI435	
Neuromuscular Biology	5	2	BI437	
Antibiotics: Discovery, Modes of Action & Resistance	5	2	BI439	
EITHER Medical Mycology **OR**	5	2	BI436	
Control of Protein Activity*	5	2	BI440	

- ***some asterisked modules may already have been taken in 3rd year; if so you may choose other modules from the optional lists.**

In order to graduate with a BSc (Hons) Biological Science degree you must pick a minimum of five "core" lecture modules (as part of your 6 or 7 needed) from the following list in your final year:
CORE BIOLOGICAL LECTURE MODULES: BI403, BI406, BI410, BI411, BI435, BI440, BI441

- **If you are taking BI447 Sandbox Project you must take 6 optional modules, 5 of which MUST be chosen from the modules which are asterisked*.**
- **If you are taking BI445 Biological Science Research Project OR BI448 Prior Research Project OR BI423 Literature Project 1 & BI425 Advanced Practicals/Professional Modules, you must take 7 optional modules, 5 of which MUST be chosen from the modules which are asterisked*.**

SUBJECT: **BIOLOGICAL & BIOMEDICAL SCIENCES** **Year of Study:** **4th**
Qualification: BSc (Biomedical Science)

This page is for the information of 3rd Biological Science & Biomedical students only, as they will be choosing optional modules this year which are listed below. This will enable them to see what modules will be left for them to choose from next year if they wish to graduate with a Biomedical Science Degree.

Module name	Credits	Semester	Module code	Tick Selections
Semester 1 – Compulsory Modules You are required to take all compulsory modules				
Seminar Series	5	Year long	BI420	√
Research Methodology 1	5	1	BI421	√
Compulsory Modules (Capstone Project) You are required to take *either:* BI423 and BI425 *OR* BI445 *OR* BI448 *OR* BI447.				
Literature Project 1	10	Year long	BI423	
Advanced Practicals/Professional Modules 1	5	Year long	BI425	
Biological Science Research Project	15	1 OR 2	BI445	
Prior Research Project	15		BI448	
Sandbox Project	20	Year long	BI447	
Semester 1 – Optional Modules. Select either 3 or 4 modules from the following Group:				
Plant Biotechnology	5	1	BI403	
EITHER Advanced Immunology* **OR**	5	1	BI405	
Fungal & Bacterial Secondary Metabolism	5	1	BI441	
EITHER Tumour Biology* **OR**	5	1	BI407	
Bioethics & Biotechnology*	5	1	BI411	
Translational Clinical Research*	5	1	BI433	
Human Nutrition & Metabolic Disease*	5	1	BI444	
Semester 2 – Optional Modules. Select either 3 or 4 modules from the following Group:				
EITHER Behavioural Ecology **OR**	5	2	BI406	
Clinical Proteomics: Discovery, Validation & Medical Utility*	5	2	BI443	
Plant Developmental Biology	5	2	BI410	
Applied Immunology*	5	2	BI418	
Molecular Ecology and Biogeography	5	2	BI435	
Neuromuscular Biology*	5	2	BI437	
Antibiotics: Discovery, Modes of Action & Resistance*	5	2	BI439	
EITHER Medical Mycology* **OR**	5	2	BI436	
Control of Protein Activity	5	2	BI440	

You must take all compulsory modules ticked. Tick the box opposite each optional module, which you have selected to take in Semester 1 and Semester 2. You must take a total of **60** Credits.

In order to graduate with a BSc (Hons) Biomedical Science degree, you must pick a minimum of five "core" lecture modules (as part of your 6 or 7 needed) from the following list in your final year:
CORE BIOMEDICAL LECTURE MODULES: BI405, BI407, BI411, BI418, BI433, BI436, BI437, BI439, BI443, BI444

- **If you are taking BI447 Sandbox Project you must take 6 optional modules, 5 of which MUST be chosen from the modules which are asterisked*.**
- **If you are taking BI445 Biological Science Research Project OR BI448 Prior Research Project OR BI423 Literature Project 1 & BI425 Advanced Practicals/Professional Modules, you must take 7 optional modules, 5 of which MUST be chosen from the modules which are asterisked*.**

***some asterisked modules may already have been taken in 3rd year; if so you may choose other modules from the optional lists.**

MAYNOOTH UNIVERSITY THIRD YEAR COURSES IN BIOLOGY – 2024/25

For a full module descriptions including Learning Outcomes, assessment, etc. please check the module descriptors on the Course Finder webpage:

BI301 Introduction to Immunology. Topics covered include: cellular and non-cellular components of the innate and adaptive immune system, the structure and downstream signaling pathways of the B cell receptor (including VDJ rearrangements), T cell receptor, cytokine receptors and pathogen recognition receptors, the role of the professional antigen presenting cells in initiating the adaptive immune response, the roles of the effector T cells and B cells in the immune response to pathogen, central tolerance, the structure and role of Major Histocompatibility complex (MHC) Class I and Class II molecules, the antigen processing pathways. **BI301**

BI302 Microbiology. Classification methods for bacteria, fungi and viruses; structural features of bacteria, fungi and viruses; microbial growth requirements; controlling microbial growth, aspects of medical microbiology and disease; antibiotics; fungal life styles; mycelial growth and production of degradation enzymes; viral replication mechanisms; viral strategies to avoid host detection. **BI302**

BI303 Ecology. Topics covered include: Soil ecology and the role of microbes in nutrient cycling; The interaction of climate and soil in the formation of the 10 principal global biomes; Vegetation change through succession: patterns, mechanisms and examples from Bogs and Sand Dunes; Lotka-Volterra modeling of organism and population interactions; Intra-specific competition within species; Inter-specific competition between species; Predatory-Prey relationships; Density-dependent and Density-Independent selection mechanisms; Gradients and patterns of global species diversity. Along with a lab-based practical component there will be a weekend field course to introduce field observation of ecological processes. **BI303**

BI304 Molecular Biology 2. Methodologies used for recombinant DNA technology; Regulation of gene expression at the transcriptional and post-transcriptional level, chromatin structure and introduction to epigenetics. **BI304**

BI305 Dissertation. A series of essay titles will be provided to students, and assigned based on a first-come first serve online selection process. In addition to an introductory lecture and a mandatory workshop, the student will be given written details of the approach to take when writing a scientific review of 2000 words or less on their assigned topic. Guidelines will also be supplied to the student regarding assessment rubrics, the mandatory research portfolio, information research and management, academic integrity, and the context of the essay in relation to the 7 skills writing programme. **BI305**

BI306 Plant Responses to the Environment. Topics covered include: genes and gene regulation in plants; signal perception, transduction and cellular/developmental responses; methods to study gene function in plants; environmental regulation of plant growth and development; photoreceptors and how plants perceive light as a developmental signal; temperature as an environmental signal for plants; integration of multiple environmental signals to regulate flowering; plant interactions with other organisms; perception of pathogens by plants; plant immunity; phytohormones involved in plant responses to pathogens; programmed cell death; systemic acquired resistance; plant responses to abiotic stresses. **BI306**

Optional Module (in place of BI306):

BI315 Bioinformatics. databases, database searching, multiple sequence alignment, analysis of gene expression data, next-generation genome sequencing, gene finding, protein structure prediction and phylogeny reconstruction. **BI315**

BI203 Animal Physiology. Principles of molecular, cellular and integrative physiology. An introduction to the organization of nervous systems and endocrine systems in vertebrates. Principles of membrane potential, action potential generation and propagation in neurons. Principles of synaptic transmission. Physiology of contraction in striated and smooth muscle. Physiology of circulatory systems, gas-exchange mechanisms, energy metabolism, osmoregulation and excretion. Physiology of sensory systems including the biology of eye design, colour vision, sound and hearing, mechanoreception, olfaction and taste**.** **BI203**

BI301 Introduction to Immunology. Topics covered include: cellular and non-cellular components of the innate and adaptive immune system, the structure and downstream signalling pathways of the B cell receptor (including VDJ rearrangements), T cell receptor, cytokine receptors and pathogen recognition receptors, the role of the professional antigen presenting cells in initiating the adaptive immune response, the roles of the effector T cells and B cells in the immune response to pathogen, central tolerance, the structure and role of Major Histocompatibility complex (MHC) Class I and Class II molecules, the antigen processing pathways. **BI301**

BI302 Microbiology. Classification methods for bacteria, fungi and viruses; structural features of bacteria, fungi and viruses; microbial growth requirements; controlling microbial growth, aspects of medical microbiology and disease; antibiotics; fungal life styles; mycelial growth and production of degradation enzymes; viral replication mechanisms; viral strategies to avoid host detection. **BI302**

BI304 Molecular Biology 2. Methodologies used for recombinant DNA technology; Regulation of gene expression at the transcriptional and post-transcriptional level, chromatin structure and introduction to epigenetics. **BI304**

BI305 Dissertation. A series of essay titles will be provided to students, and assigned based on a first-come first serve online selection process. In addition to an introductory lecture and a mandatory workshop, the student will be given written details of the approach to take when writing a scientific review of 2000 words or less on their assigned topic. Guidelines will also be supplied to the student regarding assessment rubrics, the mandatory research portfolio, information research and management, academic integrity, and the context of the essay in relation to the 7 skills writing programme. **BI305**

BI308 Proteomics. Methodologies used for protein characterisation and analysis including 1D/2D electrophoresis, Selective enzymatic/chemical protein fragmentation, peptide purification and amino acid sequencing; Matrix Assisted Laser Desorption/Ionisation- Time of Flight (MALDI-TOF) mass spectrometry; Genome database mining. Gene/protein identification by alignment protocols; biologicals and biopharmaceuticals; Implications of contamination/impurities in therapeutic products. **BI308**

BI314 Scientific Communication. This module is designed to enable the student to become familiar with relevant aspects of the biotechnology industry (relevant technologies, Research and Development operations, manufacturing operations, quality management systems, patenting, etc.). As part of a defined team, the student will be required to obtain information (i.e., from scientific literature, company information and internet resources) on a specific area of biotechnology research or industry and communicate effectively with colleagues in order to collate a detailed report. The student will also obtain presentational skills, both verbal and written, by class discussion and co-presenting the report along with team members. Individuals currently working in the biotechnology industry or research area will be invited to present seminars to the students. **BI314**

BI302 Microbiology. Classification methods for bacteria, fungi and viruses; structural features of bacteria, fungi and viruses; microbial growth requirements; controlling microbial growth, aspects of medical microbiology and disease; antibiotics; fungal life styles; mycelial growth and production of degradation enzymes; viral replication mechanisms; viral strategies to avoid host detection. **BI302**

BI303 Ecology. Topics covered include: Soil ecology and the role of microbes in nutrient cycling; The interaction of climate and soil in the formation of the 10 principal global biomes; Vegetation change through succession: patterns, mechanisms and examples from Bogs and Sand Dunes; Lotka-Volterra modeling of organism and population interactions; Intra-specific competition within species; Inter-specific competition between species; Predatory-Prey relationships; Density-dependent and Density-Independent selection mechanisms; Gradients and patterns of global species diversity. Along with a lab-based practical component there will be a weekend field course to introduce field observation of ecological processes. **BI303**

BI304 Molecular Biology 2. Methodologies used for recombinant DNA technology; Regulation of gene expression at the transcriptional and post-transcriptional level, chromatin structure and introduction to epigenetics. **BI304**

BI305 Dissertation. A series of essay titles will be provided to students, and assigned based on a first-come first serve online selection process. In addition to an introductory lecture and a mandatory workshop, the student will be given written details of the approach to take when writing a scientific review of 2000 words or less on their assigned topic. Guidelines will also be supplied to the student regarding assessment rubrics, the mandatory research portfolio, information research and management, academic integrity, and the context of the essay in relation to the 7 skills writing programme. **BI305**

BI306 Plant Responses to the Environment. Topics covered include: genes and gene regulation in plants; signal perception, transduction and cellular/developmental responses; methods to study gene function in plants; environmental regulation of plant growth and development; photoreceptors and how plants perceive light as a developmental signal; temperature as an environmental signal for plants; integration of multiple environmental signals to regulate flowering; plant interactions with other organisms; perception of pathogens by plants; plant immunity; phytohormones involved in plant responses to pathogens; programmed cell death; systemic acquired resistance; plant responses to abiotic stresses. **BI306**

Optional Module (in place of BI306):

BI315 Bioinformatics. databases, database searching, multiple sequence alignment, analysis of gene expression data, next-generation genome sequencing, gene finding, protein structure prediction and phylogeny reconstruction. **BI315**

BI309 General Methodology. General laboratory techniques include: laboratory safety; molarity calculations, making solutions, aseptic technique, correct handling and use of equipment; report writing. More advanced techniques include: bacterial transformation and plasmid DNA preparation, polymerase chain reaction; restriction enzyme digestion; agarose gel electrophoresis; reverse transcription; use of reporter genes; immunoblotting; two-dimensional gel electrophoresis. **BI309**

BI310 Animal Behaviour and Comparative Physiology. Instinct, learning and the development of behaviour; how behaviour evolves; communication; motivation; living in groups; migration, homing and navigation; anti-predator behaviour; biological rhythms; dormancy; temperature relations; adaptation to extreme environments. **BI310**

BI311 Microbial Biotechnology. Fungal fermentation systems, brewing and single cell protein production by fungi, fungal gene alteration, heterologous gene expression in fungi. Bioremediation, engineering microbes to degrade toxic products. Generation of recombinant DNA libraries, library screening, clone characterization and DNA sequencing, expression and purification of recombinant proteins in bacteria. **BI311**

BI312 Scientific Writing. The study of structure and function of research papers, critical reading of research publications: papers, reviews etc, assessment of quality of research publications, literature project on specific Biological topic, oral presentations, group projects. **BI312**

BI316 Molecular Pharmacology & Toxicology. This course outlines basic molecular and cellular concepts of modern pharmacology and toxicology. Molecular pharmacology is concerned with the development, design, structure and action of drugs and their effects on biological systems. Toxicology is the scientific study of poisons and their action, as well as the investigation of drug-induced side effects. Pharmacological agents and toxins are also routinely used as analytical and investigative tools for the assessment of biomolecular or pathophysiological processes. In this module, various classes of drugs and toxins will be presented in the context of their biological effects in therapy and cytotoxicity. **BI316**

MAYNOOTH UNIVERSITY THIRD YEAR COURSES IN BIOLOGICAL SCIENCES – FOURTH YEAR OPTIONS 2024/25

Semester 1: 4th year options For a full course description, go to the Course Finder webpage.

BI403 Plant Biotechnology. In the first half of the course, the commercial use of tissue culture methods for rapid clonal population of crop plants is followed by a consideration of the potential for producing valuable chemicals in cell cultures, and the potential for mutation breeding at the cell level. The remainder of the course looks at the procedures for genetic transformation of crops, examines the relative merits of nuclear vs.plastid transformation, and reviews the progress in relation to a range of traits including herbicide, pest, stress and disease resistance, improved nutritional and storage quality of foods, and the production of valuable pharmaceuticals.

