



OÉ Gaillimh  
NUI Galway

***Coláiste na hEolaíochta  
College of Science***

***Information Booklet***

***2011/2012***

**4<sup>th</sup> Year Science  
Degree Programmes  
(Undenominated & Denominated)**

The 2011-12 Information Booklet is valid for that Session. Whilst every effort is made to ensure the contents of the Information Booklet are accurate, the Information Booklet is issued for the guidance of students and staff only. The Information Booklet is not an offer to supply courses of study nor is it in any way to be construed as imposing any legal obligation on the College of Science or University to supply courses either at all or in part in respect of any subject. No guarantee is given that courses, syllabuses, fees or regulations may not be altered, cancelled or otherwise amended at any time. The Information Booklet confers no rights on any student registered for the Session 2011-12.

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## Welcome

Firstly, I would like to take this opportunity to welcome you back to University and to congratulate you on your achievements to date.

To assist you in a smooth return to your 4<sup>th</sup> Year, the College of Science has compiled this Information Booklet which will provide you with all the initial necessary information.

This year, self-service registration will take place between the 23<sup>rd</sup> August and 16<sup>th</sup> September 2011. Therefore, it is essential that all students are aware of the codes required for their particular programme as outlined in this booklet.

In this booklet, you will find a list of all the available subjects on offer for the academic session 2011/2012. We hope to make the Registration process as smooth as possible for you.

I hope you find your 4<sup>th</sup> Year of University life enjoyable and successful.

**Professor Tom Sherry,**  
**Dean, College of Science**

# Information for Students

Please read these instructions carefully before Self-Service Registration during the weeks of 23<sup>rd</sup> August to 16<sup>th</sup> September 2011.

Please note:

- Students who do not register during the Registration timeframe will be liable for a €200 Late Registration Fee.

## Subject Listing for 4<sup>th</sup> Year.

A list of subjects together with their breakdown of modules, weightings, etc. is listed where relevant on pages 11 – 46. Students are required to register for 60 ECTS Credits.

Students must list all of their optional choices where options are available.

- In the case of a subject where all modules are obligatory, only the Level 1 code need be listed on the registration form, e.g., Under 4BS2, CH401: Chemistry (as students are obliged to take all sections of CH401).
- In the case of a subject where choices are available both the Level 1 code and the Level 2 codes must be indicated, e.g., under 4BS2, CS421: Computer Science has a list of choices. Therefore the choices must also be listed, e.g., CS421: MA304 and MP362.

Where options are not available, students will automatically be registered for all listed subjects.

**Coláiste na hEolaíochta/College of Science**

**1. The Academic Year**

The session will be organised as follows:

*Semester I:* 5<sup>th</sup> September 2011 – 25<sup>th</sup> November 2011  
*Study Week:* begins Monday, 28<sup>th</sup> November 2011  
*Examinations:* 5<sup>th</sup> December 2011 – 16<sup>th</sup> December 2011

*Semester II:* 9<sup>th</sup> January 2012 – 30<sup>th</sup> March 2012  
*Study Week and Easter*  
*Vacation:* 2<sup>nd</sup> April 2012 - 20<sup>th</sup> April 2012  
*Examinations (Summer):* 23<sup>th</sup> April 2012 – 18<sup>th</sup> May 2012

*Examinations (Autumn Repeat):* to be confirmed

**2. Registration:**

You are required to register on the date stipulated (*self-service during the weeks of 23<sup>rd</sup> August to 16<sup>th</sup> September 2011*). The Change of Mind date for subject choice amendments (self-service registration) are 29<sup>th</sup> and 30<sup>th</sup> September. The Registration Office is not empowered to accept registrations after the specified registration date.

**Autumn Repeat Students**

Autumn repeat students who have passed their autumn examinations must also begin classes at the start of term. Autumn Repeat students will be given information in relation to registration by the Registration Office at the beginning of term.

**Course Registration**

Subject listings for your programme are enclosed. You must complete the subject registration in accordance with this instruction. Modules to a total of 60 ECTS Credits must be taken.

**3. Lecture Timetables**

Detailed timetables for each subject containing venue, etc., will be available from discipline offices. **They will not be available from the College Office.**

**4. Examination Timetable – Semester I**

The examination timetable will be posted on notice boards during the semester.

## 5. Examination Entry

Subject registration also includes Examination Entry. You will not be required to complete another form. The importance of correct registration and course selection is therefore emphasised.

## 6. Examinations

### 6.1 Date

Examinations are held at the end of Semester I (December), in Spring (March) and Semester II (at the end of April/May). Please check the module listings on Page 12-51 for when your examinations will occur.

### 6.2 Autumn Examinations

There are no Autumn (repeat) examinations in Fourth Science.

### 6.3 Deferral

The policy for deferral that applies in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year does not apply to 4<sup>th</sup> year as the 4<sup>th</sup> year examination is a final examination. However, deferral may be granted only in the most exceptional circumstances following discussion and agreement by the Dean, the Head of Department and the External Examiner for the subject.

## 7. Information and Support Services

As a student of the College of Science, if you are confused by any aspect of your programme, by the registration requirements or if you are experiencing personal difficulties or any difficulties in your academic programme, you are strongly recommended to seek advice and support from the academic staff, the Dean, the University Offices and the Student Support Services of the University. Timely support may be the key to your success in the programme and to a level of achievement which does you justice.

### College of Science Offices

Dean of Science	Professor Tom Sherry	Room 210 Concourse	Ext. 3615
Administrative Officer	Mr. Kilian Dooley	Room 208 Concourse	Ext. 4166
Administrative Assistant	Ms. Claire Mitchell	Room 207 Concourse	Ext. 3700
Administrative Assistant	Ms. Cora Costello	Room 209 Concourse	Ext. 3630
Administrative Assistant	Ms. Olive Mills	Room 211 Concourse	Ext. 2182

# Code of Practice for Dealing with Plagiarism

## Introduction

1. Plagiarism is the act of copying, including or directly quoting from, the work of another without adequate acknowledgement. The submission of plagiarised materials for assessment purposes, plagiarism in publication or in public presentation is fraudulent and all suspected cases will be investigated and dealt with appropriately by the University following the procedures outlined here and with reference to the Disciplinary Code.
2. All work submitted by students for assessment purposes, for publication or in public presentation, is accepted on the understanding that it is their own work and written in their own words except where explicitly referenced using the accepted norms and formats of the appropriate academic discipline.
3. Whilst some cases of plagiarism can arise through poor academic practice with no deliberate intent to cheat, this still constitutes a breach of acceptable practice and requires to be appropriately investigated and acted upon.
4. Regulations, guidelines and procedures regarding plagiarism should be made widely available and a statement included in course handbooks, websites, departmental noticeboards or appropriate handouts to students. Plagiarism can arise through ignorance and therefore it is important to ensure that students understand what is meant by the term and the seriousness of the offence.
5. Schools are recommended to consider requiring students to sign a short declaration that work submitted by them for assessment purposes, for publication or in public presentation, is their own and that such a statement may be attached to a submitted piece of coursework, essay or dissertation (or signed at the start of each course/ academic year, acknowledging that the student has read and understood the plagiarism regulations). The purpose of this statement is to reinforce the principle of statement (2) above and to remind students of the requirements for the submission of a formally marked assessment.
6. Cases in which students knowingly permit others to copy their work shall also be subject to the procedures outlined here and considered an offence.

## Procedures

7. A small number of staff should be identified in each College who would have responsibility for dealing with suspected and reported cases of plagiarism<sup>1</sup>. These staff are Designated Authorities, as described in the NUI Galway Student Code of Conduct.

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<sup>1</sup> This is in keeping with best practice recommendations from the UK's JISC Plagiarism Advisory Service and also reflects practice in a number of institutions. Whilst it may seem like an additional burden in terms of administration, it offers a number of advantages of either leaving the responsibility to the lecturer involved or indeed, the Head of Department. In some universities each department identifies one such staff member, in others, a single staff member may span a number of subjects within a broad "cognate area." Further, having a small number of such staff clearly identified, across the university, who can readily be trained in such issues, ensures consistency of practice. It also enables "fast-tracking" of "minor" or admitted offences and responds to the outcome of Flanagan vs University College Dublin (1988, <http://www.ucc.ie/law/irlii/cases/159jr-88.htm>), as do the remainder of these guidelines.