The different methods for transforming crop plants are explained, including infection with modified pathogens such as *Agrobacterium tumefaciens,* and direct DNA delivery methods such as particle bombardment (the "gene gun"), and chemically or electrically induced uptake into protoplasts. The importance of regulation of gene activity, and stability of the transgene are considered, alongside ethical and safety concerns about exploiting the technology. Particular traits, which can be tackled by this approach, are evaluated as a number of case histories. Foremost among these are those which have already led to a marketed product, e.g. tomatoes with a long storage life, cotton resistant to boll weevil, and herbicide resistant soybean. A number of other characters are under development in this rapidly moving field, and new case histories will be introduced every year. **BI403**

BI405 Advanced Immunology. This module will provide the students with a detailed understanding of the immune system, including the signalling pathways and effector molecules that mediate immune effector functions. Topics covered include: Innate Immunity, Pattern recognition receptor signalling, the Major Histocompatibility complex, antigen processing and –presentation, T and B cell activation, Immune effector mechanisms, Cell migration and Inflammation, Transplantation immunology, the immune response to viruses and viral immune evasion.

Assessment: Total marks 100%. 70% for two hour written examination at the end of the semester, **30% continuous assessment (MCQ). BI405**

BI411 Bioethics & Biotechnology. How ethicists work; basic Western ethical ideas including classical and preference utilitarianism, Kant and deontological theory, rights approaches, virtue ethics, feminist thought, the void; application to issues in biology, biotechnology, medicine and environment. Current case histories with stakeholder analyses: these may include genetic engineering, cloning, patenting of biological material. Detailed knowledge of relevant biotechnological science will form a central part of this module. **BI411**

BI441 Fungal & Bacterial Secondary Metabolism. Fungal and bacterial secondary metabolites have great potential due to their potent physiological influences on cellular functions such as antibiotics, antivirals, antifungals, antiapoptotics, cytotoxics, immunosuppressives, and deadly mycotoxins. Therefore, they are extremely important for medical, biotechnological and chemical applications. The focus of this advanced module is the fungal and bacterial secondary metabolites and the control of their production by genetic and epigenetic factors. Specific sections found in this module will be connected with chemical biology, genetics, epigenetics and fungal molecular biology. The major classes of microbial natural products and their biosynthetic pathways will be introduced. Potential impact of the bioactive metabolites in biotechnology, medicine and chemical biology will be discussed in depth. The term "gene clusters" will be introduced by analogy to prokaryotic operons. Control of gene clusters in fungi at the chromatin and epigenetic level will be examined by examples of histone modifications. Cellular signaling elements (MAPK, PKA, PKC) regulating the biosynthesis of fungal secondary metabolites will be analyzed. **BI441**

Semester 2: 4th year Options

BI406 Behavioural Ecology. This module will enable students to develop an understanding of the adaptive value of behaviours to animals and how these behaviours evolve. Specific topics covered include the altered behaviour of parasitised animals (parasite manipulation and alternative explanations), optimal foraging (how animals make decisions about what food to eat and where to look for it) and a range of topics associated with reproductive behaviour (sexual selection, sperm competition, partitioning of reproductive effort between mating and parenting, mating systems, and sexual conflict). The overall objective is to understand how behavioural strategies contribute to animals' fitness. **BI406**

BI435 Molecular Ecology And Biogeography. This module considers the broad topic of natural history in a global context. Section 1 begins with a general recap on the principles of DNA variation, and how this understanding influences our reading of observed patterns of genetic variation in natural populations. We also consider the utility and application of molecular markers to understand inheritance, natural selection and genetic divergence using standard population genetics techniques. To support the development of our understanding, we consider a wide range of field examples, including case studies of gene-flow in the wild, including animal and wind-based dispersal patterns and gene flow between crops and wild plants. We also apply this knowledge to consider Conservation genetics of endangered mammals. In section 2, we review the theory of Plate-tectonics and the inferred dynamics of past climate cycles and glaciations. We then consider historical biogeography in the broad sense, and the tracing of historical migrations using nuclear, mitochondrial and chloroplast DNA markers; with special emphasis on the postglacial colonization of Europe by animals and plants and the biogeographic impact of continent collisions, illustrated by case studies of recent invasions in Europe and Tropical Central America and Southeast Asia. In each case we review evidence for dispersal waves, hybridization zones and extinction events. **BI435**

BI437 Neuromuscular Biology. This advanced module focuses on the molecular and cellular mechanisms of normal skeletal muscle functions, as well as the molecular pathogenesis of selected neuromuscular disorders. Specific sections will be concerned with the biochemistry, physiology, cell biology and ultrastructure of skeletal muscle fibres, focusing on the molecular mechanisms underlying development, differentation, fibre transitons and metabolic adaptations to changed functional demands. The diagnosis of muscle diseases and pathobiochemical aspects of major neuromuscular pathologies will be examined, including a discussion of disorders related to myasthenia gravis, myotonia, motor neuron disease, malignant hyperthermia, x-linked inherited muscular dystrophy, disuse atrophy and sarcopenia of old age. Cell biological and biochemical research tools in the study of the molecular pathogenesis of genetic, autoimmune and pharmacogenetic muscle disorders are described. The potential sites for genetic and cell biological interventions at different stages of the neuromuscular disease process will be discussed. **BI437**

BI440 Control of Protein Activity and Abundance. Proteins are fundamental cellular components that regulate practically all processes in the cell. The control of their activity and abundance is essential for their physiological function and therefore needs to be tightly regulated. This course focuses on the cellular mechanisms leading to the control of protein activity and abundance and describes how changes in protein function affect biological processes (e.g. transcription, developmental programs, immunity…). Topics covered include: basic notions of protein structure; changes in protein activity through protein-protein interactions; control of protein activity by ligand binding; regulation of protein activity and localization by different types of covalent modifications; role of signaling cascades involving kinases; control of protein stability by the ubiquitin/proteasome system. These topics will be introduced and illustrated using examples from a wide range of research areas, as well as from different organisms such as bacteria, yeast, plants and animals. **BI440**

BI443 Clinical Proteomics: Discovery, Validation & Medical Utility. This advanced module focuses on the field of clinical proteomics, which can be divided into the analysis of body fluids and tissues. Soluble biomarkers will be discussed, which are found in biofluids including blood, urine and saliva, are considered indicator biomolecules that assist in detecting diseased conditions at an early stage, make discrimination between different diseases, and are useful for monitoring progression and response to specific therapeutic

strategies. Established clinical biomarkers such as carcinoembryonic antigen (CEA) will be discussed and problems associated with their diagnostic utilities will be addressed. Expression of tissue-based proteins (up-regulation or down-regulation) in various pathological conditions will be explored with emphasis on metabolic and signalling pathways as potential therapeutic targets for treatment of disease. The relationship between biomarkers and therapeutic targets will be examined and the role of companion diagnostics in this area assessed. Underpinning clinical proteomics are the recent developments in quantitative mass-spectrometry, array-based high-throughput protein microarrays and novel fractionation technologies, which will be examined in detail. The role of other "omic" methodologies that are complementary and synergistic to clinical proteomics will be reviewed, specifically looking at metabolomics as an example. **BI443**

BI302 Microbiology. Classification methods for bacteria, fungi and viruses; structural features of bacteria, fungi and viruses; microbial growth requirements; controlling microbial growth, aspects of medical microbiology and disease; antibiotics; fungal life styles; mycelial growth and production of degradation enzymes; viral replication mechanisms; viral strategies to avoid host detection. **BI302**

BI303 Ecology. Topics covered include: Soil ecology and the role of microbes in nutrient cycling; The interaction of climate and soil in the formation of the 10 principal global biomes; Vegetation change through succession: patterns, mechanisms and examples from Bogs and Sand Dunes; Lotka-Volterra modeling of organism and population interactions; Intra-specific competition within species; Inter-specific competition between species; Predatory-Prey relationships; Density-dependent and Density-Independent selection mechanisms; Gradients and patterns of global species diversity. Along with a lab-based practical component there will be a weekend field course to introduce field observation of ecological processes. **BI303**

BI306 Plant Responses to the Environment. Topics covered include: genes and gene regulation in plants; signal perception, transduction and cellular/developmental responses; methods to study gene function in plants; environmental regulation of plant growth and development; photoreceptors and how plants perceive light as a developmental signal; temperature as an environmental signal for plants; integration of multiple environmental signals to regulate flowering; plant interactions with other organisms; perception of pathogens by plants; plant immunity; phytohormones involved in plant responses to pathogens; programmed cell death; systemic acquired resistance; plant responses to abiotic stresses. **BI306**

BI317 Inquiry Based Biology Teaching & Learning. This module will explore best practice for teaching practical biology and specifically Leaving Cert Senior Cycle Practical Biology. Topics covered will include: risk assessment; purchasing (equipment, glassware, reagents); using laboratory equipment; basic laboratory techniques; lab preparation plans; practical class plans; practical demonstrations; recommendations for best practice. On successful completion of the module, students should be able to be able to teach practical Biology – focusing on the practical component of the Leaving Cert Biology Syllabus. **BI317**

MAYNOOTH UNIVERSITY THIRD YEAR COURSES IN BIOLOGY FOR BIOLOGICAL & GEOGRAPHICAL SCIENCES STUDENTS – 2024/25

Core Modules

BI303 Ecology. Topics covered include: Soil ecology and the role of microbes in nutrient cycling; The interaction of climate and soil in the formation of the 10 principal global biomes; Vegetation change through succession: patterns, mechanisms and examples from Bogs and Sand Dunes; Lotka-Volterra modeling of organism and population interactions; Intra-specific competition within species; Inter-specific competition between species; Predatory-Prey relationships; Density-dependent and Density-Independent selection mechanisms; Gradients and patterns of global species diversity. Along with a lab-based practical component there will be a weekend field course to introduce field observation of ecological processes. **BI303**

BI305 Dissertation. A series of essay titles will be provided to students, and assigned based on a first-come first serve online selection process. In addition to an introductory lecture and a mandatory workshop, the student will be given written details of the approach to take when writing a scientific review of 2000 words or less on their assigned topic. Guidelines will also be supplied to the student regarding assessment rubrics, the mandatory research portfolio, information research and management, academic integrity, and the context of the essay in relation to the 7 skills writing programme. **BI305**

BI320 Field Course in Ecology. The course is taught over a 5-day period during the Easter Vacation of Semester 2 (**provisional**). This is a residential course, based at a host centre in Ireland (Sligo/Donegal area) and involving excursions to a range of different field sites. Each day involves training, fieldwork and case investigations across a range of ecological topics and habitat settings. Activities will include vegetation studies, habitat descriptions, biodiversity assessment, habitat restoration, human-ecosystem interactions and climate-ecosystem interactions. Field work and workshops will be led by MU academic staff and guest experts. A preliminary workshop and learning guide will be provided to students prior to the course, and during the field week technical training and guidance will be provided for all activities. A significant element in the field course is group-based learning and problem-solving activities. A post-field course workshop will be provided to guide students in the preparation of their final project report. **BI320**

BI352 Scientific Writing (Biology & Environment). Topics covered include: study of structure and function of research papers, critical reading of research publications: papers, reviews and other forms of scientific literature, assessment of quality of research publications, use of databases, use of spatial data and information, writing a paper summary, writing a paper abstract, writing up a biological technique, oral presentations, presentation of scientific information to the non-scientific community. *Students taking this module cannot also take, or have taken BI312.* **BI352**

Optional Modules

(For Students taking Laboratory Science/ Junior Cycle Teaching Pathway only – select 2 modules.)

BI302 Microbiology. Classification methods for bacteria, fungi and viruses; structural features of bacteria, fungi and viruses; microbial growth requirements; controlling microbial growth, aspects of medical microbiology and disease; antibiotics; fungal life styles; mycelial growth and production of degradation enzymes; viral replication mechanisms; viral strategies to avoid host detection. **BI302**

BI306 Plant Responses to the Environment. Topics covered include: genes and gene regulation in plants; signal perception, transduction and cellular/developmental responses; methods to study gene function in plants; environmental regulation of plant growth and development; photoreceptors and how plants perceive light as a developmental signal; temperature as an environmental signal for plants; integration of multiple environmental signals to regulate flowering; plant interactions with other organisms; perception of

pathogens by plants; plant immunity; phytohormones involved in plant responses to pathogens; programmed cell death; systemic acquired resistance; plant responses to abiotic stresses. **BI306**

BI310 Animal Behaviour and Comparative Physiology. Instinct, learning and the development of behaviour; how behaviour evolves; communication; motivation; living in groups; migration, homing and navigation; anti-predator behaviour; biological rhythms; dormancy; temperature relations; adaptation to extreme environments. **BI310**

BI303 Ecology Field Trip 2024-2025

SEASHORE DAY Saturday 9th or Sunday 10th November

[Mandatory for all students enrolled in BI303]

Pre-field trip lecture: 10am Wednesday 6th November TSILT2

Saturday 9th or Sunday 10th November

(You will be assigned to either the Saturday group or the Sunday group)

09.00 Depart Phoenix Restaurant, North Campus
10.00 (approx.) Portrane, Co. Dublin (Rocky Shore)
14.00 (approx.) Bull Island, Co. Dublin (Sand Dunes)
18.00 (approx.) Arrive at Maynooth

Mandatory: warm waterproof clothing, **rubber boots** and a change of clothes. Bring snacks and lunch. A lunch stop will be provided at the Applegreen M1 stop in Lusk at 1pm.

WARNING: On this course you should adhere carefully to guidelines provided by staff and attempt nothing that may put yourself or others at risk.

If you have specific health requirements, you are obliged to ensure that the Course Leader (John Devaney) is informed in advance and is given details of who to contact in case of emergency. You should ensure that you have proper medication taken or with you as appropriate.

NOTE: Satisfactory participation in the Field Course is required for entry into Fourth Year.

GUIDELINES FOR BI305 DISSERTATION ASSIGNMENTS

The BI305 Dissertation module comprises the research, composition and submission of a research thesis, based on a topic selected by each student, as well as completion of a research portfolio in support of this thesis. Building on the technical elements that have been introduced as part of the ***7 Skills Writing Programme*** in years 1 and 2, the guidelines and assessment of the dissertation will follow a similar format, focused in this case on the preparation of a full science thesis. Assessment is based on the submitted essay, and on the portfolio of evidence documenting the research you have completed in preparation of the text.

Full details on the BI305 Dissertation, including the time schedule and key dates, and guidelines on the content, layout, formatting, originality and assessment of the dissertation are provided in the ***BI305 Module Handbook***, available on the BI305 Moodle Page at the start of Semester I. All of this information will be covered on **Monday 30th September at 10.00 hrs, room JHL3**, presented by the module coordinator, Dr Conor Meade.

While the focus of the BI305 Dissertation is independent learning, there is a clearly structured schedule which all students should follow over the course of the module, from essay title selection all the way up to final submission (see below).

When at the end of the module your BI305 Dissertation has been corrected and returned to you, you will have the opportunity early in Semester II to meet with your supervisor for feedback on your essay.

Dissertation Details:

Abstract: **200 words**

Main Essay: **2000 words**

Deadline: **5pm WEDNESDAY 18th December**

Selecting Your Essay Topic

You will be required to select an essay topic from the list on **pages 33-36.** A selection list of topic choices will be available on **MOODLE** during the time-period specified below. Once the choice window opens, essay topics will be assigned on a first-come, first-served basis. Each topic can be selected by up to 2 students. In some cases topics MAY be available for 3 students, the list of these topics is made by random selection each year. The number of students per essay topic is final, and no exceptions will be made. You will only receive confirmation of your essay selection once formally notified by the Biology Department.

Essay Topic Selection via Moodle

Choices Open:
8pm Tuesday 1st October

Choices Close:
Midnight Thursday 3rd October

Essay Lists and Selection Portals:
MOODLE PAGE: BI305

For students in MH202 Biotechnology:
MOODLE PAGE: BI314

When you have completed your manuscript and submitted it **by the Deadline: 5.00PM WEDNESDAY 18TH DECEMBER,** it will be examined, annotated with notes and advice, and then returned to you early in Semester 2.

BI305 Schedule for Semester I

From Week 2 onwards there follows a series of week-by-week key dates, detailed below. These cover tuition & instruction, assessment, contact between students and supervisors, learning supports and online resources. Please familiarize yourself with this schedule.

BI305 Schedule Academic Year 2024-25

Please consult the BI305 Guidebook and Moodle Page for full details
All online resources (Turnitin, Learning Supports, Portfolio Folder) are provided through BI305 Moodle

Week		*Event*	*Date*	*Details*		*Mandatory [✓] Recommended [R]*	*Continuous Assessment Portfolio [✓]*
1	23-27 Sep	3rd Year Start	23-Sep				
2	30 Sep-4 Oct	**BI305 Introductory Lecture (Mandatory)**	30-Sep	*JHL3*	10-11am	✓	
		Selection of Essay Topic (online)	1 - 3 Oct	*BI305 Moodle*		✓	
3	7-11 Oct	Preliminary meet with Supervisor (in-person)	7-11 Oct	*email supervisor**		✓	
		(MH201 Only) Research Planning Workshop^	7-Oct	*Lab 1*	10-11am	✓	
4	14-18 Oct	**BI305 Writing Workshop (Mandatory)**	16-17 Oct	*Lab 1, 3*	2-5pm	✓	✓
5	21-25 Oct	Submit Essay Plan to Supervisor** (& copy to Moodle Portfolio)	21-25 Oct			✓	✓
6	28 Oct-1 Nov	Study Week; BI305 Turnitin Self-Check opens on Moodle	28-Oct				
7	4-8 Nov	(MH201 Only) Information Management Workshop Thursday 2-4^	7-Nov	*Library*	2-4pm	✓	
8	11-15 Nov	Drop-In Supervisor Meetings (in-person or online)		*email supervisor****		*R*	
9	18-22 Nov	Drop-In Supervisor Meetings (in-person or online)		*email supervisor****		*R*	
10	25-29 Nov	Submit 1 page Essay sample text for Feedback** (& copy to moodle portfolio)	25-27 Nov			✓	✓
11	2-6 Dec	BI305 Turnitin Final Submission opens on Moodle	4-Dec				
12	9-13 Dec	*Advised* deadline for completion of Turnitin Self-Check	13-Dec			*R*	
13	16-20 Dec	**Deadline: Final Submission Wednesday 18th Dec.**	18-Dec				

* Once students have been formally notified of their topic and supervisor, they should email supervisor to arrange preliminary meeting
** Guidelines will be provided by supervisors at preliminary meeting, and on the BI305 Moodle Page
*** Students should meet their supervisor during their designated consultation times in either week 8 or 9
^ Supplementary resources for MH201 students who do not take science communication modules

This version: CM 14th Sep 2024; subject to change

Week 2 begins with a mandatory BI305 Introduction Lecture on Monday 30th September.
Later, after you apply for your essay topic during Week 2 – completed via BI305 on Moodle- you will contact your supervisor via email in **Week 3** to arrange a first meeting to discuss your essay.

In Week 4, all students are required to attend a Writing Workshop in your designated Year 3 practical session, which is an assessed learning activity. In **Week 5** you must return a brief, bullet-point essay plan to your supervisor, and post a copy to your moodle portfolio (for portfolio credit). This should cover 3-6 bullets maximum, each briefly describing a key element of your essay, to a maximum of 250 words. Your

supervisor will determine if you are broadly on the right track in terms of the topics you intend to cover, as per your initial meeting discussions, and offer brief direction as appropriate.

When you have completed your preliminary research, you can begin using ***Turnitin*** on Moodle to help improve the originality of your writing. Please note you are required to submit your draft essay at least once to the **Turnitin self-check portal** on the **BI305** Moodle page.

In **Week 10 you are invited to** submit a 1 page sample of your draft essay text to your supervisor, and post a copy to your moodle portfolio (for portfolio credit). This should be written to the technical standard you expect to submit in your final essay, with correct grammar, punctuation, structure, and citation, and a bibliography of references used in the text. Your supervisor will correct this text and offer written feedback on the document layout & format, citation format, and basic grammatical phrasing (if appropriate). Note: supervisors will not correct text for quality of writing or content.

Using this feedback you should proceed to complete your full essay. The deadline for submission is **Wednesday December 18th at 17.00 hours** (**Week 13)**. When you have completed your manuscript, you are required to upload an electronic copy (in word .doc format) via the Turnitin 'Final Submission' portal on the BI305 Moodle Page. Please see the **BI305 Moodle Page [Dissertation Final Submission]** for guidelines.

Additional BI305 Supports for MH201 Science Students

MH201 Omnibus Science students are offered additional supports to assist in completing the BI305 module, as detailed in the Schedule for the year (above). These are in lieu of learning supports offered to students on other degree streams taking modules BI312, BI314 or BI352. These supports include:

- Research and Writing Planning Workshop: Monday 7th October 10-11am in Lab 1
- Information Management Workshop at MU Library: Thursday 7th November 2-4pm

TURNITIN, ORIGINALITY, AI-GENERATED CONTENT AND PLAGIARISM

Dissertation Writing:
When you are writing an essay is essential that you prepare your work with due care – especially in ensuring that what you write is your own work and not a copy of someone else's work (plagiarism). To assist with this we provide you with two important aids: (i) an online self-assessment tool on moodle for checking the originality of your work, called 'Turnitin' (see below); and (ii) a clear guide to what is, and is not, acceptable in terms of originality: *the MU Biology Plagiarism and Academic Integrity Policy* (see below). Please read both very carefully as it is mandatory to follow the guidelines contained therein.

Essay Preparation and Submission – the *Turnitin* facility
All Biology dissertations at MU must be submitted to the online *Turnitin* Facility on Moodle. This portal allows you and your supervisor to confirm the originality of your written work. *Turnitin* compares your text with pre-existing texts (from a database of *all* scientific research on the web) and highlights sections where you have used wordings and paragraphs written before by other authors. When you receive a 'self-check' report you are able to make appropriate text changes to ensure your written work is actually your own. Thus, you can eliminate any accidentally plagiarised text, and ensure you are being understood correctly.

Please note

- The onus is on you, the student, to validate the originality of your work using *Turnitin*.
- You should only submit your completed essay when you have checked it on *Turnitin*
- Submitted essays that are deemed to contain copying/ plagiarism will be dealt with according to the departmental policy on plagiarism (see page 29).

From April 2023, Turnitin has also acquired the capacity to identify ***AI-generated text content***. As in the case for plagiarism, it is the responsibility of each student to ensure that they have not submitted AI-generated content where they are at the same time claiming sole authorship of the essay.

GUIDELINES FOR STAFF-STUDENT INTERACTION IN UNDERGRADUATE DISSERTATION/ PROJECT MODULES

Writing a thesis while an undergraduate student at the Biology Department

A key learning objective for undergraduate thesis modules at the MU Biology Department is that you, the student, develops a sense of ownership and responsibility for your dissertations/projects. In supervisor-student relationships during the preparation of theses, responsibility is two-way. A student will have expectations in terms of support and advice from the supervisor and a supervisor will have expectations regarding independent research by the student, time-keeping, regularity of work and reporting, etc. In the end, it is the student's dissertation/project and the student is expected to take full responsibility for researching, writing and editing his/her own work.

Note: The following guidelines relate to staff-student interactions in preparation of all written theses. Additional specific guidelines for Literature and Laboratory projects, respectively, are provided in relevant sections, below.

Meetings

- In the week following the assignment of topics to students, students will contact their supervisor to arrange a first meeting. Further meetings will be arranged by agreement.

Role and Responsibilities of Supervisor

- To set the essay/ project topic and provisional title
- To provide general background information on the subject area
- To inform student of expected standard of research and citation (eg. the Harvard format)
- To brief student of the importance good essay structure, and provide feedback to the student later in the process regarding their proposed essay title, focus and structure
- To inform student of likely challenges in terms of planning and deadlines
- To make clear to the student that further reasonable contact is welcome, including additional meetings as the student progresses with their work

Role and Responsibilities of Students

- Following the first meeting with your supervisor, to read around the broad essay topic and inform Supervisor of your chosen essay title
- With regard to the University policy on Plagiarism and Academic Integrity, present and discuss only your own work
- Consider seriously the advice and recommendations of the supervisor regarding research work, citation and time management
- Understand that the supervisor is there to assist with the task of completing a dissertation to standard and on time
- Understand that it is not within the remit of the supervisor to correct any essay or project dissertation text prior to submission

DEPARTMENT OF BIOLOGY POLICY ON PLAGIARISM AND USE OF GenAI TOOLS

Definition of Plagiarism

Plagiarism involves an attempt to use an element of another person's work, without appropriate acknowledgement in order to gain academic credit. It may include the unacknowledged verbatim reproduction of material, unsanctioned collusion, but is not limited to these matters; it may also include the unacknowledged adoption of an argumentative structure, or the unacknowledged use of a source or of research materials, including computer code or elements of mathematical formulae in an inappropriate manner.

The policies of the University apply within the Department of Biology, as contained on the Maynooth University website (https://www.maynoothuniversity.ie/university-policies/rules-regulations-students). Plagiarism is a form of academic dishonesty and will be treated with the utmost seriousness wherever discovered.

This policy will be implemented in the following manner:

1. Dealing with Suspected Cases of Plagiarism: Assignment markers will refer suspected cases of plagiarism to the Module Coordinator (or in the case of practical assignments, in first instance to the Academic in charge of practical module); Any student submitting written work for continuous assessment can be asked by the marker or the department to take a further test. This may take the form of an oral examination on the assignment in question and related issues, or the writing of a test paper in controlled conditions. Requiring a student to take such a test does not necessarily imply that plagiarism is suspected.

2. Dealing with Proven Cases of Plagiarism: If there is evidence of plagiarism, the matter will be turned over to the Course Coordinator, who will determine the disciplinary consequences following the guidelines outlined below. **In each case the student may be invited to explain in person** to the Course Coordinator the origin of the material contained in the piece in question.

Procedures

i. Where a marker ***(or course coordinator)*** believes that a case of plagiarism has been identified, the matter shall be referred to the Head of Department with a written report outlining the reasons for suspecting that the work has been plagiarised.

ii. The Head of Department shall then make an initial finding as to whether or not plagiarism has occurred, taking account of factors including, but not confined to, the extent of the plagiarism, indications of intent to deceive, the student's prior history in this regard, practice within the discipline, and the level at which the student has submitted the work. The Head of Department will not take account of extenuating medical or personal circumstances in making a decision.

iii. If the Head of Department is the marker who suspects plagiarism has occurred, he or she shall delegate responsibility to a nominee in that department to follow the procedures laid down in this policy

iv. Where the Head of Department determines that plagiarism has not occurred but there are indications of incorrect citation, the work shall be awarded a grade that takes account of the failure to cite sources correctly, within the overall context of the work as a whole.

v. Where it is considered right to do so, the Head of Department shall confirm the determination that plagiarism has occurred by making a record of the decision setting out the reasons. At this point, the Head of Department shall consult the Registrar's Office, informing the Registrar of the finding, and requesting any information on previous findings in relation to the student. Should prior findings exist, the procedures in xi and xii shall apply.

vi. Where the Head of Department determines that plagiarism has occurred, a meeting with the student shall be convened to inform the student of the finding.

vii. The student shall be advised of the determination by the Head of Department and of the consequences that may unfold and that a response should be received by the Head of Department from the student within ten working days from the date the determination was confirmed.

viii. The student shall be advised that failure or refusal to respond within the designated period of time, or failure or refusal to attend for any meeting requested by the Head of Department, will result in the matter being referred to the **Academic Discipline Board of Maynooth University** in like manner as if the student had chosen not to accept the findings of the report.

ix. Where the student chooses not to accept the findings of the report, the matter shall be referred to the **Academic Discipline Board of Maynooth University** together with all relevant documentation and reports.

x. Where the student accepts the findings of the report, the student shall be asked to sign the report. The Head of Department shall then countersign the report. The Head of Department will then give the work a mark of 0. The student will be allowed to redo the assignment before a designated deadline prior to the next Examination Board meeting, if it is practical to do so. The mark for the resubmitted work will be capped at 40%. A record shall be kept in the Department of the incident, and this shall be forwarded to the Registrar's Office.

xi. In the case of a second finding of plagiarism in relation to a student, the matter is automatically referred to the Academic Discipline Board, who shall notify the student that the matter has been brought to its attention.

xii. A "second finding" in this regard may refer to findings made in the current academic year or in previous academic years, and it may refer to findings made by more than one Department."

-***(Maynooth University Policy on Plagiarism)***

2a. Minor Plagiarism: In cases of minor plagiarism, the following will apply:
In instances where an element forming part of an assignment (from a phrase or sentence up to a paragraph or two) is found to be plagiarised, marks will be deducted for that assignment, there will be no possibility of submitting a 'make-up' assignment, and previous and subsequent work submitted in connection with the course may be subject to particular scrutiny. While the amount of marks deducted will be proportionate to the extent of the plagiarised material, the deduction may be severe.

2b. Major Plagiarism: In cases of major plagiarism, the following University statutes will apply:
In instances where a significant part or all of an assignment is found to be plagiarised, the Department will "award a mark of zero in the assignment, with no chance to resubmit in the current academic year" ***(Maynooth University Policy on Plagiarism),*** and previous and subsequent work submitted in connection with the course may be subject to particular scrutiny. In serious cases the plagiarism will be referred to the **Academic Discipline Board.**

2c. Postgraduate Students: Instances of postgraduate plagiarism will be referred directly to the project supervisor or member of faculty responsible for the relevant postgraduate programme. "Instances of plagiarism among postgraduate research students will be treated as being particularly serious. The Board will not take into account extenuating medical or personal circumstances in making its decision." **(Maynooth University Policy on Plagiarism).**

3. Recording: All cases of plagiarism will be recorded by the Course Coordinator on the student's permanent record card. All members of the Department providing a reference for a student **may be obliged to mention an instance of major plagiarism**, or two or more instances of minor plagiarism, when providing a reference for the student.

The Maynooth University policy on Academic Integrity is stated below and breaches of this will lead to academic misconduct procedures.

Academic Integrity

Where a student is required to produce work for assessment, it is expected that **the work is the student's own work** and is produced in a fair and honest manner. Students are required to be aware of and comply with the subject-specific requirements set by the individual Departments or module leaders on different assessments and need to be aware that these may differ not only by subject but also by assessment.

Breaches of academic integrity include:

- A student **falsifies data or information** in an assessment.
- A student **submits the same content** for more than one assessment without appropriate acknowledgement (self-plagiarism).
- **Using Generative Artificial Intelligence (GenAI) tools** or other computer-generated material to complete all or part of an assessment **without acknowledgement** and outside the terms of Departmental policies or requirements for individual assignments.
- A student gets another person or service to complete all or part of an assessment.
- Using any tools explicitly forbidden by the Department or within the programme.