8. These staff should be trained on the basic issues, be made aware of current best practice guidelines; techniques for minimising, detecting and responding to plagiarism; and current national and international developments across the HE sector.
9. A member of teaching staff who suspects that a submitted piece of student work may be plagiarised should notify the appropriate plagiarism advisor in their College/cognate area. A short report including a copy of the suspected example and any evidence for plagiarism should be forwarded to the advisor.
10. The plagiarism advisor shall conduct an investigation of the alleged plagiarism, firstly determining whether it represents a “minor” or “major” offence.
11. Minor cases are those in which the suspected plagiarism is a first offence and represents poor academic practice. Such cases include:
  - apparently innocent misuse of materials;
  - inadequate citation such as poor referencing, inappropriate paraphrasing;
  - over-reliance on sources without sufficient of the candidate’s own work;
  - those in which the suspected plagiarism represents only a small proportion of the work and/or an element in a piece of work which makes a small contribution to the mark for the module
12. The advisor will, in such cases, normally interview the candidate to discuss the suspected plagiarism.
13. If the advisor is satisfied that there is sufficient evidence of such an offence, the student will be given a written warning and provided with advice on avoiding plagiarism and the necessity of properly acknowledging and referencing sources.
14. Major cases are those which may include, for example:
  - copying multiple paragraphs in full without acknowledgement of the source;
  - taking essays from the Internet without revealing the source;
  - copying all or much of the work of a fellow student with, or without, his/her knowledge or consent;
  - submitting the same piece of work for assessment under multiple modules;
  - those involving a final year undergraduate or postgraduate student (taught or research);
  - a second offence where the student has been in receipt of an earlier written warning.
15. In consideration of possible major cases, the student will be notified, in writing, of the suspected offence, provided with a copy of the marked-up piece

of work and invited to attend an interview with the plagiarism advisor and an additional member of staff<sup>2</sup>.

16. The student will have the right to be accompanied and assisted, at the interview, by a “friend.”<sup>3</sup>
17. At the interview, the student will be given a clear explanation of what has been alleged, shown a copy of his/her work, given the opportunity to justify the work and be invited to admit or deny responsibility.
18. In such major cases, where the advisor is satisfied that an offence has occurred, the advisor is required to determine between three possible courses of action, depending on the apparent severity of the offence:
  - (a) an opportunity to repeat and resubmit the work, but where the maximum mark that can be awarded is the pass mark appropriate to the module;
  - (b) the immediate imposition of an academic penalty, which would normally be the award of zero marks to the plagiarised work, with no option to resubmit the work;
  - (c) the submission of the case for consideration by the university’s Discipline Committee.
19. In all cases, the student will be notified in writing of the decision of the advisor and any penalty imposed.
20. In keeping with the University’s Code, the student shall be entitled to appeal a decision to the Appeals Board.
21. An appropriate record should be kept<sup>4</sup> in respect of any upheld allegation, which can be consulted by the plagiarism advisor to determine whether a new case is potentially a second, or subsequent, offence.
22. Basic statistical information covering the number of cases referred to advisors, the number of written warnings and other penalties applied and their distribution across Departments and Faculties, should be collated by the University to inform subsequent modifications to these regulations and ascertain the requirement for wider training and information dissemination on this topic.

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<sup>2</sup> For example, the Head of Department, a senior staff member in the department, or another plagiarism advisor.

<sup>3</sup> As used in the University’s Code. This may, for example, be a parent or guardian; a fellow student or other friend; a representative from the Students’ Union; or a legal representative, if so desired.

<sup>4</sup> By the appropriate University office.

# Undenominated Science

## **4BS2: 4<sup>th</sup> Year Subjects:**

Students register for one subject (each worth 60 ECTS) and use the relevant code as listed below:

AN402:	Anatomy
AX401:	Applied Physics and Electronics
BI401:	Biochemistry
BT401:	Botany
CH401:	Chemistry
CS421:	Computer Science
EOS430:	Earth and Ocean Sciences
PH400:	Experimental Physics
MI401:	Microbiology
PM417:	Pharmacology
SI401:	Physiology
ZO401:	Zoology

Details of modules in each subject follow on the next page.

## Fourth Year Undenominated Science (4BS2)

**Key:**

AN: Anatomy

AX: Applied Physics and Electronics

BI: Biochemistry

BT: Botany

CH: Chemistry

CS: Computing Studies

EOS: Earth and Ocean Sciences

PH: Physics

MI: Microbiology

PM: Pharmacology

SI: Physiology

ZO: Zoology

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
AN402	AN425	Molecular and Cellular Anatomy I	6	I	I	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN427	Molecular and Cellular Anatomy II	6	II	II	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN429	Project A	9	II	II	Con. Ass.		Mr. A. Black & Dr. S. McMahon
	AN430	Project B	15	II	II	Con. Ass.		Mr. A. Black & Dr. S. McMahon
	AN431	Oral	3	II	II	Oral		Mr. A. Black & Dr. S. McMahon
	AN434	Topographical Anatomy	6	I & II	I & II	Con. Ass.	1	Mr. A. Black & Dr. S. McMahon
	AN435	Advanced Anatomy I	9	I	I	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN436	Advanced Anatomy II	6	II	II	3 hours	1	Mr. A. Black & Dr. S. McMahon
AX401	PH407	Solid State Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH408	Optoelectronics	4.5	I	I	2 hours	1	Head of School of Physics
	PH435	Electromagnetism and Relativity	4.5	II	II	2 hours	1	Head of School of Physics
	PH457	Quantum Mechanics	4.5	I	I	2 hours	1	Head of School of Physics
	PH458	Nanotechnology	4.5	II	II	2 hours	1	Head of School of Physics
	PH459	Applied Optics	4.5	II	II	2 hours	1	Head of School of Physics
	PH462	Problem Solving	6	I & II	II	Con. Ass		Head of School of Physics
	PH464	Signal & Image Processing	4.5	II	II	2 hours	1	Head of School of Physics
	PH465	Radiation and Medical Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH467	Applied Physics Laboratory & Project	18	I & II	II	Project		Head of School of Physics

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
BI401	BI404	Experimental Planning & Reasoning	6	I & II	II	Con. Ass.		Dr. Byrnes
	BI411	Oral Examination	3	II	II	Oral		Dr. Byrnes
	BI412	Lab work/practical project	12	I & II	II	Con. Ass.		Dr. Byrnes
	BI434	Biomolecules: Structures, Interactions & Signalling	6	I	I	3 hours	1	Dr. Byrnes
	BI435	Molecular Biology, Cell Biology & Molecular Genetics	6	II	II	3 hours	1	Dr. Byrnes
	BI437	Current Topics in Bioscience	6	II	II	2 hours	1	Dr. Byrnes
	BI441	Advanced Technologies in Biochemistry & Cell Biology	6	II	II	3 hours	1	Dr. Byrnes
	BI442	Research Paper Analysis	6	II	II	3 hours	1	Dr. Byrnes
	BI443	Literature Review	6	II	II	Essay		Dr. Byrnes
	BI444	Seminar	3	I & II	II	Con. Ass.		Dr. Byrnes
BT401	BT411	Botany Project	24			Con. Ass.		Head of Discipline
	BT415	Advanced Topics in Algal Research	6	I	I	2 hours	1	Head of Discipline
	BT424	Ecology and Conservation Issues	6	II	II	2 hours	1	Head of Discipline
	BT430	History of Plants, Atmosphere and Climate Change	6	II	II	2 hours	1	Head of Discipline
	BT431	Plant Evolution and Cell Biology	6	I	I	2 hours	1	Head of Discipline
	BT432	Current Topics in Plant Science	12	II	II	3 hours	1	Head of Discipline
	BT433	Plant Genetics and Biotechnology for Food and Livelihood	6	II	II	2 hours	1	Head of Discipline
CH401	CH428	Project	18	I & II	II	Project		Head of School of Chemistry
	CH429	Physical Chemistry I	7	I	I	2 hours	1	Head of School of Chemistry
	CH430	Inorganic Chemistry I	7	I	I	2 hours	1	Head of School of Chemistry
	CH431	Organic Chemistry I	7	I	I	2 hours	1	Head of School of Chemistry
	CH432	Physical Chemistry II	7	II	II	2 hours	1	Head of School of Chemistry
	CH433	Inorganic Chemistry II	7	II	II	2 hours	1	Head of School of Chemistry
	CH434	Organic Chemistry II	7	II	II	2 hours	1	Head of School of Chemistry
CS421	CS424	Object Oriented Programming/Internet Programming	6	I	II	2 hours	1	Head School of MSAM
	CS428	Advanced Operating Systems	6	I & II	II	2 hours	1	Head School of MSAM
	MA410	Artificial Intelligence	6	I & II	II	2 hours	1	Head School of MSAM
	MM354	Numerical Mathematics	6	I	I	2 hours	1	Head School of MSAM

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
CS421	MP307	Modelling II	6	II	II	2 hours	1	Head School of MSAM
<b>Students must select <u>one</u> computer science project to a value of 6 ECTS</b>								
	MA433	Computer Science Project	6	I & II		Con. Ass.		
	MP453	Computer Science Project	6	I & II		Con. Ass.		
	CT430	Computer Science Project	6	I & II		Con. Ass.		
<b>Options: Students must select modules to a value of 18 ECTS</b>								
	CS402	Cryptography	6	I & II	II	3 hours	1	
	CS423	Neural Network	6	II	II	2 hours	1	
	CT336	Graphics and Image Processing	6	I	I		1	
	CT406	Advanced Programming	6	II	II	2 hours	1	
	CT433	Advanced Studies in IT	6	II	II	3 hours	1	
	IE332	Quality Management	6	I	I	2 hours	1	
	IE433	Quality Engineering	6	II	II	2 hours	1	
	MA387	Statistics I (hons)	6	I	I	2 hours	1	
	MA391	Statistics II (hons)	6	II	II	2 hours	1	
	MA337	Statistics I (pass)	6	I	I	2 hours	1	
	MA338.II	Statistics II (pass)	6	II	II	2 hours	1	
EOS430	EOS416	Climate Change, Energy and Resource Management	10	I	SP	2 hours	1	Dr. C. Brown
	EOS427	EOS Field Project/Honours Thesis and Field Trip or Research Cruise	20	I & II	II	Project		Prof. P. Ryan
<b>Options: Students must take <u>three</u> Advanced Courses to a value of 30 ECTS</b>								
	EOS411	Environmental and Marine Geophysics	10	II	II	3 hours	1	Dr. E. Daly
	EOS412	Environments and the history of life	10	II	II	3 hours	1	Mr. J. Murray
	EOS413	Biophysical and Biogeochemical interaction in the oceans	10	II	II	3 hours	1	Dr. R. Cave
	EOS414	Petrogenesis of igneous and metamorphic rocks	10	II	II	3 hours	1	Dr. K. Moore
	EOS415	Applied Geoscience	10	II	II	2 hours	1	Dr. T. Henry
PH400	PH407	Solid State Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH408	Optoelectronics	4.5	I	I	2 hours	1	Head of School of Physics
	PH435	Electromagnetism and Relativity	4.5	II	II	2 hours	1	Head of School of Physics