Responsible use of Generative Artificial Intelligence (GenAI) tools for assignments submitted to the Biology Department.

This section lays out the **departmental advice and policies on how to use artificial intelligence (AI)** ethically and responsibly to support your learning. It details when AI may or may not be used in your assignments. **Where permitted, be cautious when using AI tools for assignments.** You should also refer to Maynooth University's guidelines: https://www.maynoothuniversity.ie/centre-teaching-and-learning/hub/academic-integrity-and-artificial-intelligence. Updates to the Biology Department guidelines and policies on the use of GenAI will be posted on the Moodle course page **All Biology Students 2025.** **It is important that you keep yourself up-to-date with this information.**

The key to appropriate use of GenAI tools (eg ChatGPT or others) is to use these tools **cautiously, critically, and reflectively** to support you in your learning, research and writing in Biology. They should **not** be a replacement for your critical reading in a topic and should build on your understanding of Biology (not replace it). Using clear, limited, and accurate prompts when interrogating GenAI based tools will certainly help you. However, tools such as ChatGPT do not verify or even discover information, these tools analyse text to give a most probable pattern that approximates to an answer to your prompt. In other words, they simply spit out the most likely next word. This is an important consideration: ChatGPT (or equivalent) can give you a very well-structured essay which is completely false! **This is why AI tools must not be used in any written assignment (this also includes lab reports and write-ups)**. ChatGPT (or equivalent) does not "know" the material it presents is fake and if you do not understand the output, then neither do you.

GenAI tools do not verify material scientifically but do incorporate all the biases inherent in the interpretations of the material of others. Thus, ChatGPT (or equivalent) can deliver overtly or covertly racist, sexist or other discriminatory material as apparent fact, when in reality, these have no scientific basis. It can be trained to "support" these outputs with fabricated references or misrepresented material of others. Such outputs should not be used in your work, but *can you tell the difference between real or fake material?* Using an GenAI tool properly takes more effort than you might expect, as you will need to check the veracity, and sources of the returned material, evaluate it critically and rewrite it before use. Be aware of the implicit and explicit biases in any text produced by AI tools and take steps to mitigate this in the work you submit.

What are the acceptable uses of AI tools for Biology department assignments?

- It is only acceptable to use GenAI tools in your Biology assignments **if specifically stated by your lecturer** for a particular module or assignment.
- Before using a GenAI tool, make sure you understand the basics of your topic, then use prompts that are clear, limited/focused, and accurate;
- Spend time verifying the material returned, including the sources used, by your query or prompt;
- Remember that LLM/GenAI tools generate text without understanding the output, they generate, summarise and predict text, no matter how unscientific or false.

What are unacceptable uses of AI tools for Biology department assignments?

If you attempt to present the outputs of GenAI software such as ChatGPT or Quillbot as your own work, then you are attempting to present material that is not the result of your academic judgement or authorship. If you use these tools in the following ways, then you have breached the Department and University standards of academic integrity and will be subject to the disciplinary procedures of the Department and/or University.

You must NOT use any GenAI tools of any kind:

- **for any aspect of your 3rd year writing assignments or in your lab reports and write-ups (unless explicitly approved by your module lecturer)**
- to create blocks of text (including single paragraphs to complete assignments) and/or submit these as your own work
- to create diagrams, figures or tables and submit these as your own work. Instead learn to use BioRender, Power Point or Excel to create diagrams and graphs, using your judgement.
- to support your preparation of an assignment without declaring which tools and/or how they were used.
- with false, or inaccurate references or submit AI-generated false, biased or discriminatory claims.

Consequences of unacceptable AI use in course material submitted to the Biology department could be large and impact you in many years' time.

Think of your future career. Future tools in the University may detect GenAI much more accurately than at present. **These may be deployed retrospectively and you could face loss of your degree qualification**, public embarrassment, and even loss of a job. Students presenting content that has been generated using GenAI are subject to the **same disciplinary procedures as plagiarism**. This can potentially result in denial of a reference, or a permanent notice on your student academic transcript, with career-long negative implications. Where a marker (or detection software) of submitted material suspects the inappropriate use of AI tools, the following procedure applies: if the module coordinator considers the use to be non-trivial, the issue will be referred to the departmental academic integrity committee who will assess the case and have the option to perform a **verification assessment** in the form of a face-to-face interview as detailed in the University's Marks and Standards. Where a student does not engage fully with the departmental process or in the most serious instances, the case will be referred directly to the University's Academic Discipline Board without further consideration by the department.

You should also consider how using GenAI tools prevents you from actually engaging with the material and assessments that your lecturers have designed to help you have a deeper understanding of your subject. Using GenAI tools also prevents you from developing important transferrable skills which you need for your future professional life.

Biology Dept Academic Integrity Committee
May 2023

BI305 DISSERTATION TOPICS 2024-25

3rd Biology/Biological & Biomedical Sciences students choose from the following list:

BI305 Biology/Biological & Biomedical Sciences Topics	Supervisor
Advancements in in vitro techniques as alternatives to animal testing in biomedical research	Movia, Dania
Ageing and the immune response	Butler, Marion
Allergic Diseases and Aging	Masterson, Joanne
Aneuploidy and antifungal resistance mechanisms.	Fitzpatrick, David
Annexin proteins and skeletal muscle membrane repair	Ohlendieck, Kay
Anti-fungal resistance mechanisms in Candida species	Kavanagh, Kevin
Are zoonotic infections the new danger to human health?	Kavanagh, Kevin
Bacterial transposons and integrons	Walsh, Fiona
Biochemical regulation of muscle bioenergetic pathways	Ohlendieck, Kay
Biochemistry of beta-lactamase enzymes	Walsh, Fiona
Biological degradation of man-made polymers.	Bayram, Özgür
Biomarkers for the diagnosis of neonatal sepsis.	Doyle, Sean
Cancer metastasis: Mechanisms of tumour spread and potential therapeutic targets	O'Dea Shirley
Causes and consequences of the sixth mass extinction	Devaney, John
Cellular therapeutic strategies based on macrophages	English, Karen
Circular RNAs	Schroeder, Martina
Cirrhosis-associated immune dysfunction	Robinson, Mark
Describe the Genetics, Clinical Features and Implications of an Autosomal Recessive Disorder: Tay-Sachs Disease	Lopez, Lorna
Endoplasmic Reticulum (ER) Stress in Allergy	Masterson, Joanne
Eosinophils in the Cancer Microenvironment	Masterson, Joanne
Evolution of cellular organisms. The Tree or Network of Life?	Fitzpatrick, David
Extracellular vesicles as therapeutics	English, Karen
Factors that affect bovine fertility	Miggin, Sinead
Fungal pathogens: their impact on plants, animals, and humans	Hoysted, Grace
Hormones and bovine reproduction	Miggin, Sinead
Immune receptor binding of collagen	Robinson, Mark
Immune responses of the eye	Kavanagh, Kevin
Inflammation and arthritis	Miggin, Sinead
Innate immune training	English, Karen
Is silver an effective antimicrobial agent?	Kavanagh, Kevin
Localized mRNA translation	Schroeder, Martina
Macrophage migration inhibitory factor in health and disease	English, Karen
MAIT cells and cancer	Hogan, Andrew
MAIT cells and viral infection	Hogan, Andrew
Mechanisms of Aneuploidy: From Chromosomal Non-Disjunction to Clinical Phenotypes	Lopez, Lorna
Mechanisms of cellular senescence and its role in aging and cancer	O'Dea Shirley
Membrane-bound proteins are attractive drug targets	Dowling, Paul
Mesenchymal stem cells in regenerative medicine	O'Dea Shirley
Modelling antimicrobial resistance transfer	Walsh, Fiona

Molecular mechanisms of plasmid conjugation	Walsh, Fiona
Molecular physiological analysis of skeletal muscle ion channels	Ohlendieck, Kay
Mycopathogens and their agricultural impact.	Fitzpatrick, David
Nanomedicine: revolutionizing drug delivery systems in modern healthcare	Movia, Dania
Negative regulation of type I IFN signaling	Robinson, Mark
Next generation mucosal vaccines	McNamee, Eoin
Next generation therapies for autoimmune diseases	McNamee, Eoin
NK cell nutrients	Hogan, Andrew
NK cell receptors	Robinson, Mark
NK cells as cancer immunotherapies	Hogan, Andrew
Nutritional immunity- the battle for zinc.	Doyle, Sean
Preventative strategies to reduce mycotoxin contamination in food and feed sources	Bayram, Özgür
Recent advances in targeting the “undruggable” proteins	Dowling, Paul
Regulation of skeletal muscle enzyme kinetics	Ohlendieck, Kay
RNA editing in plant mitochondria	Nugent, Jackie
Role of extracellular vesicles in cell communication and disease pathogenesis	O’Dea Shirley
Role of jasmonic acid in the regulation of plant responses to pathogens	Graciet, Emmanuelle
Role of nanotechnology in targeted cancer therapies	Movia, Dania
Root –microbial interactions in the soil	Meade, Conor
Sensing of viruses by pattern recognition receptors	Butler, Marion
Sex Differences in Allergic Disease	Masterson, Joanne
Sex differences in diseases	Butler, Marion
Sex differences in the immune response	Butler, Marion
Soil biodiversity and human health	Dirilgen, Tara
Specialised ribosomes	Schroeder, Martina
The current state of single-cell proteomics and future perspective	Dowling, Paul
The ethics and efficacy of New Approach Methodologies in replacing animal testing	Movia, Dania
The inflammatory response	Miggin, Sinead
The lymph node germinal centre in vaccination OR Autoimmunity	McNamee, Eoin
The mucosal immunoglobulin A (IgA) response	McNamee, Eoin
The mycotoxins: growing hazard	Bayram, Özgür
The oomycetes and the risk they pose to global food security.	Fitzpatrick, David
The Role of Mitochondria in Health and Disease	Carolan, Jim
The utility of Exhaled Breath Condensate (EBC) in cancer detection	Dowling, Paul
Trojan horse strategies to overcome antimicrobial resistance.	Doyle, Sean
Uses of bioconjugation in molecular biotechnology.	Doyle, Sean
Viral manipulation of mRNA translation	Schroeder, Martina
What is a gene?	O’Maoileidigh Diarmuid
Xenobiotics and their environmental impact.	Bayram, Özgür

3rd Biotechnology students choose from the following list:

BI305 Biotechnology Topics	Supervisor
AAV mediated gene delivery to mucosal tissues	Masterson, Joanne
Agricultural Biotechnology	Carolan, Jim
Alternatives to antimicrobials	Walsh, Fiona
Biological degradation of man-made polymers.	Bayram, Özgür
Biotechnological applications of fungi in the environment	Hoysted, Grace
Biotechnology and soil health	Dirilgen, Tara
Cell lines: friend or foe in cancer research?	Dowling, Paul
Chimeric antigen (CAR) Macrophages	English, Karen
CRISPR and gene editing: Potential applications and ethical considerations	O'Dea Shirley
Ex vivo expansion of immune cells using feeder cell lines	Robinson, Mark
Flu vaccines	Schroeder, Martina
Hepatitis B vaccine production in Yeast: pros and cons	Kavanagh, Kevin
Immune-based therapies in cancer	Butler, Marion
Immunotherapeutic CAR-T cells	Hogan, Andrew
Importance of enzyme kinetics in biotechnological processes	Ohlendieck, Kay
Innovative approaches in biotechnology: from organoids to microfluidics as alternatives to preclinical animal testing	Movia, Dania
Intergrated Pest Management (IPM) strategies.	Fitzpatrick, David
JAK/STAT inhibitors to treat Autoimmunity: Good, Bad or more of the same?	McNamee, Eoin
Manipulating resistance genes in crops: pros and cons	Graciet, Emmanuelle
Plant stress mitigation strategies in agriculture	O'Maoileidigh Diarmuid
Principles and applications of lateral flow immunoassays.	Doyle, Sean
Pros and cons of Golden Rice biotechnology	Nugent, Jackie
Proteomic analysis of bovine seminal plasma	Miggin, Sinead
The use of phytoremediation for restoring degraded environments	Devaney, John

3rd Biological & Geographical Sciences students choose from the following list:

BI305 Biological & Geographical Sciences Topics	Supervisor
Biodiversity of the Burren: A Landscape under Pressure	Meade, Conor
Challenges and opportunities to improve plant photosynthesis for sustainable agriculture	O'Maoileidigh Diarmuid
Climate change and marine biodiversity in Ireland and Northwest Europe	Meade, Conor
Ecosystem restoration and rehabilitation of post-industrial peatlands	Devaney, John
eDNA Approaches to Assessing Biodiversity	Carolan, Jim
Flowering time in response to climate change	O'Maoileidigh Diarmuid
Integrated pest management practices: what is their contribution to the development of a sustainable agriculture?	Graciet, Emmanuelle
Is agroecology relevant to the development of sustainable agricultural practices?	Graciet, Emmanuelle
Linking aboveground and belowground diversity	Dirilgen, Tara
Non-chemical Pesticide Control of Crop Pests	Carolan, Jim
Pesticide Resistance in Insects	Carolan, Jim
PHYB (Phytochrome B) and ambient temperature sensing in plants	Nugent, Jackie
Plant Biotechnology for Agricultural Sustainability	O'Maoileidigh Diarmuid
Plant diversity and associational resistance to pests and pathogens	Devaney, John
Plant mitochondria plant salt stress tolerance	Nugent, Jackie
Plant plastids and salt stress tolerance	Nugent, Jackie
Precision agriculture: technological advancements and impact on agriculture	Graciet, Emmanuelle
Soil biodiversity	Dirilgen, Tara
Symbiotic relationships of fungi: mutualism, parasitism and commensalism	Hoysted, Grace
The Biogeography of the Mediterranean Basin	Meade, Conor
The contribution of fungi to carbon and nutrient cycles	Hoysted, Grace
The impact of elevated atmospheric CO_2 on crop productivity	Devaney, John
The role of microorganisms in bioremediation	Hoysted, Grace
Urban soil biodiversity	Dirilgen, Tara

MU LIBRARY: UNDERGRADUATE GUIDE

Welcome to Maynooth University! We look forward to meeting you during your studies, whether that's online or in-person.
Library staff will help you with any questions you have about accessing books and reading material.

MU Library will be essential to you for:

- finding the right **e-books** and **online material** to help you study & write your assignments and essays,
- borrowing physical **books,**
- short, free **online tutorials & quizzes** that will help you improve your information skills,
- approachable **library staff** who will help you find what you are looking for, and
- booking a **group study room** when you are working on projects with fellow-students.

Best thing of all? All the resources above are **FREE to use** when you are a student in MU!

Fig. 1: Exterior of MU Library

Start Here: Our Library Homepage

Visit our library homepage at https://www.maynoothuniversity.ie/library. It's a great starting point for:

- Up-to-date library access information
- Details on using our services, both on and off-campus
- Information skills training classes (LIST & other sessions)
- Support for your studies and assignments

IMPORTANT! Use your MyCard (student card) to access the library and borrow books.

For more information, look at our guide "Using the Library" here https://bit.ly/3LOslGU or ask us for a demo.
Your **MyCard** (student card) entitles you to access the library and to borrow books. Click the "*Using the Library*" tab on the library homepage, for more information.