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>	
PH400	PH457	Quantum Mechanics	4.5	I	I	2 hours	1	Head of School of Physics	
	PH458	Nanotechnology	4.5	II	II	2 hours	1	Head of School of Physics	
	PH459	Applied Optics	4.5	II	II	2 hours	1	Head of School of Physics	
	PH462	Problem Solving	6	I & II	II	Con. Ass		Head of School of Physics	
	PH468	Experimental Physics Laboratory & Project	18	I & II	II	Project		Head of School of Physics	
	<b>Options: Students must select <u>two</u> modules (1 option per semester) to a value of 9 ECTS (<i>other than the combination of PH464 + PH465</i>)</b>								
	PH406	Spectroscopy	4.5	II	II	2 hours	1	Head of School of Physics	
	PH463	Atmospheric Physics	4.5	I	I	2 hours	1	Head of School of Physics	
	PH464	Signal & Image Processing	4.5	II	II	2 hours	1	Head of School of Physics	
PH465	Radiation and Medical Physics	4.5	I	I	2 hours	1	Head of School of Physics		
MI401	MI405	Project	18	I	I	Project		Head of Microbiology	
	MI406	Self-Study Essay	4	I	I	Con. Ass.		Dr O'Byrne	
	MI413	Problem Solving Papers	6	II	II	Dept. Ass.		Dr. Wall	
	<b>Options: Students must select <u>eight</u> modules to a value of 32 ECTS</b>								
	MI414	Nucleic Acids: Structure & Function	4	II	II	Dept. Ass.		Dr. Boyd	
	MI416	Multi Gene Systems & their Regulation: An Overview	4	II	II	Dept. Ass.		Dr. C. Carroll	
	MI417	Bioinformatics	4	II	II	Dept. Ass.		Dr. Collins	
	MI418	The RNA World	4	II	II	Dept. Ass.		Dr. Barry	
	MI419	Introduction to Non-Reductionist Biology	4	II	II	Dept. Ass.		Prof. P. Smith	
	MI423	Microbial Decomposition Processes	4	II	II	Dept. Ass.		Prof. O Flaherty	
	MI425	Microbiology & Human Development	4	II	II	Dept. Ass.		Prof. Cormican	
	MI426	Bacterial Molecular Pathogenesis	4	II	II	Dept. Ass.		Dr. O Byrne	
	MI428	Fungal Bioprocess Technology & Biotechnology	4	II	II	Dept. Ass.		Dr. Fleming	
	MI434	Marine Microbiology and Biogeochemistry	4	II	II	Dept. Ass.		Dr. Collins	
	MI432	Recombinant Protein Production Technology	4	II	II	Dept. Ass.		Dr. Wall	
	MI435	Molecular Microbial Ecology	4	II	II	1.5 hours		Dr. C. Smith	
	MI436	Molecular Systems Biology	4	II	II	1.5 hours		Dr. Abram	

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
PM417	PM408	CNS Drug Portfolio	3	II	II	Con. Ass.		Dr. Eilís Dowd
	PM419	Neuropharmacology	6	II	II	Con. Ass.	1	Dr. Eilís Dowd
	PM420	Drug Development & Delivery	6	II	II	3 hours	1	Dr. Eilís Dowd
	PM421	Molecular Pharmacology	6	II	II	3 hours	1	Dr. Eilís Dowd
	PM422	Experimental Pharmacology	6	I	I	3 hours	1	Dr. Eilís Dowd
	PM423	Journal Club	3	I	I	Con. Ass.		Dr. Eilís Dowd
	PM425	Research Project	15	I	I	Con. Ass.		Dr. Eilís Dowd
	PM426	Advances in Pharmacology & Therapeutics	6	II	II	Con. Ass.		Dr. Eilís Dowd
	PM428	Oral Examination	3	II	II	Oral		Dr. Eilís Dowd
	PM430	Advanced Principles of Toxicology	6	I	I	3 hours	1	Dr. Howard Fearnhead
SI401	SI407	Oral Examination	3	II	II	Oral		
	SI408	Immunology	6	II	II	3 hours	1	
	SI422	Advanced Neurophysiology	6	II	II	3 hours	1	
	SI424	Advanced Techniques in Physiology	9	I	I	2 hours	1	
	SI425	Scientific Writing	3	I	I	Con. Ass.	1	
	SI426	Project I	15	II	II	Project		
	SI431	Therapeutics	6	I	I	2 hours	I	Dr Ailish Hynes
	SI432	Pathophysiology	6	I	I	2 hours	I	Dr Ailish Hynes
	SI433	Advanced Cardiocascular and MicroCirculatory Physiology	3	I	I	1 hour	I	Dr Ailish Hynes
SI434	Advanced Gastrointestinal Physiology	3	I	I	1 hour	I	Dr Ailish Hynes	
ZO401	ZO407	Thesis/Project	18	I	II	Project		
	ZO408	Terrestrial & Freshwater Ecology	12	I	II	3 hours	1	
	ZO409	Evolutionary, Developmental & Marine Zoology	12	II	II	3 hours	1	
	ZO411	Integrative Zoology	6	II	II	Cont. Ass.		
	ZO412	Zoology Literature Review	12	II	II	Cont. Ass.	1	

## Fourth Year Hons B.Sc. in Mathematics (4BS3)

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>	
MA480	MA490	Measure Theory	5	I	II	3 hours	1	Head of School of MSAM	
	MA482	Functional Analysis	5	II	II			Head of School of MSAM	
	MA416	Rings	5	I	II	3 hours	1	Head of School of MSAM	
	MA491	Fields Thoery	5	II				Head of School of MSAM	
	MA484	Statistics I	5	I	I	2 hours	1	Head of School of MSAM	
	MA486	Statistics II	5	II	II	2 hours	1	Head of School of MSAM	
	MA430	Mathematics Project	10	I & II	II	Con. Ass.		Head of School of MSAM	
	<b>Options: Please select options to a value of 20 ECTS Credits</b>								
	CS304	Mathematical and Logical Aspects of Computing	5	I & II	II	3 hours	1	Head of School of MSAM	
	CS401	Fractal Geometry	5	I	I	2 hours	1	Head of School of MSAM	
	CS402	Cryptography	5	I & II	II	3 hours	1	Head of School of MSAM	
	CS407	Computer Algebra	5					Head of School of MSAM	
	CS424	Object Oriented Programming/ Internet Programming	5	I	II	2 hours	1	Head of School of MSAM	
	CS428	Advanced Operating Systems	5	I & II	II	2 hours	1		
	IE321	Operations Research I	5	I	I	2 hours	1	Dr. Sheil	
	IE324	Systems Simulation	5	I & II	SP	2 hours	1	Dr. Sheil	
IE409	Quality and Reliability Engineering	5							

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
	IE425	Reliability and Safety Analysis	5					
	IE433	Quality Engineering	5	II	II			
	IE332	Quality Management	5	I	I			
	IE864	Reliability and Maintenance	5					
	MA337	Statistics I	5	I	I	2 hours	1	Head of School of MSAM
	MA338.II	Statistics II	5	II	II	2 hours	1	Head of School of MSAM
	MA401	Combinatorial Mathematics	5	I	I	2 hours	1	Head of School of MSAM
	MA407	Differential Equations	5					Head of School of MSAM
	MA410	Artificial Intelligence	5	I & II	II	2 hours	1	Head of School of MSAM
	MA417	Automated Reasoning	5	II	II	2 hours	1	Head of School of MSAM
	MA423	Fast Fourier Transforms	5	I	I	2 hours	1	Head of School of MSAM
	MA426	Wavelets	5	I	I	2 hours	1	Head of School of MSAM
	MA485	Numerical Analysis	5					Head of School of MSAM
	MP231	Mathematical Methods I	5	I	I	2 hours	1	Head of School of MSAM
	MP232	Mathematical Methods II	5	II	II	2 hours	1	Head of School of MSAM
	MP305	Modelling I	5	I	I	2 hours	1	Head of School of MSAM
	MP307	Modelling II	5	II	II	2 hours	1	Head of School of MSAM
	MA435	Undergraduate Ambassador Module in Mathematics	10	II	II	Project		Head of School of Maths