Need Help? We're Here for You!

If you're having trouble finding what you need, our library staff are ready to help. *[Photo by Daniel Balteanu]*

Whether you're on campus or off, you can:

- Visit the **Library Information Desk** on the ground floor of the library
- Use the live "Library Chat" box on our homepage
- Fill out our "Online Enquiry Form" on the left side of our homepage

Explore Our Study Spaces

The MU Library, located on the South Campus, across the road from the TSI building, offers various study spaces to suit your needs:

- **Ground Floor**: Open-access area before the turnstiles, where you can eat, drink, and chat, with over 50 laptops and print facilities.
- **Levels 1 and 2**: Quieter areas with bookable group study rooms, a flexible learning space and a silent study room.

Check out our spaces ahead of time with our VR Tours and Exhibitions here: https://bit.ly/3WLUp41

Find the Right Resources

Using the correct information source is crucial for your success. Each subject has a dedicated *Subject Guide* on our website. These guides, available here: https://bit.ly/3SuB84D include recommended books, databases, reference styles, online tutorials, and more. There's contact information for our *Teaching & Learning Librarians*, if you need more information on your topic.

Tech and Tools at the Library

We offer various technological resources, including:

- **Laptop Loans**: Borrow a laptop from the laptop-bank opposite the library desk.
- **Ground Floor Print Hub:** Multifunction printers available for all your print jobs.
- **3D Printing**: Available for free student and staff use; ask at the Information Desk.
- **Charging Stations**: For recharging your devices quickly.
- **Short Story Dispenser**: For a quick, fun read.
- **Wellness Zone:** Try out our 3 Energy Pods & Cubbie on Level 1, for rest and relaxation.

You can also suggest up to 5 books a year for the library to order here: https://bit.ly/4dcxLYj

IT Services

IT Services are available at the Library Information Desk during service hours to help with any IT issues, including photocopying.

Refreshments

There is a Starbuck's Café found on the ground floor of the library, plus vending machines and water fountains available in the library.

Stay Connected and Informed
Keep an eye on the screens in the library for events. Follow us on social media for updates, tips and events throughout the year:

- **Instagram**: @library_mu
- **Facebook**: @MaynoothUniLibrary
- **X**: @mu_library

We wish you every success in your studies and look forward to seeing you soon!

Useful Links and Contacts

- **Library Homepage**: https://www.maynoothuniversity.ie/library
- **Using the Library:** https://nuim.libguides.com/library-services/usingthelibrary
- **A-Z Subject Guides**: https://nuim.libguides.com/
- **Book a Group Study Room**: https://nuim.libcal.com/booking/MU_GroupStudyRooms
- **Online Tutorials**: http://nuim.libguides.com/list-online

INFORMATION REGARDING CONTINUOUS ASSESSMENT, PRACTICALS, ABSENCES AND LATE SUBMISSION IN BIOLOGY

REGULATIONS & REQUIREMENTS CONCERNING PRACTICAL CLASSES

(1) Undergraduate Biology is a largely practical subject. It is **compulsory** that you attend **all** classes and perform the exercises in the Practical Biology set for each class.

(2) Students with a medical condition/allergy, or who are pregnant/breastfeeding, are requested to inform the senior demonstrator (Patricia.McDonnell@mu.ie). If the medical condition/situation changes during the year, please inform the senior demonstrator. All staff involved in this process will respect student **confidentiality**, ensuring that this information is provided to the relevant personnel on a need-to-know basis only.

(3) Practical Classes will begin at exactly 14.05 for afternoon session (Friday Biological & Biomedical Science Practicals commence at 13.05 or 13.35, dependent on timetable, Friday Science Education Practials commence at 12.05pm). Students are expected to be present and prepared with lab coats, safety glasses at this time. For safety reasons usually no admittance will be allowed after these times. **Late comers may be excluded**.

(4) **Laboratory coat. You will NOT be allowed into the lab without a lab coat when chemicals or biological agents are used.**

(5) **Safety glasses** are required when any chemical or biological agent is used. These may be purchased in the practical session if necessary. Prescription glasses are not safety glasses – contact your optician if you want to purchase safety glasses with prescription lenses or your demonstrator if you want to purchase alternative safety glasses which fit over prescription glasses.

(6) You should read the relevant section of the practical manual **before** the practical.

(7) Health and safety procedures must be adhered to at all times. Instruction from demonstrators and technical staff must be obeyed at all times. Failure to do so will result in automatic expulsion from the laboratory and the forfeit of any grades associated with that practical session and an "unexplained absence" will be awarded.

(8) Laboratory reports must be handed in and/or submitted on Moodle for correction on the date instructed. **Permission to submit a late report/assignment** for any practical must be obtained from the **Senior Demonstrator** (Patricia.McDonnell@mu.ie) either **before** the submission deadline or **within 24 hours** of the deadline.

(9) Each student has a responsibility to ensure that all Laboratory Reports are returned with a definite mark/grade by their demonstrator. Any errors should be made known immediately to the demonstrator and/or laboratory co-ordinator. *Mistakes cannot be rectified once grades are uploaded onto the university system!*

(10) You should read your marked practical write-ups so that you can learn from your mistakes and so that you will be prepared for the questionnaires which make up the bulk of your practical assessment.

PLEASE NOTE THAT THE UNIVERSITY PLAGIARISM POLICY APPLIES TO PRACTICAL CLASSES AND ALL ASSOCIATED REPORT WORK. ALL WORK SUBMITTED MUST BE YOUR OWN.

LATE SUBMISSION OF COURSEWORK

On occasion, a student may not be able to meet a course deadline on a literature project due to unforeseen exceptional circumstances. If you find yourself in this position, you may request a later submission date. The **ONLY** third year module covered by this policy is **BI305.**

If you require a later submission date, you should complete the online ***Biology Department Late Submission Request Form*** available via Moodle **All Biology Students 2025**. Please note that you will be required to upload your supporting documentation at the time of submission with the exception of illnesses of 2 days duration or less, which does not require supporting documentation.

All applications must be received 5 working days prior to the original submission date or 24 hours post submission date only in order to be considered. Submission with supporting documentation does not guarantee that an extension will be granted. Approval is at the discretion of the department. Further instructions on the process are available on Moodle.

The form should **NOT** be used to request extensions in relation to **Lab Practicals, Lab Write-Ups or MCQ resits**. In these cases, you should follow the procedure as outlined in the handbook and contact Patricia McDonnell at patricia.mcdonnell@mu.ie

The table below gives examples of instances where late submission requests may be considered.

Reason for Application	Details Needed	Supporting Documentation Needed
Medical Circumstances	• Specify details • (e.g. Illness, injury, hospital appointment, hospitalisation)	• Appropriate original supporting evidence must be supplied by a registered general practitioner for illnesses of 3 days or more.
Personal Circumstances	• Specify details (e.g., family illness)	• Appropriate original supporting evidence must be supplied by a registered medical practitioner or other health professional.
Bereavement	• Specify relationship (e.g., parent/ guardian, grandparent, sibling, spouse, child, friend)	• Appropriate supporting evidence must be supplied (e.g., RIP.ie notice).
Other	• Specify circumstances (e.g., jury duty, wedding of a sibling or other immediate family member, victim of crime; participation in a sporting/other event for MU.	• Appropriate original supporting evidence must be supplied.

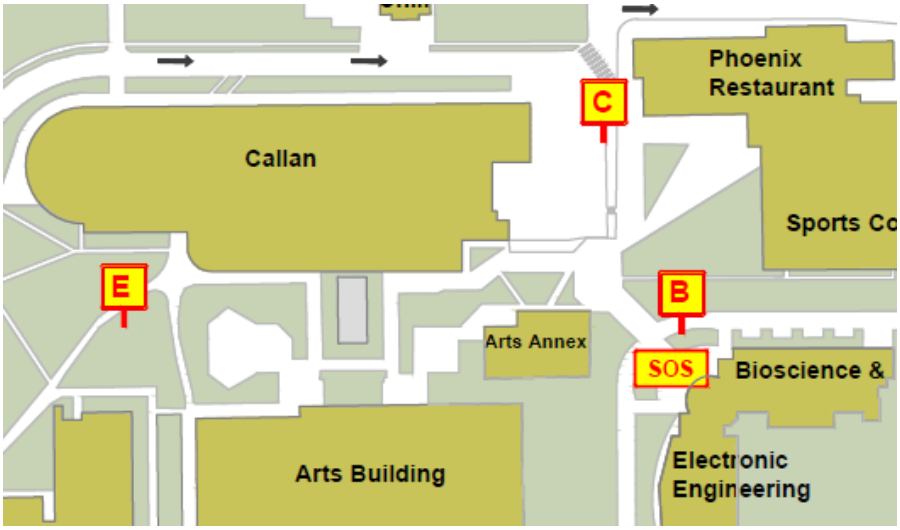
BIOLOGY LABORATORY SAFETY

For the protection of yourself and others please read the following notes carefully and obey the instructions implicitly.

COVID-19 GUIDANCE:
If you have COVID: do not come on campus, follow the HSE guidance for self-isolation (https://www2.hse.ie/conditions/covid19/)

FIRE:

- On hearing the fire alarm or on discovering a fire, stop what you are doing and raise the alarm.
- If you are using a Bunsen, switch it off.
- Leave in an orderly manner and close the door behind you. **Do not use the lift. Do not stop to collect your belongings.**
- Make your way to the nearest assembly point B, C or E (see the map below).
- Remain at this location until instructed by security staff to return to the building.



PERSONAL PROTECTION:

- Do not smoke, vape, eat, drink or chew gum in the laboratory. University Policy prohibits storage of food and drink and food in all laboratories.
- You are required to wear a Howie style white laboratory coat with all buttons closed and sleeves fully extended at all times.
- You must wear safety glasses at all times. Please contact your demonstrator if you need to purchase a pair.
- You will be provided with gloves for your personal protection. Unfortunately, they only protect the wearer and can easily contaminate surfaces. Remove all gloves before leaving the laboratory, even if for a brief period. Remove gloves while using laboratory equipment unless there are specific hazards present. Do not wear gloves when using Bunsen burners unless specifically instructed by the lecturer in charge.
- If you need to transfer samples or equipment to another laboratory, remove one glove and used the un-gloved hand to open doors etc.
- Sandals, flip-flops and other open footwear are prohibited when chemical and biological agents are used.
- Long hair must be tied back.
- You must wash your hands immediately at the end of the practical.

PERSONAL INJURY:

- You must cover any cuts or grazes with a plaster before starting any lab work. Please inform your demonstrator. There are first aid cabinets in all teaching laboratories.
- Report any accident or injury, however trivial, to a demonstrator.
- Specific hazards or disposal instructions for chemicals and/or materials will be explained to the class, if any. You must follow these instructions carefully.
- Please inform your demonstrator if you have any concerns relating to a pre-existing medical condition, or if chemical/biological agents used in a practical session may affect any pre-existing medical condition.

GENERAL SAFETY:

- In accordance with university regulations, you will be expelled from the practical session if you do not conduct yourself in an orderly manner, or if you deliberately act in an unsafe manner.
- Students are allowed in the teaching laboratory only during timetabled laboratory sessions. You may not use the laboratory at other times unless you obtain permission from the Senior Demonstrator.
- Undergraduate students should not enter the preparation laboratory, research laboratories, growth rooms, storerooms etc. without permission.
- Proper regard to the correct use of equipment is required from all students. Intentional interference with safety signs and safety features of any equipment is a criminal offence.
- We expect you to leave your bench place, including sink, clean and tidy.

You should be aware that we frequently transport chemicals and biological materials around the department. Therefore, it is very important that you walk slowly and carefully in the corridors.

N.B. Follow the instructions of your demonstrator at all times. Please check with your demonstrator if you have any doubts or questions in relation to safety. Notify your demonstrator or Senior Demonstrator if you have any health issues which you feel may be impacted by any practical.

REGULATIONS CONCERNING CONTINUOUS ASSESSMENT (CA) & NOTIFICATION OF ABSENCES

It is the responsibility of all students to be available for class throughout Semester I and Semester II between the hours of 0900-1800 Monday to Friday, in addition to occasional classes outside these hours (eg. field trips, academic visits).

The CA component of a module contributes significantly to the final module mark (summarized below). In addition, students who engage with the CA components generally do better in the theory exam than students who do not engage with the CA. The CA:Theory Exam weighting for modules taken by 3rd year students are summarised in the table below.

Module code	CA:theory point distribution	Module code	CA:theory point distribution
BI203	40:60	BI315	30:70
BI301	30:70	BI316	30:70
BI302	30:70	BI317	100:0
BI303	40:60	BI320	100:0
BI304	40:60	BI403	0:100
BI305	100:0	BI405	30:70
BI306	30:70	BI406	0:100
BI308	40:60	BI411	0:100
BI309	100:0	BI435	20:80
BI310	40:60	BI437	0:100
BI311	30:70	BI440	0:100
BI312/BI352	100:0	BI441	40:60
BI314	100:0	BI443	20:80

The module coordinator will set the marking schemes for the CA for each module.
No repeat option for the CA component of a module will be available within an academic year.

FAILURE TO ATTEND AND ENGAGE IN THE CONTINUAL ASSESSMENT COMPONENT OF MODULES WILL HAVE A SIGNIFICANT EFFECT ON YOUR FINAL MODULE GRADES, AND MAY BE COMMENTED ON IN STUDENT REFERENCES.

NOTE: students with verifiable, extenuating, circumstances that affect their CA performance should make their situation known to the Senior Demonstrator (Patricia.McDonnell@mu.ie), **within term time** in order for any, or appropriate, consideration to CA marks to be made.

Please read and take note of your responsibilities relating to absence as, in signing a Notification of Absence Form, you agree that you have read and understood them.

Note that:

- **Submission of an Absence Form does not automatically mean that the absence is acceptable** and that it is at the discretion of the department as to whether any absence is deemed acceptable or unacceptable. If the absence should be deemed unacceptable it will be recorded as such and count against the minimum attendance level.