## Fourth Year Hons B.Sc. in Applied Mathematics (4BS4)

**Key:**

AM: Applied Mathematics

MA: Mathematics

MP: Mathematical Physics

CS: Computing Science

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
AM480	MA378	Numerical Analysis II	5	II	II	2 hours	1	Head of School of Maths
	MA385	Numerical Analysis I	5	I	I	2 hours	1	Head of School of Maths
	MP307	Modelling II	5	II	II	2 hours	1	Head of School of Maths
	MP365	Fluid Mechanics	5	II	II	2 hours	1	Head of School of Maths
	MP366	Electromagnetism	5	I	I	2 hours		Head of School of Maths
	MP403	Cosmology & General Relativity	5	I	I	2 hours	1	Head of School of Maths
	MP490	Mathematical Physics Project	10	I & II	II	Project		Head of School of Maths
	MP491	Non Linear Systems	5	II	II	2 hours	1	Head of School of Maths
	MP494	Partial Differential Equations	5	II	II	2 hours	1	Head of School of Maths
<b>Options: Please select options to a value of <u>10 ECTS Credits</u></b>								
	MA401	Combinatorial Mathematics	5	I	I	2 hours	1	Head of School of Maths
	MA407	Differential Equations	5				1	Head of School of Maths
	MA423	Fast Fourier Transforms	5	I	I	2 hours	1	Head of School of Maths
	MA426	Wavelets	5	I	I	2 hours	1	Head of School of Maths
	MA435	Undergraduate Ambassador Module in Mathematics	10	II	II	Project		Head of School of Maths
	CS304	Mathematical and Logical Aspects of Computing	5	I & II	II	3 hours	1	Head of School of Maths
	CS401	Fractal Geometry	5	I	I	2 hours	1	Head of School of Maths
	MA410	Artificial Intelligence	5	I & II	II	2 hours	1	Head of School of Maths
	MA416	Rings	5	I	II	3 hours	1	Head of School of Maths
	MA417	Automated Reasoning	5	II	II	2 hours	1	Head of School of Maths
	MA423	Fast Fourier Transforms	5	I	I	2 hours	1	Head of School of Maths

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
AM480	MA341	Metric Spaces	5	I	I	2 hours	1	Head of School of Maths
	MA342	Topology	5	II	II	2 hours	1	Head of School of Maths
	MA343	Groups I	5	I	I	2 hours	1	Head of School of Maths
	MA344	Groups II	5	II	II	2 hours	1	Head of School of Maths
	MA482	Functional Analysis	5	I	II	3 hours	1	Head of School of Maths
	MA490	Measure Theory	5	II	II			Head of School of Maths
	MA491	Field Theory	5	II	II	3 hours	1	Head of School of Maths

## Fourth Year Science (Intercalated) (4BS6)

### Key:

AN: Anatomy

BR: Bacteriology

PM: Pharmacology

BI: Biochemistry

PA: Pathology

SI: Physiology

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
AN402	AN425	Molecular and Cellular Anatomy I	6	I	I	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN427	Molecular and Cellular Anatomy II	6	II	II	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN429	Project A	9	II	II	Con. Ass.		Mr. A. Black & Dr. S. McMahon
	AN430	Project B	15	II	II	Con. Ass.		Mr. A. Black & Dr. S. McMahon
	AN431	Oral	3	II	II	Oral		Mr. A. Black & Dr. S. McMahon
	AN434	Topographical Anatomy	6	I & II	I & II	Con. Ass.	1	Mr. A. Black & Dr. S. McMahon
	AN435	Advanced Anatomy I	9	I	I	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN436	Advanced Anatomy II	6	II	II	3 hours	1	Mr. A. Black & Dr. S. McMahon
BI401	BI404	Experimental Planning & Reasoning	6	I & II	II	Con. Ass.		Dr. Byrnes
	BI411	Oral Examination	3	II	II	Oral		Dr. Byrnes
	BI412	Lab work/practical project	12	I & II	II	Con. Ass.		Dr. Byrnes
	BI434	Biomolecules: Structures, Interactions & Signalling	6	I	I	3 hours	1	Dr. Byrnes
	BI435	Molecular Biology, Cell Biology & Molecular Genetics	6	II	II	3 hours	1	Dr. Byrnes
	BI437	Current Topics in Bioscience	6	II	II	2 hours	1	Dr. Byrnes
	BI441	Advanced Technologies in Biochemistry & Cell Biology	6	II	II	3 hours	1	Dr. Byrnes
	BI442	Research Paper Analysis	6	II	II	3 hours	1	Dr. Byrnes
	BI443	Literature Review	6	II	II	Essay		Dr. Byrnes
	BI444	Seminar	3	I & II	II	Con. Ass.		Dr. Byrnes
BR401	BR401	Bacteriology	60					
PA401	PA401	Pathology	60					

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
PM417	PM419	Neuropharmacology	6	II	II	Con. Ass.	1	
	PM420	Drug Development & Delivery	6	II	II	3 hours	1	Dr. Eilís Dowd
	PM421	Molecular Pharmacology	6	II	II	3 hours	1	Dr. Eilís Dowd
	PM422	Experimental Pharmacology	6	I	I	3 hours	1	Dr. Eilís Dowd
	PM423	Journal Club	3	I	I	Con. Ass.		Dr. Eilís Dowd
	PM425	Research Project	15	I	I	Con. Ass.		Dr. Eilís Dowd
	PM426	Advances in Pharmacology & Therapeutics	6	II	II	Con. Ass.		Dr. Eilís Dowd
	PM428	Oral Examination	6	II	II	Oral		Dr. Eilís Dowd
	PM430	Advanced Principles of Toxicology	6	I	I	3 hours	1	
SI401	SI407	Oral Examination	3	II	II	Oral		
	SI408	Immunology	6	II	II	3 hours	1	
	SI422	Advanced Neurophysiology	6	II	II	3 hours	1	
	SI424	Advanced Techniques in Physiology	9	I	I	3 hours	1	
	SI425	Scientific Writing	3	I	I	3 hours	1	
	SI426	Project I	15	II	II	Project		
	SI431	Therapeutics	6	I	I	1 hour		Dr. Eilís Dowd
	SI432	Pathophysiology	6	I	I	1 hour		Dr. Eilís Dowd
	SI433	Advanced Cardiovascular and MicroCirculatory Physiology	3	I	I	1 hour		Dr. Eilís Dowd
	SI434	Advanced Gastrointestinal Physiology	3	I	I	1 hour	1	Dr. Eilís Dowd

## Fourth Year Applied Mathematics and Physics (4BS9)

**Key:**

MX: Applied Mathematics and Physics      EP: Experimental Physics      MP: Mathematical Physics

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
MX402	PH407	Solid State Physics	5	I	I	2 hours	1	Head of School of Physics
	PH408	Optoelectronics	5	I	I	2 hours	1	Head of School of Physics
	PH459	Applied Optics	5	II	II	2 hours	1	Head of School of Physics
	PH490	Experimental Physics Laboratory and Project	15	I & II	II	Con. Ass.		Head of School of Physics
	MP305	Modelling I	5	I	I	2 hours	1	Head of School of Maths
	MP403	Cosmology and General Relativity	5	I	I	2 hours	1	Head of School of Maths
	MP491	Non-linear Systems	5	II	II	2 hours	1	Head of School of Maths
	MP365	Fluid Mechanics	5	II	II	2 hours	I	
	MP366	Electromagnetism	5	I	I	2 hours	I	
	MP494	Partial Differential Equations	5	II	II	2 hours	I	

# Denominated Degree Programme in Biomedical Science

## 4BO2: 4<sup>th</sup> Year Biomedical Science

Students register for the following modules:

### Core:

BM403:	Biomedical Science	12 ECTS
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### Optional - Choose one of the following:

AN402:	Anatomy	48 ECTS
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BI401:	Biochemistry	48 ECTS
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PM417:	Pharmacology	48 ECTS
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SI401:	Physiology	48 ECTS
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## Fourth Year Biomedical Science (4BO2)

### Key:

AN: Anatomy

PM: Pharmacology

CB: National Centre for Biomedical Engineering Science

BI: Biochemistry

SI: Physiology

MD: Medicine

CT: Information Technology

### List of Fourth Year Courses

Level 1	Level 2	Module Name	ECTS Credits	Taught Sem I or II	Exam Sem I or II	Exam Duration	No. of Exam Papers	Course Director
BM403	<b>Options: Students must select <u>two</u> module to a value of 6 ECTS</b>							
	PM430	Advanced Principles of Toxicology	6	I	I	3 hours	1	Dr. Howard Fearnhead
	BI441	Advanced Technologies in Biochemistry and Cell Biology	6	II	II	3 hours	1	Dr. Byrnes
	AN427	Molecular and Cellular Anatomy II	6	II	II	3 hours	1	
	SI408	Immunology	6	II	II	3 hours	1	
	GT301	Genetics	6	I	SP	3 hours		
<b>Options</b>								
AN402	AN425	Molecular and Cellular Anatomy I	6	I	I	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN434	Topographical Anatomy	6	I & II	I & II	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN435	Advanced Anatomy I	9	I	I	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN432	Research Presentation	3	I & II	I & II	Project		Mr. A. Black & Dr. S. McMahon
	AN430	Project B	15	II	II	Con. Ass.		Mr. A. Black & Dr. S. McMahon
	AN436	Advanced Anatomy II	6	II	II	3 hours	1	Mr. A. Black & Dr. S. McMahon
	AN431	Oral	3	II	II	Oral		Mr. A. Black & Dr. S. McMahon
BI401	BI411	Oral Examination	3	II	II	Oral		Dr. Byrnes
	BI421	Seminar	3	I & II	II	Con. Ass.		Dr. Byrnes
	BI422	Essay	6	II	II	Con. Ass.		Dr. Byrnes
	BI423	Year's Work on Practical and Report/Project	12	I & II	II	Con. Ass.		Dr. Byrnes
	BI434	Biomolecules: Structures, Interactions & Signalling	6	I	I	3 hours	1	Dr. Byrnes
	BI435	Molecular Biology, Cell Biology & Molecular Genetics	6	II	II	3 hours	1	Dr. Byrnes