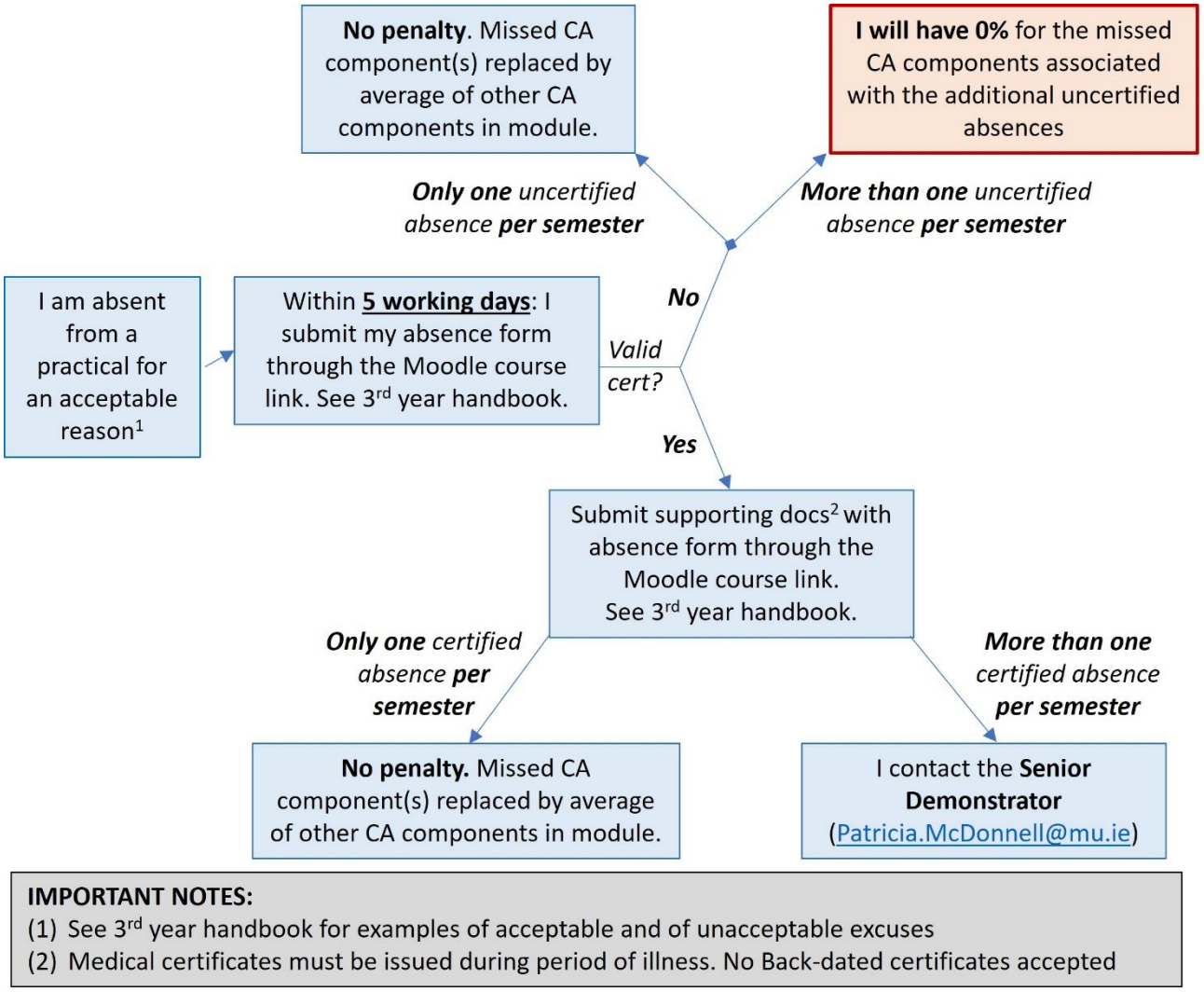
- Although a specific individual absence may be deemed acceptable, if your overall attendance and submission of work drops below the minimum level prescribed by your department, then **disciplinary procedures will still be followed.**
- **Notification of absence, whether it is deemed acceptable or unacceptable, does not constitute grounds for appeal** against a course or programme failure or failure to progress to the next stage of study.

Laboratory practicals/reports/assignments - absences or late submissions:

1. Attendance at **ALL** laboratory practicals in a module is compulsory.
2. If you are unable to attend a laboratory practical you must advise the Department of Biology by submitting an on-line **Absence Form** through the Moodle **course** **All Biology Students 2025** either **before** your absence or **within FIVE working days** of your absence. When submitting the absence form you will also be able to upload copies of medical certificates or other relevant supporting documentation if you have it. Instructions on how to do this are on the Moodle page indicated above. Failure to do this may result in the absence being counted as unacceptable and you will be given a mark of **zero** for the missed practical.
3. If you are submitting a medical certificate, **the cert must be issued during the period of illness**.

   NOTE: BACK-DATED MEDICAL CERTIFICATES WILL NOT BE ACCEPTED FOR ANY REASON.
4. No more than **ONE** missed practical **per semester** (**NOT MODULE**) will be accepted without verification of extenuating circumstances. Examples of the kind of circumstances where absence **may** be deemed as '*acceptable*' and '*unacceptable*' for non- attendance are shown below.
5. If you lodge **more than one absence certificate in a semester** you will need to contact the **Senior Demonstrator** (Patricia.McDonnell@mu.ie) to supply appropriate certification and/or explain your absences.
6. Laboratory reports/assignments must be submitted *via* the appropriate on-line submission portal on Moodle by the date and time instructed.
7. **Permission to submit a late report/assignment** for any practical must be obtained from the **Senior Demonstrator** (Patricia.McDonnell@mu.ie) either **before** the submission deadline or **within 24 hours** of the deadline.
8. Laboratory reports/assignments approved for late submission **must be submitted within one week** of the original deadline in order for them to be graded by the laboratory demonstrator.
9. Laboratory reports/assignments submitted more than one week after the original deadline **may** be graded by the relevant lecturer and the marks for this late report **will be capped at 40%.**
10. Only one late report/assignment submission will be allowed *per* module without relevant supporting documentation to justify subsequent late submissions.

PLEASE NOTE THAT THE UNIVERSITY PLAGIARISM/ACADEMIC INTEGRITY POLICY APPLIES TO ALL LABORATORY PRACTICAL REPORTS AND ASSIGNMENTS.



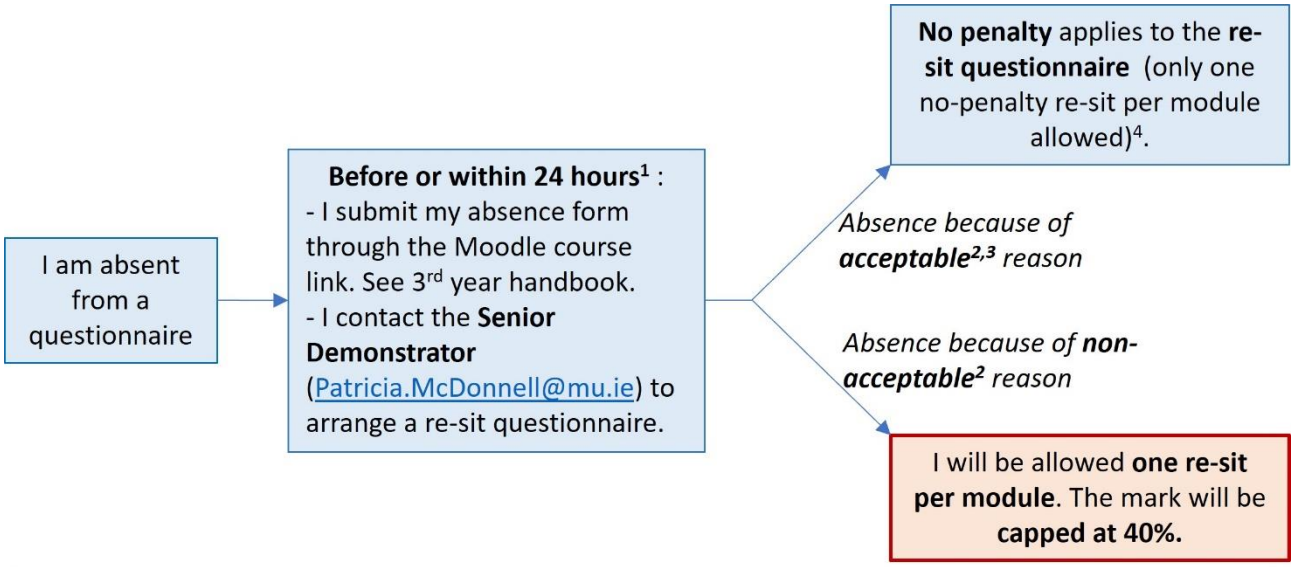
Questionnaires - absences:

1. Attendance at **ALL** questionnaires in a module is compulsory.
2. If you are unable to attend a module questionnaire for **ANY** reason you must advise the Department of Biology by submitting an on-line **Absence Form** through the Moodle course **All Biology Students 2025** either before your non-attendance or within **24 hours** of the non-attendance. When submitting the absence form you will be able to upload copies of medical certificates and/or other relevant supporting documentation to justify your non-attendance. Full instructions on how to do this are available on the Moodle page indicated above. **Failure to do this may result in the absence being counted as unacceptable and you will not be offered a no-penalty, re-sit opportunity for the missed questionnaire.**
3. If you are submitting a medical certificate, **the cert must be issued during the period of illness**.

   NOTE: BACK-DATED MEDICAL CERTIFICATES WILL NOT BE ACCEPTED FOR ANY REASON.
4. Arrangements to take a no-penalty, re-sit, questionnaire must be made through the **Senior Demonstrator** (Patricia.McDonnell@mu.ie) either **before** the questionnaire **or within 24 hours** of the scheduled questionnaire, unless there are extenuating circumstances that can be verified. In this case, you should still contact the **Senior Demonstrator** as soon as possible.
5. **Only one** no-penalty, re-sit questionnaire opportunity will be **allowed *per* module**, unless there are continuing and verifiable circumstances.

6. Students can avail of the opportunity to re-sit **ONE** missed questionnaire at the end of a semester. The marks for this re-sit questionnaire will be **capped at 40%**.
7. It is up to you, the student, to request this re-sit opportunity.
8. Arrangements to take this capped, re-sit, questionnaire must be made through the **Senior Demonstrator before the end of a semester** (Patricia.McDonnell@mu.ie).

Questionnaires are exams and Maynooth University Exam policies and regulations apply during both. These can be viewed at the Maynooth University Examinations Office webpage.



IMPORTANT NOTES:
(1) If verifiable extenuating circumstances, submit absence form and contact Senior Demonstrator as soon as possible.
(2) See 3rd year handbook for examples of acceptable and of unacceptable excuses
(3) Medical certificates must be issued during period of illness. No Back-dated certificates accepted.
(4) Students with on-going issues should contact the Senior Demonstrator during term time in order for any consideration for CA marks to be made.

It is your responsibility to:

- **Recognise that submission of an Absence Form does not automatically mean that the absence is acceptable** and that it is at the discretion of the department as to whether any absence is deemed acceptable or unacceptable. If the absence should be deemed as unacceptable it will be recorded as such and count against the minimum attendance level.
- **Recognise that,** although a specific individual absence may be deemed acceptable, if your overall attendance and submission of work drops below the minimum level prescribed by your department, then **disciplinary procedures will still be followed.**
- **Recognise that notification of absence, whether it is deemed acceptable or unacceptable, does not constitute grounds for appeal** against a course or programme failure or failure to progress to the next stage of study.

1. Notification of Absence Forms

Reason for absence	**Documentation required *(all to be submitted online through Moodle)***
Illness up to and including 5 consecutive term-time days (excluding Saturdays and Sundays)	**Absence Form** Only one **uncertified** absence allowed **per semester**
Illness for more than 5 consecutive term-time days (excluding Saturdays and Sundays)	**Absence Form** **plus** formal Medical Certification issued and dated during the period of illness and signed by the Medical Centre, your GP or hospital consultant
Unrelated to sickness	**Absence Form** plus supporting evidence

2. Supporting evidence

The following table gives examples of the kind of supporting evidence that you may be required to provide as justification of absence.

Absence	**Evidence**
Illness of LESS THAN FIVE consecutive term time days	Self-certification– **Absence Form** which must be submitted to the department through Moodle **within 5 working days of the end of the period of absence**. Should students submit repeated self-certifications, the department will require students to produce formal Medical Certification. **Note that alternative arrangements for a missed test will normally only be made if a medical certificate is supplied.**
Illness of MORE THAN FIVE consecutive term time days	Formal Medical Certification issued and dated during the period of illness and signed by the Health Centre or your GP or hospital consultant
Outpatient's appointment	Letter from outpatients or appointment card
Doctor or dental appointment	Appointment card
Documented personal problems	Letter from someone, e.g. counsellor, who has direct knowledge of the problem and/or is involved in supporting you
Illness of dependent or family member	Medical Certification and statement explaining illness and why personal attention is necessary
Bereavement	Formal certificate or note from family member who can vouch for the situation
Severe transport problem	A copy of online or newspaper reports on the problem to be submitted to the department **within 5 working days of the problem having occurred**
Court attendance	Official correspondence from the Court confirming attendance requirement
Victim of crime	Statement of events, police report and crime reference number
Involvement in a significant/prestigious event	Letter of invitation from the relevant organising body
Sport commitment at national/county level	Official correspondence from the relevant sporting body confirming the requirement to be available on specified dates

The following table gives examples of the kind of circumstances where absence **may** be deemed as 'acceptable' and 'unacceptable' for non- attendance. This is for general guidance; it does not represent an exhaustive list. All absences will be reviewed on a case by case basis.

Acceptable	Unacceptable
• Illness • Hospitalisation • Outpatients appointment (where possible you should try to make any appointment outside of your class commitments • Doctor or dental appointment (you should try to make any appointments outside of your class commitments) • Documented personal problems • Illness of dependent or family member (until other arrangements can be made) • Bereavement • Severe transport problems (e.g. severe disruption of train travel due to signaling failure or track problems or major traffic incident on motorways, which can be verified by online or newspaper reports) • Court attendance or victim of crime • Representing College/county/ country at significant or prestigious event or sport commitment or involvement in such an event	• Oversleeping • Misreading the timetable • Paid employment and voluntary work • IT and/or computer problems • Minor transport problems, e.g. being stuck in normal rush hour traffic, not permitting enough time in travel plans for minor unanticipated delays, missed public transport • Holidays • Family celebrations • Weddings • Accommodation issues, e.g. moving house • Extra-curricular sports activities • Driving test • Lack of awareness of attendance requirements and College Regulations in this regard

INFORMATION ON EXAMINATIONS IN BIOLOGY

EXAMINATIONS

***Biology Prizes*:**
Ann Burnell Prize for best performance in 3rd year Biology: Certificate + cash prize
Microbiology Society Prize to best 3rd Biotech student: Certificate + cash prize & free membership to the Microbiology Society

Third year of a 4-year degree will contribute **20% towards your final degree mark**. It is therefore essential that you engage with all the continuous assessment components of each of your modules and that you study carefully for your theory exams.

3rd year students who pass both subjects but do not achieve the necessary 45% to progress into 4th year will be awarded a Pass Degree.

Please see the Examinations Office webpage for information (under Policies & Regulations) for Marks and Standards for programmes at Maynooth University: https://www.maynoothuniversity.ie/exams.

Continual Assessment & Theory Exam
Most third-year modules have a continual assessment component and a theory exam. Details for each module can be found http://apps.maynoothuniversity.ie/courses/

PREPARATION FOR EXAMINATIONS

- **Preparation for examinations should begin on the first day of the first term.** Steady work throughout the year is more likely to bring success than frantic cramming for a few weeks before the exams.

- Make absolutely sure that you have a good set of lecture notes, as the lectures provide the framework for the course and exams will be based on them. **You must understand all the lecture material.** If you understand everything as you go along you will find it much easier to learn it during revision.

- Make use of the library or the books recommended by the lecturer, to fill out the lecture material, and make supplementary notes from these. Lecturers, who will also be setting and marking the exams, are usually more impressed by an answer with evidence of extra reading than one which merely restates the lecture notes.

- Begin your final revision for examinations in good time. If you leave it too late you will set yourself an impossible work load, leading to panic or undesirable practices, such as question spotting or omitting sections of the course.

- Make sure that you go into the examinations **having learned the whole course.** It is the only way to be sure of being able to answer any of the questions set. If you wish to "spot" questions do so only after you have got a good grasp of the course as a whole, then it may be worth giving **extra** attention to the areas that you guess may come up in the examination.