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
BI401	BI436	Research Paper Analysis	6	II	II	3 hours	1	Dr. Byrnes
	BI437	Current Topics in Bioscience	6	II	II	2 hours	1	Dr. Byrnes
PM417	PM408	CNS Drug Portfolio	3	II	II	Con. Ass.		Dr. Eilís Dowd
	PM419	Neuropharmacology	6	II	II	Con. Ass.	1	Dr. Eilís Dowd
	PM420	Drug Development & Delivery	6	II	II	3 hours	1	Dr. Eilís Dowd
	PM421	Molecular Pharmacology	6	II	II	3 hours	1	Dr. Eilís Dowd
	PM422	Experimental Pharmacology	6	I	I	3 hours	1	Dr. Eilís Dowd
	PM423	Journal Club	3	I	I	Con. Ass.		Dr. Eilís Dowd
	PM425	Research Project	15	I	I	Con. Ass.		Dr. Eilís Dowd
	PM428	Oral Examination	3	II	II	Oral		Dr. Eilís Dowd
SI401	SI407	Oral Examination	3	II	II	Oral		
	SI408	Immunology	6	II	II	2 hours	1	
	SI422	Advanced Neurophysiology	6	II	II	3 hours	1	
	SI424	Advanced Techniques in Physiology	6	I	I	3 hours	1	
	SI425	Scientific Writing	6	I	I	3 hours	1	
	SI426	Project I	15	II	II	Project		
	SI431	Therapeutics	6	I	I	2 hours	1	
	SI432	Pathophysiology	6	I	I	2 hours		
	SI433	Advanced Cardiovascular and MicroCirculatory Physiology	3	I	I	1 hour		
	SI434	Advanced Gastrointestinal Physiology	3	I	I	1 hour		

# Denominated Degree in Biotechnology

## 4BY2: 4<sup>th</sup> Year Biotechnology

Students register for the following modules:

BG410:	4 <sup>th</sup> Year Biotechnology	60 ECTS
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### **Option:**

Students are assigned to **one** project from the following areas:

BI402:	Biochemistry Project	12 ECTS
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MI404:	Microbiology Project	12 ECTS
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MD404:	Medicine Project	12 ECTS
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Students should register in the first instance for **BI402: Biochemistry Project**. This enrolment may be changed later to MI404 or MD404 depending on the discipline affiliation of the project supervisor to whom you are assigned.

## Fourth Year Biotechnology (4BY2)

**Key:**

BI: Biochemistry

MI: Microbiology

BG: Biotechnology

MD: Medicine

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
BG410	BG413	Core Knowledge of Biotechnology	6	I & II	I & II	Oral + Dept. Ass.		
	BG411	Literature Review	6	II	II	Con. Ass.		
	BG414	Advanced Biochemistry	9	I	I	3 hours	1	
	BG415	Molecular and Cellular Biology	9	I & II	II	3 hours	1	
	BG416	Biotechnologies	9	I & II	II	3 hours	1	
	BG417	Application of Biotechnology	9	I & II	II	2 hours	1	
<b>Option: Students are assigned to <u>one</u> project to a value of 12 ECTS</b>								
	BI402	Biochemistry Project	12	Project				
	MD404	Medicine Project	12	Project				
	MI404	Microbiology Project	12	Project				

## Denominated Degree Programme in Computing Studies/Mathematical Science

CS421:	Computing Studies Core	20 ECTS
	CS424: Object Oriented Programming	5 ECTS
	CS428: Advanced Operating Systems and Automated Reasoning	5 ECTS
	MA410: Artificial Intelligence	5 ECTS
	CT406: Advanced Programming	5 ECTS
MM491	Mathematical Science Core	20 ECTS
	MA416: Rings	5 ECTS
	MA491: Fields	5 ECTS
	MP306: Modelling	10 ECTS
MC401:	Project	10 ECTS
	Student must select <b>one</b> of the following projects:	
	MA432: Mathematics Project	10 ECTS
	MP433: Mathematical Physics Project	10 ECTS
	CT431: Information Technology Project	10 ECTS
	MA435: Undergraduate Ambassador Module in Mathematics	10 ECTS
MM492:	Options	10 ECTS
	Students must select <b>one or two</b> options to a value of 10 ECTS from the attached table of available modules.	

## Denominated Degree in Computing Studies (4CS2)

**Key:**

CS: Computing Studies                      MM: Mathematics/Mathematical Physics  
 MA: Mathematics                            IE: Industrial Engineering  
 MP: Mathematical Physics                CT: Information Technology

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
<b>Core</b>								
MM491	MA416	Rings	5	I				Head of School of MSAM
	MA491	Fields	5	II	II	3 hours	1	Head of School of MSAM
	MP305	Modelling I	5	I	I	2 hours	1	Head of School of MSAM
	MP307	Modelling II	5	II	II	2 hours	1	Head of School of MSAM
CS421	CS424	Object Oriented Programming	5	I	II	2hours	1	Head of School of MSAM
	CS428	Advanced Operating Systems and Automated Reasoning	5	I & II	II	2hours	1	Head of School of MSAM
	MA410	Artificial Intelligence	5	I & II	II	2hours	1	Head of School of MSAM
	CT406	Advanced Programming	5	II	II	2 hours	1	
<b>MC401: Students must select <u>one</u> project option to a value of 10 ECTS</b>								
MC401	MA432	Mathematics Project	10	I & II	II			Head of School of MSAM
	MP433	Mathematical Physics Project	10	I & II	II			Head of School of MSAM
	CT431	Information Technology Project	10	I & II	II			
	MA435	Undergraduate Ambassador Module in Mathematics	10	II	II	Project		Head of School of Maths
<b>Options Select options to a value of 10 ECTS Credits</b>								
MM492	MA387	Statistics I (Hons)	5	I	I	2 hours	1	Head of School of MSAM
	MA391	Statistics II (Hons)	5	II	II	2 hours	1	Head of School of MSAM
	MA341	Metric Spaces	5	I	I	2 hours	1	Head of School of MSAM
	MA342	Topology	5	II	II	2 hours	1	Head of School of MSAM
	MA482	Functional Analysis	5	I				Head of School of MSAM
	MA490	Measure Theory	5	II	II	3 hours	1	Head of School of MSAM
	MA313	Linear Algebra I	5	I	I	2 hours	1	Head of School of MSAM
	MA314	Linear Algebra II	5	II	II	2 hours	1	Head of School of MSAM

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
MM492	MA301	Advanced Calculus	5	I	I	2 hours	1	Head of School of MSAM
	MA302	Complex Variable	5	II	II	2 hours	1	Head of School of MSAM
	MA337	Statistics I	5	I	I	2 hours	1	Head of School of MSAM
	MA338	Statistics II	5	II	II	2 hours	1	Head of School of MSAM
	MA484	Statistics I (Hons)	5	I	I	2 hours	1	Head of School of MSAM
	MA486	Statistics II (Hons)	5	II	II	2 hours	1	Head of School of MSAM
	CS401	Fractal Geometry	5	I	I	2hours	1	Head of School of MSAM
	CS407	Computer Algebra	5	II	II	2hours	1	Head of School of MSAM
	CS423	Neural Network	5	II	II	2hours	1	Head of School of MSAM
	FR365	Advanced French for Science	10	I & II	II	2 hours	1	
	GR252	German	10	I & II	II	2 hours	1	
	GR224	Beginner's German for Science	10	I & II	II	2 hours	1	
	GR352	German	10	I & II	II	2 hours	1	
	MA401	Combinatorial Mathematics	5	I	I	2hours	1	Head of School of MSAM
	MA412	Fourier Analysis	5	I	I	2 hours	1	Head of School of MSAM
	CT433	Advanced Options in IT	5	I & II	II	2hours	1	Dr. Mulvihill
	IE332	Quality Management	5	I	I	2 hours	1	Dr. Sheil
	IE433	Quality Engineering	5	II	II	2 hours	1	Dr. Sheil
	MP491	Non-linear Systems	5	II	II	2 hours	1	Head of School of MSAM
	CT336	Graphics and Image Processing	5	I	I	2 hours	1	Dr. Mulvihill
	CT865	Human Computer Interaction	5	II	II	2hours	1	Dr. Mulvihill
	IE321	Operations Research I	5					
	IE324	Systems Simulation	5					
	MA385	Numerical Analysis I (Hons)	5	I	I	2 hours	1	Head of School of MSAM
	MA378	Numerical Analysis II (Hons)	5	II	II	2 hours	1	Head of School of MSAM
	MA415	Knot Theory	5	I	I	2 hours		Head of School of MSAM
	MA417	Automated Reasoning	5	II	II	2 hours		Head of School of MSAM
	MA426	Wavelets	5	I	I	2 hours		Head of School of MSAM

# Denominated Degree Programme in Earth and Ocean Sciences

## 4EH2: 4<sup>th</sup> Year Earth and Ocean Sciences

### Core:

Students are automatically registered for the following core modules under EOS430:  
Earth and Ocean Sciences:

EOS416 Climate Change, Energy and Resource Management	10ECTS
EOS427 Field Project/Honours Thesis and Field Trip or Research Cruise	20ECTS

### Options:

Students must select **three** Advanced Modules to a value of 30 ECTS Credits from the following:

EOS411 Environmental and Marine Geophysics	10 ECTS
EOS412 Environments and the History of Life	10 ECTS
EOS413 Biophysical and Biogeochemical Interactions in the Oceans	10 ECTS
EOS414 Petrogenesis of Igneous & Metamorphic Rocks	10 ECTS
EOS415 Applied Geoscience	10 ECTS

## Fourth Year Earth and Ocean Sciences (4EH2)

**Key:**

EOS: Earth and Ocean Sciences

SP: Spring Examination

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
EOS430	EOS416	Climate Change, Energy and Resource Management	10	I	SP	2 hours	1	Dr. C. Brown
	EOS427	EOS Field Project/Honours Thesis and Field Trip or Research Cruise	20	I & II	II	Project		Prof. P. Ryan
<b>Options: Students must take <u>three</u> Advanced Courses to a value of 30 ECTS</b>								
	EOS411	Environmental and Marine Geophysics	10	II	II	3 hours	1	Dr. E. Daly
	EOS412	Environments and the history of life	10	II	II	3 hours	1	Mr. J. Murray
	EOS413	Biophysical and Biogeochemical interaction in the oceans	10	II	II	3 hours	1	Dr. R. Cave
	EOS414	Petrogenesis of igneous and metamorphic rocks	10	II	II	3 hours	1	Dr. K. Moore
	EOS415	Applied Geoscience	10	II	II	2 hours	1	Dr. T. Henry

# Denominated Degree Programme in Environmental Science

## 4EV2: 4<sup>th</sup> Year Environmental Science

### Core:

EV401 Environmental Management	12 ECTS
MI403 Environmental Microbiology and Waste Management	12 ECTS
One Project area	24 ECTS

### Options:

Students must select modules from the following subjects to a value of **12 ECTS** Credits:

BT423 Long-term Climate Change and Human Impact (Prerequisite BT316)	3 ECTS
+	
BT424 Ecology and Conservation Issues	3 ECTS
EH403 Hydrology (Prerequisite EH305)	6 ECTS
TI311 Advanced GIS (Prerequisite TI223)	6 ECTS
ZO403 Environmental Zoology (Prerequisite: ZO314)	6 ECTS

The following Third Year options can also be taken in the Fourth Year provided that they have not already been taken in the Third Year:-

BT316	Plant Ecology and Palaeoecology	6 ECTS
EH305	Hydrology & Hydrogeology	6 ECTS
PH328+PH329	Physics of the Environment I & II	6 ECTS
EOS311	Environmental Geosciences	6 ECTS
TI223	Introduction to GIS	6 ECTS
ZO314	Principles of Animal Ecology	6 ECTS

**Please note** that choice of course options is subject to availability in any given year and that particular combinations of options will not be possible due to timetable clashes. In addition, the number of students taking TI311 (Advanced GIS) is restricted and places may not be available every year. Fourth Year course options will be chosen following consultation with the Course Convenor.

## Fourth Year Environmental Science (4EV2)

### Key:

EV: Environmental Science

BT: Botany

OC: Oceanography

MI: Microbiology

EH: Engineering Hydrology

PH: Physics

TI: Geography

EP: Experimental Physics

ZO: Zoology

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>	
EV410	EV401	Environmental Management	12	I & II	II	3 hours	2		
	MI403	Environmental Microbiology and Waste Management	12	I & II	I & II	3 hours	2		
	<b>Options: Please select modules to a value of <u>12 ECTS</u></b>								
	TI311	Advanced GIS	6	I	I	3 hours	1		
	TI223	Introduction to GIS	6	II	II	3 hours	1		
	BT316	Plant Ecology and Palaeoecology	6	I	I	3 hours	1	Prof. M. O'Connell	
	BT430	History of Plant, Atmosphere and Climate Change	6	II	II	2 hours	1		
	BT424	Ecology and Conservation Issues	3	I & II	II	2 hours		Dr. M. Sheehy Skeffington	
	EH305	Hydrology and Hydrogeology	6	I & II	II	3 hours	1		
	EH403	Hydrology	6	I & II	II	3 hours	1		
	EOS311	Environmental Geosciences	6	II	II	3 hours	1	Dr. T. Henry	
	PH328	Physics of the Environment I	3	I	I	1.5 hours	1	Head of School of Physics	
	PH329	Physics of the Environment II	3	II	II	1.5 hours	1	Head of School of Physics	
	ZO314	Principles of Animal Ecology	6	II	II	3 hours	1	Dr. G. McCormack	
	ZO403	Environmental Zoology	6	II	II	3 hours	1		
<b>Option: Please select <u>one</u> project area worth 24 ECTS</b>									
AR450	Archaeology Project	24	I & II	II	Project				
BR450	Bacteriology Project	24	I & II	II	Project				
BI450	Biochemistry Project	24	I & II	II	Project				

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
	BT450	Botany Project	24	I & II	II	Project		
	CH450	Chemistry Project	24	I & II	II	Project		
	CE450	Civil Engineering Project	24	I & II	II	Project		
	CM450	Commerce Project	24	I & II	II	Project		
	EC450	Economics Project	24	I & II	II	Project		
	ED450	Education Project	24	I & II	II	Project		
	EH450	Engineering Hydrology Project	24	I & II	II	Project		
	EOS450	Earth and Ocean Sciences Project	24	I & II	II	Project		
	EV450	Environmental Science Project	24	I & II	II	Project		
	EP470	Experimental Physics Project	24	I & II	II	Project		
	LW430	Law Project	24	I & II	II	Project		
	GP450	General Practice Project	24	I & II	II	Project		
	TI450	Geography Project	24	I & II	II	Project		
	HP450	Health Promotion Project	24	I & II	II	Project		
	HI450	History Project	24	I & II	II	Project		
	IF450	Information Technology Project	24	I & II	II	Project		
	LW440	Irish Centre for Human Rights Project	24	I & II	II	Project		
	MK450	Marketing Project	24	I & II	II	Project		
	MA450	Mathematics Project	24	I & II	II	Project		
	MI470	Microbiology Project	24	I & II	II	Project		
	PI450	Philosophy Project	24	I & II	II	Project		
	SP630	Political Science and Sociology Project	24	I & II	II	Project		
	PS450	Psychology Project	24	I & II	II	Project		
	RA450	Radiology Project	24	I & II	II	Project		
	ZO450	Zoology Project	24	I & II	II	Project		

# Denominated Degree in Financial Mathematics and Economics

## 4FM2: 4<sup>th</sup> Year Financial Mathematics

### Core:

Students are automatically registered for the following core modules:

MA385:	Numerical Analysis I	5 ECTS
MP491:	Nonlinear Systems	5 ECTS
CS423:	Neural Networks	5 ECTS
EC410:	Economics of Financial Markets Seminar I	5 ECTS
EC411:	Economics of Financial Markets Seminar II	5 ECTS
EC420:	International Monetary Economics	5 ECTS
MA418:	Differential Equations with Financial Derivatives	5 ECTS
MA490:	Measure Theory	5 ECTS
MA494:	Stochastic Processes	5 ECTS
MA495:	Actuarial Mathematics: Life Contingencies II	5 ECTS

### Options:

Students must select **one** project to a value of 10 ECTS Credits:

EC471:	Economics Project	10 ECTS
MA471:	Mathematics Project	10 ECTS
MP471:	Mathematical Physics Project	10 ECTS
MA435:	Undergraduate Ambassador Module in Mathematics	10 ECTS

## Fourth Year Financial Mathematics and Economics (4FM2)

**Key:**

CS: Computing Studies

MA: Mathematics

EC: Economics

MP: Mathematical Physics

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>	
MA470	MA385	Numerical Analysis I	5	I	I	2 hours	1	Head of School of MSAM	
	MP491	Non-linear Systems	5	II	II	2 hours	1	Head of School of MSAM	
	CS423	Neural Network	5	II	II	2 hours	1	Head of School of MSAM	
	EC410	Economics of Financial Markets Semester I	5	I	I	2 hours	1		
	EC411	Economics of Financial Markets Semester II	5	II	II	2 hours	1		
	EC420	International Monetary Economics	5	II	II	2.5 hours	1		
	MA418	Differential Equations with Financial Derivatives	5	II	II	2 hours	1	Head of School of MSAM	
	MA490	Measure Theory	5	I	II	2 hours	1	Head of School of MSAM	
	MA494	Stochastic Processes	5	II	II	2 hours	1	Head of School of MSAM	
	MA495	Actuarial Mathematics: Life Contingencies II	5	I	I	2 hours	1	Head of School of MSAM	
	<b>Please select <u>one</u> project</b>								
	EC471	Economics Project	10	Project	II				
	MA471	Mathematics Project	10	Project	II				Head of School of MSAM
	MP471	Mathematical Physics Project	10	Project	II				Head of School of MSAM
MA435	Undergraduate Ambassador Module in Mathematics	10	II	II	Project			Head of School of Maths	