- You might find it helpful to practice answering previous exam questions under examination conditions (in the time allowed in an exam).

- Make sure that you have everything that you might need in the examination well before. You require pens, pencils, rubber, ruler and perhaps some coloured pens or pencils and a calculator.

In the examination:

- Read the paper carefully - including the rubric (instructions above the list of questions). Make a preliminary decision as to which questions you are going to answer.

- Start with a question you feel confident about. Think carefully about what the question is asking for and answer **the question as set** - not one that you think should have come up. You might find it helpful to make short notes before starting on your answer. Also, if you think of something, whilst you are writing your answer, that you want to put down later, keep a note of it so that you don't forget. Complete your answers making sure that you follow instructions.

- **ANSWER THE CORRECT NUMBER OF QUESTIONS. This cannot be too strongly emphasised.**

  If you answer **less** than this you greatly reduce your chances of passing or doing well.

  If you answer **more** than the correct number you will be wasting time and effort.

- There is no set length for examination answers. In general, you should expect your answers to reflect the amount of writing time.

- It is often helpful to illustrate your answers. Diagrams can often give a clearer and much more economical presentation of some points though they will often need to be complemented by text. Where you are asked to give an illustrated account, drawings are essential.

- It is important that you record exactly the numbers of the questions you have answered on the front of your examination paper, as well as at the start of each question.

THIRD YEAR EXAMINATIONS
Department of Biology

THEORY

Format of theory examinations:

1½ hour papers

Modules will be examined at the end of the semester in which they are taught.

There are several formats for the written examination component of a 3rd year module. The most common are:-

- **Format A:** Section A: Two essay type questions, answer one. Section B: Two essay type questions, answer one.
- **Format B:** Three sections, answer 1 essay style question from each section, from a choice of two questions in each section.
- **Format C:** Section A: Short questions: Answer the required number. Section B: Answer one essay type question from a selection.

In these cases, the marks for the paper will be equally divided between each section, therefore you are advised to spend the same amount of time on each section. In the case of there being only one section, marks are equally divided between the questions.

No further information will be given about the structure of the papers. Individual lecturers ***may***, however, give guidance **during their lectures** about the more important aspects of their courses with respect to examinations.

Copies of previous exam papers may be used as a guide to the types of question which might be set, but you are reminded that courses are continually evolving and the content may not remain the same from one year to the next. Past examination papers can be obtained from the The Library homepage https://www.maynoothuniversity.ie/library at the bottom left of the screen in Quicklinks.
Please note that if new examination paper structures are introduced to your module, sample papers will be provided by the lecturer.

THIRD YEAR BIOLOGICAL SCIENCE EXAMINATIONS
Department of Biology

THEORY

Format of COMPULSORY MODULE theory examinations:

THREE 1½ hour papers, two in January and one in May/June:

Modules will be examined at the end of the semester in which they are taught.

FIRST SEMESTER EXAMINATIONS (January):

BI310 Animal Behaviour & Comparative Physiology
BI311 Microbial Biotechnology

SECOND SEMESTER EXAMINATIONS (May/June):

BI316 Molecular Pharmacology & Toxicology

Format of OPTIONAL MODULE theory examinations:

All examinations are of **TWO** hours duration, and most will be in the following format:

STANDARD: Answer **TWO** questions, one from each section.

The following will all be held in Semester 1:

BI403 Plant Biotechnology
BI405 Advanced Immunology
BI411 Bioethics and Biotechnology
BI441 Fungal and Bacterial Secondary Metabolism

The following will all be held in Semester 2:

BI406 Behavioural Ecology
BI435 Molecular Ecology and Biogeography
BI437 Neuromuscular Biology
BI440 Control of Protein Activity
BI443 Clinical Proteomics: Discovery, Validation and Medical Utility

ADDITIONAL INFORMATION

EXPERIENTIAL LEARNING AT MAYNOOTH

Experience More During Your Time at MU

The routes available to Maynooth students to experience more from their degree programme are diverse, enabling the development of rich learning experiences that connect classroom content with real-world experience. The Experiential Learning Office connects Maynooth students to a range of opportunities in the following areas.

MU SPUR (Summer Programme for Undergraduate Research)

An active research based and paid experiential learning programme for successful undergraduate pre-final year student applicants who **wish to learn more about the postgraduate experience, by** working closely with faculty mentors on research projects across a range of disciplines.

Community Based Service Learning

Community Based Service Learning presents a credit-bearing academic experience that empowers students to engage with their surrounding communities, which often results in enhancing student's academic, civic, social and personal development, whilst they contribute to the common good. The experiential learning office facilitates academic staff in offering community based service learning experiences with their students.

For further information, refer to:

Website: https://www.maynoothuniversity.ie/experiential-learning-office
Email: explearning@mu.ie

PROGRAMME ADVISORY OFFICE

For Programme choices and options information

The Programme Advisory Office, within the Office of the Dean of Teaching and Learning, is available to advise you on any choices you might have to make related to your programme including subject choice. The Programme Advisory Office acts as a guide to students as you navigate your own way through your programme options.

Continuing second year students may also avail of the service if you are unsure about your programme options, for example if you have any questions about the difference in major/minor pathways or whether or not to choose to take an Elective.

The **Programme Advisory Office** can be contacted via
Email: programme.choices@mu.ie
Telephone: 01 474 7428
In person: please see their website for information about meeting a member of the Programme Advisory Team: https://www.maynoothuniversity.ie/programme-advisory-office

University Supports and Services

Academic Advisory Office

The Academic Advisory Office offers a convenient first point of contact for students who wish to seek advice or assistance with their general experience of University life. The office provides an ombudsman-like role for students who may be encountering difficulties in their programme of study.

Academic Advisory Office

Examination Office

The Examinations Office is part of the University Registry and administers the examination timetable. It is responsible for the central administration of the University written examinations. The academic year is semesterised with examinations held in Semester One (January) and Semester Two (May) with a Supplemental/Resit autumn session in August.

Examination Office

Student Health Centre

The Student Health Centre is an acute care/advisory service. The service is envisaged as an addition to the student's own family doctor or specialist medical service. It operates within resource constraints so certain service limitations apply. Students should continue to attend their own general practitioner.

Student Health Centre

Student Services

Student Services is an integral part of the University community, enabling the promotion and development of its educational mission. Using a holistic approach, we offer a range of clearly defined services to support and empower students to achieve their personal and academic potentials and so enhance their life's journey. We strive to create a community which is open and caring and where diversity is expected and respected."

Student Services

Maynooth Access Programme

The Maynooth University Access Programme (MAP) encourages under-represented groups to enter third level and provides these groups with support through their time at Maynooth. These groups include under-represented school leavers, mature students, students with disabilities and members of the Irish Traveller community. Maynooth University Access Programme

FSE Equality, Diversity and Inclusion (Committee)

The Faculty of Science and Engineering Equality, Diversity and Inclusion (EDI) Committee, are delighted to announce a series of EDI online training opportunities that are available to all students. EDI training is a potent tool for increasing awareness, enhancing comprehension, and equipping individuals with the skills required to both implement and advocate for fairness, respect, and the celebration of our differences.

How to Get Involved:

Participation in online EDI training initiatives is open to all students. The Equality Office has shared a helpful list of EDI-related online courses / training sessions at Maynooth University and highlighted who they are available to.

Training	Location	Staff / Students?
EDI in HE & Let's Talk About Race	Moodle	Available to staff and students at MU
Consent at MU – Preventing Sexual Violence & Harassment	Moodle	Available to staff and students at MU
Sexual Health | Maynooth University (Student Link)	Moodle	Available to staff and students at MU
Disability Awareness Training – National Disability Authority	Online	Open access

If you have any questions or require additional information, please do not hesitate to contact the Universities EDI Committee at (fse.admin@mu.ie).

Map of Campus

Campus Maps

Timetables 2024/25: See link Timetables | Maynooth University

Biochemical Calculations Website: Biochemicalc™

http://www.biochemicalc.com

Students in the Department of Biology now have access to Biochemicalc™. This website, developed by Professor Sean Doyle (Biology) and Mr Dermot Kelly (Computer Science), allows students to:

1. Learn the fundamental concepts of biochemical calculations such as:

> What are moles, nanomoles and micrograms? Why do I need to use moles in my calculations? How do I make up laboratory solutions such as buffers? What is molarity?

2. Use online calculators to help solve biochemical problems.

> The online calculators allow students to calculate the weights (in mg or g) of reagents required for making up laboratory solutions of defined molarity, calculate the volume of stock solutions required for preparation of a more dilute reagent, carry out %(w/v) dilutions, work out how to do serial dilutions etc…

3. Practice online questions to test their understanding of biochemical calculations.

> Biochemicalc™ offers a suite of pre-formatted questions to help students judge if they understand key concepts required for becoming proficient at undertaking laboratory calculations. These questions are of varying difficulty and style, and are designed for use in association with the online calculators on the Biochemicalc™ website.

Although primarily designed for students in the 3rd and 4th years of our degree programmes, it will also be of assistance to students at earlier stages of study. Indeed it may be of use to students taking Chemistry, or any subject requiring knowledge of laboratory calculations. Postgraduates may also find aspects of Biochemicalc™ beneficial to their own research projects and also find use of its functionalities a useful "double-check" for their own laboratory calculations.

We encourage you to use Biochemicalc™ and please tell others if you're happy with it. If not, please email: biochemicalc@gmail.com

Biochemicalc™ was funded by the NUI Maynooth CTL Fellowship Programme 2011

DEPARTMENT OF BIOLOGY STAFF RESEARCH INTERESTS

Name & Qualifications	Key Words	Research Interests
Dr O. Bayram, MSc PhD	Secondary metabolism, Fungal foods, Mycotoxins, Fungal development, Cell signalling, Epigenetics, Environmental remediation	https://www.maynoothuniversity.ie/biology/our-people/ozgur-bayram#2
Dr M.P. Butler BSc PhD	Ovarian Cancer, Mechanistic insight into diseases, Toll-like Receptor Signalling, sex differences in immune responses.	https://www.maynoothuniversity.ie/biology/our-people/marion-butler#2
Dr J.C. Carolan B.A. (Mod) PhD	Proteomics, Mass Spectrometry, Genomics, Molecular Biology, Sustainable Agriculture, Aphids, Bumblebees, Crop-pest Interactions, Pesiticides	https://www.maynoothuniversity.ie/biology/our-people/james-carolan#2
Dr J. Devaney BSc PhD	Ecology, Forest Ecology, Climate Change, Biodiversity-Ecosystem Function, Invasive species	https://www.maynoothuniversity.ie/biology/our-people/john-devaney#2
Dr. T. Dirilgen BSc PhD	Ecology, Biodiversity (aboveground and belowground), Soil-Plant-Pollinator interactions, Soil biology and ecology, Sustainability	https://www.maynoothuniversity.ie/people/tara-dirilgen
Dr P. Dowling BSc PhD	Oncoproteomics, Biomarkers, Detection, Biofluids, Mass Spectrometry	https://www.maynoothuniversity.ie/biology/our-people/paul-dowling#3
Professor S. Doyle BSc PhD	Disease diagnosis, Antimicrobial resistance, *Aspergillus fumigatus,* protein mass spectrometry, proteomics, nonribosomal peptide synthesis, Disease diagnosis, immunoassays and enzymology.	https://www.maynoothuniversity.ie/biology/our-people/sean-doyle#2
Professor K. English MSc PhD	Cellular therapy, mesenchymal stem cells, immune modulation, pre-clinical models of inflammatory disease, organ transplantation, acute respiratory distress syndrome, asthma, gene therapy, muscular dystrophy	https://www.maynoothuniversity.ie/biology/our-people/karen-english#2
Dr D.A. Fitzpatrick BSc PhD	Computational Biology, Bioinformatics, Genome Evolution, Phylogenomics, Comparative genomics, Genomics, Transcriptomics, Proteomics, Genome sequencing, Fungi, oomycetes.	https://www.maynoothuniversity.ie/biology/our-people/david-fitzpatrick#2
Dr E. Graciet MSc PhD	Protein degradation, biochemistry, plant molecular biology, plant-pathogen interactions, abiotic stresses, crop improvement	https://www.maynoothuniversity.ie/biology/our-people/emmanuelle-graciet#2
Dr A. Hogan BSc PhD	Immunology, obesity, cancer, metabolism, immunometabolism, immunptherapy	https://www.maynoothuniversity.ie/biology/our-people/andrew-hogan#2
Dr. G. Hoysted BSc PhD	Fungal Ecology, Microbial Ecology, Mycorrhizal fungi, Plants, Bacteria, Above-below ground interactions, Plant-insect interactions, Sustainability	https://www.maynoothuniversity.ie/people/grace-hoysted
Professor K.A. Kavanagh BSc PhD	*Aspergillus, Candida,* Fungi, Metal-cell interactions, Innate immunology, Insects, Proteomics	https://www.maynoothuniversity.ie/biology/our-people/kevin-kavanagh#3

Dr L.M. Lopez BA PhD	Genomics, Human Health, Circadian Rhythms, Sleep, Neurodevelopmental Conditions.	https://www.maynoothuniversity.ie/biology/our-people/lorna-lopez#2
Dr A.M. Maher BSc PhD	Entomopathogenic nematode, microbes, symbiosis, biodiversity	https://www.maynoothuniversity.ie/biology/our-people/abigail-maher#2
Professor B.P. Mahon BSc PhD	Cell Biology, Immunology, microbiome/immune interaction	https://www.maynoothuniversity.ie/biology/our-people/bernard-mahon#2
Dr J. Masterson BSc PhD	Allergy, Inflammation, Epithelial Cell Biology, Stem Cells, Fibrosis, Mucosal Barrier, Cellular Metabolism	https://www.maynoothuniversity.ie/biology/our-people/joanne-masterson#2
Dr E. McNamee BSc MSc PhD	Autoimmunity, Mucosal Immunology, Translational Immunology, Chemokines, microRNAs	https://www.maynoothuniversity.ie/biology/our-people/eoin-mcnamee#2
Dr C. Meade BSc PhD	Plant & Soil Ecology; Molecular Ecology; Phylogeography, Biogeography & Population Genetics; Sustainability	https://www.maynoothuniversity.ie/biology/our-people/conor-meade#1
Dr S. Miggin MSc PhD	Innate immunity, toll-like receptors, inflammation, Type-2-Diabetes, bovine reproduction	https://www.maynoothuniversity.ie/biology/our-people/sinead-miggin#2
Dr D. Movia MSc PhD	In vitro alternatives to animal models, non-animal preclinical research, new approach methodologies, lung cancer, respiratory research, nanomedicine	https://www.maynoothuniversity.ie/faculty-science-engineering/our-people/dania-movia
Professor P. Moynagh B.A.(Mod) PhD	Molecular Immunology, Inflammation, Inflammatory Diseases, Signal Transduction,	https://www.maynoothuniversity.ie/biology/our-people/paul-moynagh#3
Dr J.M. Nugent MSc PhD	Plant molecular biology, evolution and development	https://www.maynoothuniversity.ie/biology/our-people/jackie-nugent#3
Dr S. O'Dea BSc PhD	Cell therapy, cell engineering, cancer research	Shirley O'Dea | Maynooth University
Dr D. O'Maoileidigh BSc PhD	Plant development, flower development, fruit development, photosynthesis, transcription factors, genomics	https://www.maynoothuniversity.ie/people/diarmuid-omaoileidigh
Professor K. Ohlendieck DipBiol PhD DSc	Skeletal muscle biology, protein biochemistry, proteomics, biomarker discovery	https://www.maynoothuniversity.ie/biology/our-people/kay-ohlendieck#3
Dr N. Curran BSc PhD	Plant Biology	https://www.maynoothuniversity.ie/people/noreen-curran
Dr R. Owens BSc PhD	Pathogenic fungi, secondary metabolites, proteomics, antimicrobial agents, food proteins	https://www.maynoothuniversity.ie/biology/our-people/rebecca-owens#3
Dr M. Robinson BBioMedSc PhD	Cytotoxic natural killer cells, liver disease and cirrhosis, chronic inflammation, glycosylation of lymphoid immune cells	https://www.maynoothuniversity.ie/biology/our-people/mark-robinson#2
Dr M. Schroeder BSc PhD	Host-Pathogen interactions, Pattern recognition receptor signaling, Regulation of gene expression, RNA Biology	https://www.maynoothuniversity.ie/biology/our-people/martina-schroeder#2
Professor F. Walsh BSc PhD	Antibiotic resistance, microbiomes, infectious diseases, bacteriology, metagenomics	https://www.maynoothuniversity.ie/biology/our-people/fiona-walsh#2