# **Denominated Degree in Health & Safety Systems**

## **4HF 4<sup>th</sup> Year Health & Safety Systems**

Students are automatically registered for the following Core modules:

IE323: Information Systems Ergonomics (3 ECTS)

IE332 Quality Management (3 ECTS)

IE444 Human and Systems Reliability (6 ECTS)

IE446 Project Management (3 ECTS)

IE447 Regulatory Affairs & Case Studies (12 ECTS)

IE452 Professional Experience Report (3 (ECTS)

IE453 Health and Safety Project (18 ECTS)

HP440 Health and the Work Environment (12 ECTS)

## Fourth Year Health & Safety Systems (4HF2)

**Key:**

IE: Industrial Engineering

HP: Health Promotion

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
IE452	IE452	Professional Experience Report	3	I	I	Project		
IE453	IE453	Health and Safety Project	18	I & II	II	Project		
IE600	IE446	Project Management	3	I	I	2 hours	1	
	IE444	Human and Systems Reliability	6	I & II	I & II	2 hours ea.	2	
	IE323	Information Systems Ergonomics	3	I	I	2 hours	1	
	IE447	Regulatory Affairs and Case Studies	12	I	I	3 hours	1	
	IE332	Quality Management	3	II	II	2 hours	1	
	HP440	Health and the Work Environment	12	I & II	II	3 hours	1	



## Fourth Year Marine Science (4MR2)

### Key:

MR: Marine Science      EP: Experimental Physics      OC: Oceanography  
 BT: Botany              GE: Geology                      ZO: Zoology  
 MI: Microbiology      IY: Applied Geophysics

### **List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
MR401	BT422	Botany	3	I	I	3 hours	1	
	MR420	Marine Science	9					
	MI422	Microbiology	4	II	II	3 hours	1	
	OC423	Oceanography	4					
	ZO422	Zoology	4					
MR411	BT421	Marine Plant Science	10	I & II	Con. Ass.			
	PH461	Experimental Physics	10	I & II	Con. Ass.			
	GE431	Geology	10	I & II	Con. Ass.			
	IY421	Applied Geophysics	10	I & II	Con. Ass.			
	MI421	Marine Microbial Processes	10	I & II	Con. Ass.			
	OC421	Chemical Oceanography	10	I & II	Con. Ass.			
	OC422	Physical Oceanography	10	I & II	Con. Ass.			
	ZO421	Marine Zoology	10	I & II	Con. Ass.			
MR412	MR412	2 Essays and 1 Oral Presentation	6	Con. Ass.				
MR413	BT420	Botany Project	20	Project	II			
	PH460	Experimental Physics Project	20	Project	II			
	GE430	Geology Project	20	Project	II			
	IY420	Applied Geophysics Project	20	Project	II			
	MI420	Microbiology Project	20	Project	II			
	OC420	Oceanography Project	20	Project	II			
	ZO420	Zoology Project	20	Project	II			

## Denominated Degree Programme in Physics with Applied Physics

### 4BPP2: 4<sup>th</sup> Year Physics and Applied Physics

Students register for the following obligatory level 1 modules:

#### Core Modules

PH407	Solid State Physics
PH408	Optoelectronics
PH457	Quantum Mechanics
PH459	Applied Optics
PH435	Electromagnetism and Relativity
PH458	Nanotechnology
PH462	Problem Solving
PH411	Physics Laboratory & Project

#### Optional modules

Students must select **one** of the following level 1 modules:

PH463	Atmospheric Physics
PH465	Radiation and Medical Physics

Students must select **one** of the following level 1 modules:

PH406	Spectroscopy
PH464	Signal and Image Processing

## Fourth Year Physics and Applied Physics (4BPP2)

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
PH410	PH407	Solid State Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH408	Optoelectronics	4.5	I	I	2 hours	1	Head of School of Physics
	PH435	Electromagnetism and Relativity	4.5	II	II	2 hours	1	Head of School of Physics
	PH457	Quantum Mechanics	4.5	I	I	2 hours	1	Head of School of Physics
	PH458	Nanotechnology	4.5	II	II	2 hours	1	Head of School of Physics
	PH459	Applied Optics	4.5	II	II	2 hours	1	Head of School of Physics
	PH462	Problem Solving	6	I & II	II	Con. Ass		Head of School of Physics
	PH411	Physics Laboratory & Project	18	I & II	II	Project		Head of School of Physics
<b>Options: Students must select <u>one</u> module from below</b>								
	PH465	Radiation and Medical Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH463	Atmospheric Physics	4.5	I	I	2 hours	1	Head of School of Physics
<b>Options: Students must select <u>one</u> module from below</b>								
	PH406	Spectroscopy	4.5	II	II	2 hours	1	Head of School of Physics
	PH464	Signal & Image Processing	4.5	II	II	2 hours	1	Head of School of Physics

## **Denominated Degree Programme Physics with Astrophysics**

### **4BPA2: 4<sup>th</sup> Year Physics with Astrophysics**

Students register for the following obligatory modules:

#### **Core Modules**

PH407	Solid State Physics
PH408	Optoelectronics
PH457	Quantum Mechanics
PH459	Applied Optics
PH435	Electromagnetism and Relativity
PH458	Nanotechnology
MP403	Cosmology and General Relativity
PH466	Astrophysics
PH462	Problem Solving
PH420	Physics and Astrophysics Laboratory and Project

## Fourth Year Physics with Astrophysics (4BPA2)

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
PH405	PH407	Solid State Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH408	Optoelectronics	4.5	I	I	2 hours	1	Head of School of Physics
	PH435	Electromagnetism and Relativity	4.5	II	II	2 hours	1	Head of School of Physics
	PH457	Quantum Mechanics	4.5	I	I	2 hours	1	Head of School of Physics
	PH458	Nanotechnology	4.5	II	II	2 hours	1	Head of School of Physics
	PH459	Applied Optics	4.5	II	II	2 hours	1	Head of School of Physics
	MP403	Cosmology and General Relativity	4.5	I	I	2 hours	1	Head of School of Mathematics, Statistics and Applied Mathematics
	PH466	Astrophysics	4.5	II	II	2 hours	1	Head of School of Physics
	PH462	Problem Solving	6	I & II	II	Con. Ass		Head of School of Physics
	PH420	Physics with Astrophysics Laboratory & Project	18	I & II	II	Project		Head of School of Physics

## **Denominated Degree Programme Biopharmaceutical Chemistry**

### **4BPC2: 4<sup>th</sup> Year Biopharmaceutical Chemistry**

Students register for the following obligatory modules:

#### **Core Modules**

<b>CH431</b>	<b>Physical Chemistry</b>
<b>CH432</b>	<b>Inorganic Chemistry</b>
<b>CH433</b>	<b>Organic Chemistry</b>
<b>BI434</b>	<b>Biomolecules: Structures, interactions and signaling</b>
<b>CH441</b>	<b>Biopharmaceutical Chemistry</b>
<b>CH442</b>	<b>Industrial Biochemistry (UL module)</b>
<b>CH443</b>	<b>Biopharmaceutical Chemistry Project</b>

## Fourth Year Biopharmaceutical Chemistry (4BPC2)

### List of Fourth Year Courses

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
CH440	CH431	Physical Chemistry	7	I	I			
	CH432	Inorganic Chemistry	7	I	I			
	CH433	Organic Chemistry	7	I	I			
	BI434	Biomolecules: Structure, interactions and signalling	6	I	I	3 hours	1	
	CH441	Biopharmaceutical Chemistry	7	II	II	2 hours		Dr Peter Crowley
	CH442	Industrial Biochemistry	6	II	II	2 hours	1	Dr Gary Walsh UL
	CH443	Biopharmaceutical Chemistry Project	20	I&II	I&I I	Project		Dr Peter Crowley

# **Denominated Degree in Physics with Medical Physics**

## **4BPM2: 4<sup>th</sup> Year Physics with Medical Physics**

Students register for the following obligatory modules:

PH401: Physics with Medical Physics

All modules are obligatory.