BI305 DISSERTATION COVER PAGE

For online submission via Turnitin

[*Sample from Academic Year 2021-22, updated version will be posted to BI305 Moodle*]

Maynooth University
National University of Ireland Maynooth

Department of Biology
2021/22 Dissertation Cover Sheet

BI305 Dissertation

DISSERTATION TITLE:	eg."Covid-ByeBye": Outcome of Phase III clinical trials for new SARS-Covid-19 vaccine.
SUBMITTED BY:	***Your name here***
STUDENT NUMBER:	***Your student number here***
SUPERVISOR:	***Supervisor's name here***
WORD COUNT:	***(state count here to confirm that count is less than limit)***
DECLARATION This thesis is submitted in fulfilment of the requirements for the BSc (Hons) Degree IN SUBMITTING THIS THESIS I ACKNOWLEDGE THAT: I have read and understood the Departmental policy on plagiarism. I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.	
SIGNATURE (TYPED):	***Your name here***
DATE:	***17/12/2021***

Teaching Council Registration Curricular Subject Requirements (PostPrimary) For persons applying for registration on and after 1 January 2017:

At least four of the following essential areas to a minimum total of 40 ECTS credits (or equivalent) with at least one area from (a), (b) or (c):

Essential areas of study	**Modules covering these areas**	
(a) Botany	**BI102**	
(b) Plant Physiology	**BI102**	**BI306**
(c) Ecology	**BI303**	
(d) Microbiology	**BI302**	
(e) Zoology	**BI204**	
(f) Mammalian Physiology	**BI203**	
(h) Biochemistry	**BI201**	
(i) Genetics	**BI101**	
(j) Molecular Biology	**BI210**	**BI304**

The remaining 20 ECTS credits (or equivalent) may be in any of the above essential areas, or be drawn from the following optional areas:

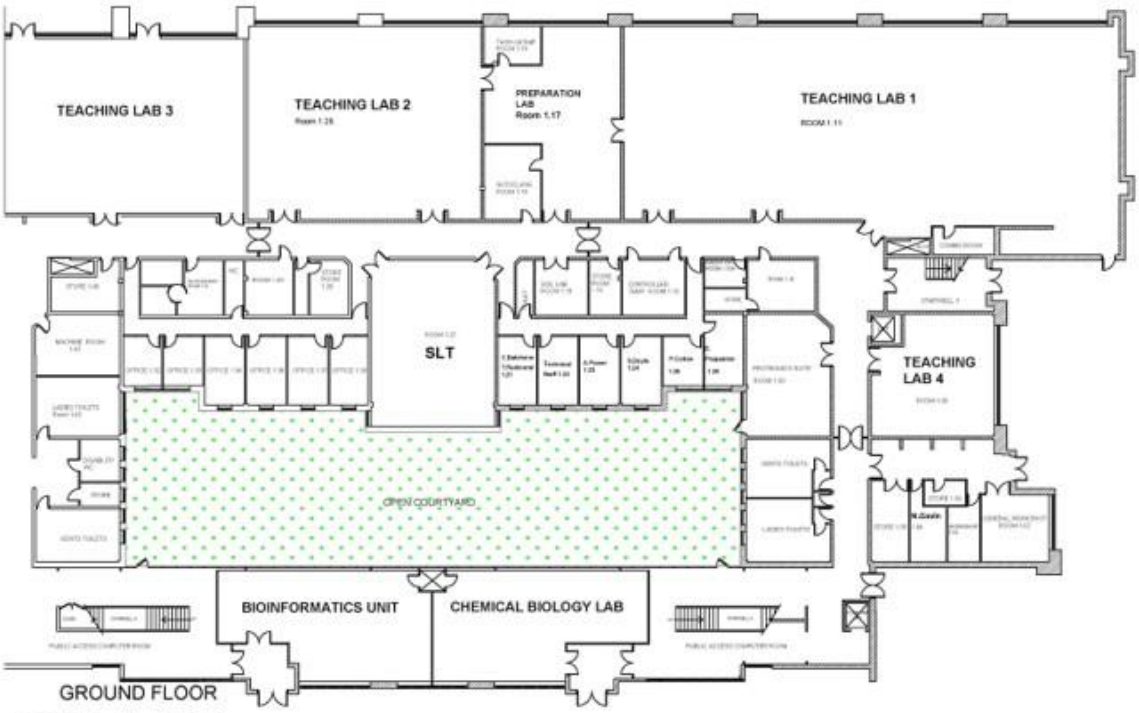
Optional areas of study (can be taken care of with 4th year options) also BI301, BI305 and BI306 or BI315

(k) Biotechnology
(l) Bioinformatics
(m) Pharmacology
(n) Biosciences
(o) Environmental Biology

MH201 Biology Modules 1st-3rd year

CODE	NAME	Credits	Year of Study	Compulsory or Optional	
BI101	From Cell to Organism	7.5	1	compulsory	
BI102	Biological Function and Diversity	7.5	1	compulsory	
BI201	Biochemistry 1	5	2	compulsory	
BI203	Animal Physiology	5	2	compulsory	
BI204	Evolutionary Biology	5	2	compulsory	
BI210	Molecular Biology of the Cell	5	2	compulsory	
BI301	Introduction to Immunology	5	3	compulsory	
BI302	Microbiology	5	3	compulsory	
BI303	Ecology	5	3	compulsory	
BI304	Molecular Biology 2	5	3	compulsory	
BI305	Dissertation	5	3	compulsory	
BI306	***Plant Responses to the Environment***	***5***	***3***	***options***	***either***
BI315	***Bioinformatics***	***5***	***3***	***options***	***or***

Plant Biology Options in final year				
BI403	**Plant Biotechnology**	**5**	**4**	**options**
BI410	**Plant Developmental Biology**	**5**	**4**	**in 4th year**



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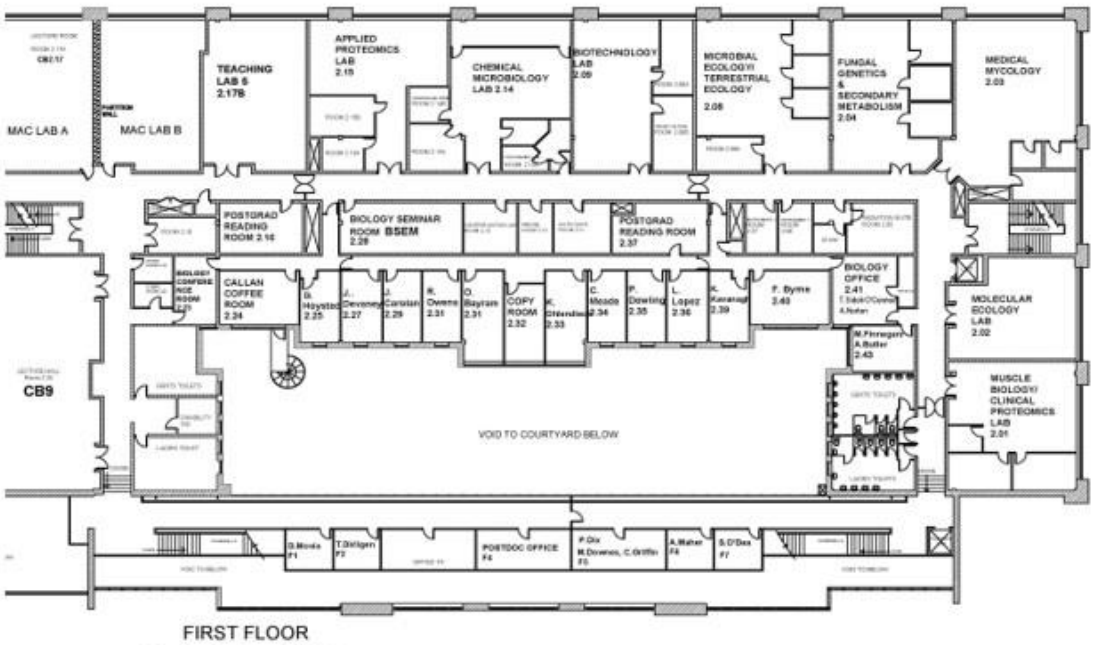

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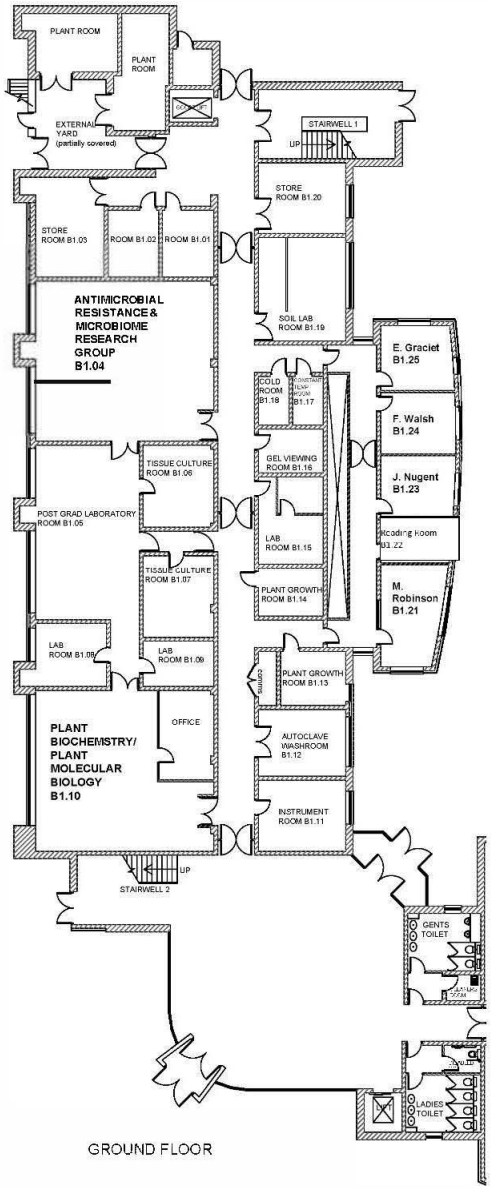

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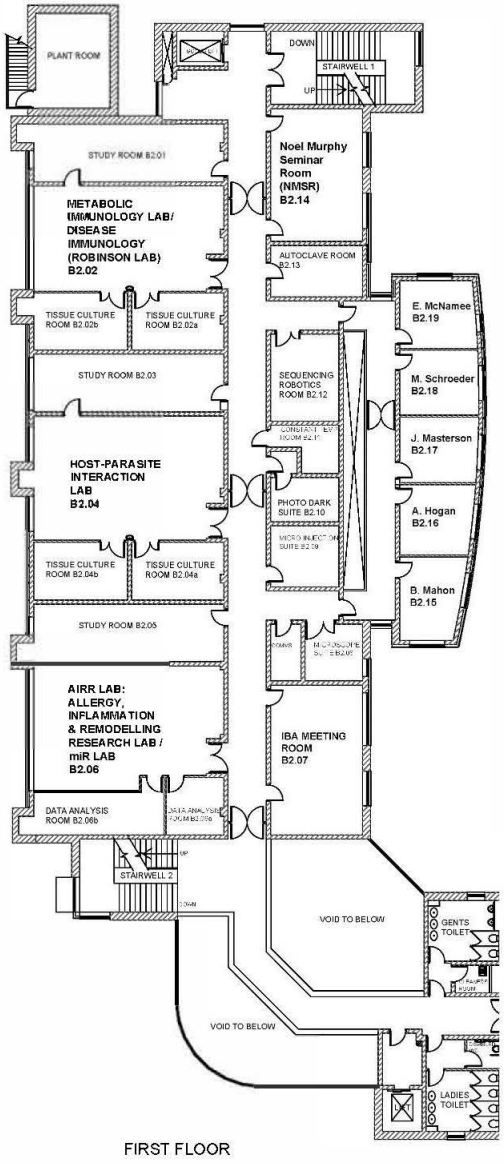

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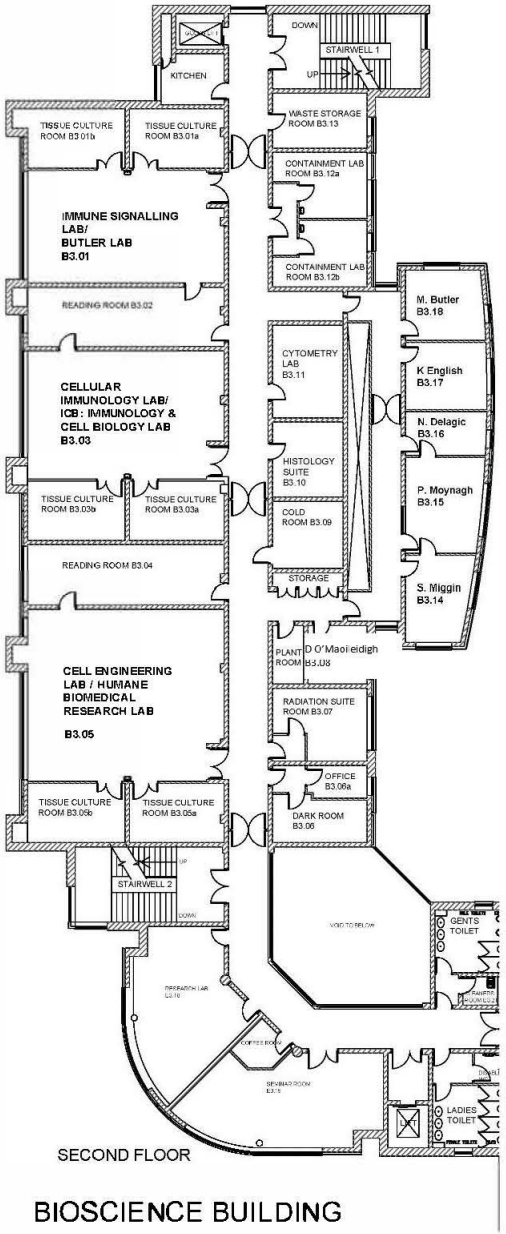

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