## Fourth Year Physics with Medical Physics (4BPM2)

**Key:**

EP: Experimental Physics

PH: Physics

**List of Fourth Year Courses**

<i>Level 1</i>	<i>Level 2</i>	<i>Module Name</i>	<i>ECTS Credits</i>	<i>Taught Sem I or II</i>	<i>Exam Sem I or II</i>	<i>Exam Duration</i>	<i>No. of Exam Papers</i>	<i>Course Director</i>
PH401	PH407	Solid State Physics	4.5	I	I	2 hours	1	Head of School of Physics
	PH408	Optoelectronics	4.5	I	I	2 hours	1	Head of School of Physics
	PH435	Electromagnetism and Relativity	4.5	II	II	2 hours	1	Head of School of Physics
	PH457	Quantum Mechanics	4.5	I	I	2 hours	1	Head of School of Physics
	PH458	Nanotechnology	4.5	II	II	2 hours	1	Head of School of Physics
	PH459	Applied Optics	4.5	II	II	2 hours	1	Head of School of Physics
	PH462	Problem Solving	6	I & II	II	Con. Ass		Head of School of Physics
	PH402	Medical Imaging and Image Processing	4.5	II	II	2 hours	1	Head of School of Physics
	PH403	Biophotonics	4.5	I	I	2 hours	1	Head of School of Physics
	PH404	Laboratory & Project	18	I & II	II	Project		Head of School of Physics

# MARKS AND STANDARDS 2010/2011

## FOURTH (HONOURS) UNIVERSITY EXAMINATION IN SCIENCE

(Including Denominated Degree Programmes)

<b>Course Instance</b>	4BO2, 4BS2, 4BS3, 4BS4, 4BS9, 4BPA2, 4BPC2, 4BPM2, 4BPP2, 4BY2, 4CS2, 4EH2, 4EL3, 4EV2, 4FM2, 4HF2, 4MR2,	<b>Duration of Course</b>	12 months
<b>Course Type</b>	<b>Bachelor</b>	<b>NQAI Level</b>	Level 8
<b>Title (in full)</b>		<b>Full/Part Time</b>	Full Time
<b>ECTS (per yr)</b>	<b>60 ECTS</b>	<b>Mode of Study</b>	Taught
<b>Marks</b>	Marks returned out of 100%		
<b>Board Meetings</b>	1 <sup>st</sup> Sitting - <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer <input type="checkbox"/> Autumn <input type="checkbox"/> Winter 2 <sup>nd</sup> Sitting - <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Autumn <input type="checkbox"/> Winter		
<b>Marks Entry</b>	<input checked="" type="checkbox"/> Results will be returned at level 2 and an aggregated result will be calculated up to Level 1.		

<b>Honours</b>	Honours awarded at the subject level (level 1)
<b>Honours and Pass Standards</b> <i>Please choose the appropriate % for each Grade relevant to this course instances</i>	H1                      70% H2                      N/A H21                     60% H22                     50% Pass                    40% <i>Honours will be removed at every level where a student fails overall.</i>
<b>Year 4th</b> <b>Passing on the Aggregate Rules</b>	A student can reach a 40% pass on the aggregate mark within a group or subject (from level 2 to level 1 only) where a student has excess credits in other modules within that same group / subject which are equal to single deficiency, minimum mark 0%.
<b>Honours Rules</b>	Honours can be awarded in 1 <sup>st</sup> <input checked="" type="checkbox"/> and / or 2 <sup>nd</sup> <input type="checkbox"/> Sitting
<b>Award</b> <i>(where applicable)</i>	<b>Based on final year -or- Final year and penultimate year to the benefit of the student</b> <input type="checkbox"/> Final Year alone (100%) <input checked="" type="checkbox"/> 20% of the penultimate year (Year 3) + 80% of the final year (Year 4) <input type="checkbox"/> Either of the above to the benefit of the student
<b>Carrying Forward</b>	Yes <input checked="" type="checkbox"/> A candidate fails the examination as a whole, but has obtained a passing mark or more in one or more subjects, they can be carried forward. No <input type="checkbox"/>
<b>Progression Rules</b>	<input type="checkbox"/> Candidates must clearly pass one year in order to progress to the next year <input checked="" type="checkbox"/> Not Applicable
<b>Special Requirements</b> <i>(where applicable)</i> <u>No longer than 3 lines</u>	<b>4HF2: Denominated Degree Programme in Health &amp; Safety Systems</b> The level of degree awarded, including the level of Honours applicable, will be based on the Overall/Average Mark (%), over all modules examined, subject to the following condition: (i) no candidate shall pass, who has failed to reach a satisfactory standard (40%) in <b>either</b> IE452 (Professional Experience Report), <b>or</b> IE453 (Health & Safety Project) <i>Note: Where there are specific Course Requirements to be passed outright or 0 ECTS (Pass/Fail) modules on the course structure please give details including the module code</i>

**ADDITIONAL INFORMATION**  
***Fourth (Honours) University Examination in Science***  
***(Including Denominated Degree Programmes)***

**General Standards (except where Special Requirements apply):**

- Modules/components passed at the B.Sc. (Honours) examinations may be carried in perpetuity.
- Normally, no autumn supplemental examinations are allowed for 4<sup>th</sup> Year (Honours) degree students. Supplemental examinations will be taken in the following academic year at the next normal sitting of the examination. Supplemental examination results will be capped at 40% in each module repeated.
- In the case of repeat project/thesis, only a re-write and re-submission of the thesis is permitted.

**Award of Honours:**

A candidate who fails to gain admission to Fourth Year Honours course in accordance with the standards laid down above when the candidate first sat the Third University Examination in Science will be treated as a candidate for the Third University Examination in Science under the rules for that examination as laid down above.

A candidate who fails the 4<sup>th</sup> Year Examination will be deemed to have failed in the overall B.Sc. Honours Degree (based on the combined 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> Year marks). A candidate who fails the Fourth Year Honours examination may be awarded the B.Sc. (General) Degree. Such a candidate may be considered for the award of the B.Sc. (General) on the basis of marks obtained in the Third University Examination in Science.

Students taking Fourth Year Honours Examinations and achieving a mark of between 40% and 49% therein (reaching a pass standard, but failing to reach honours) may be awarded a B.Sc. Honours Degree at Pass level.

**Note on the Calculation of 4<sup>th</sup> Year (Honours) Degree Results (excluding 4BS6: Intercalated Degree)**

- For students in Fourth Year from 2010/2011: The overall degree result will be based on 80% of overall 4<sup>th</sup> Year results + 20% of overall 3<sup>rd</sup> Year results.

**INTERCALATED DEGREE**

<b>Course Instance</b>	4BS6	<b>Duration of Course</b>	12 months
<b>Course Type</b>	<b>Bachelor</b>	<b>NQAI Level</b>	Level 8
<b>Title (in full)</b>	<b>Intercalated Degree</b>	<b>Full/Part Time</b>	Full Time
<b>ECTS (per yr)</b>	<b>60 ECTS</b>	<b>Mode of Study</b>	Taught
<b>Marks</b>	Marks returned out of 100%		
<b>Board Meetings</b>	1 <sup>st</sup> Sitting - <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer <input type="checkbox"/> Autumn <input type="checkbox"/> Winter 2 <sup>nd</sup> Sitting - <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Autumn <input type="checkbox"/> Winter		
<b>Marks Entry</b>	<input checked="" type="checkbox"/> Results will be returned at level 2 and an aggregated result will be calculated up to Level 1.		

<b>Honours</b>	Honours awarded at the subject level (level 1)	
<b>Honours and Pass Standards</b> <i>Please choose the appropriate % for each Grade relevant to this course instances</i>	H1	70%
	H2	N/A
	H21	60%
	H22	50%
	Pass	40%
	<i>Honours will be removed at every level where a student fails overall.</i>	
<b>Year 4th</b> <b>Passing on the Aggregate Rules</b>	A student can reach a 40% pass on the aggregate mark within a group or subject (from level 2 to level 1 only) where a student has excess credits in other modules within that same group / subject which are equal to single deficiency, minimum mark 0%.	
<b>Honours Rules</b>	Honours can be awarded in 1 <sup>st</sup> <input checked="" type="checkbox"/> and / or 2 <sup>nd</sup> <input type="checkbox"/> Sitting	
<b>Award</b> <i>(where applicable)</i>	<b>Based on final year -or- Final year and penultimate year to the benefit of the student</b> <input checked="" type="checkbox"/> Final Year alone (100%) of the penultimate year and of the final year <input type="checkbox"/> Either of the above to the benefit of the student	
<b>Carrying Forward</b>	Yes <input checked="" type="checkbox"/> A candidate fails the examination as a whole, but has obtained a passing mark or more in one or more subjects, they can be carried forward. No <input type="checkbox"/>	
<b>Progression Rules</b>	<input type="checkbox"/> Candidates must clearly pass one year in order to progress to the next year <input checked="" type="checkbox"/> Not Applicable	
<b>Special Requirements</b> <i>(where applicable)</i> <i>No longer than 3 lines</i>	<i>Note: Where there are specific Course Requirements to be passed outright or 0 ECTS (Pass/Fail) modules on the course structure please give details including the module code</i>	

*Created by Sheila Coyle and Grainne Morahan on behalf of the Academic Records Office*

# Recognised Subjects for the Higher Diploma in Education

## Extract from PAC Information Booklet

For further information on application procedures, candidates should refer to the Postgraduate Applications Centre website for up-to-date official information: <http://www.pac.ie/hdip.php>. The extract below is for general information only.

### Necessity for approval of degrees and subjects by the Teaching Council for the purposes of Registration as a Post Primary Teacher

In order to be eligible for appointment to an incremental salaried teaching position in a State funded Post Primary school, a teacher must be registered with the Teaching Council. Once Section 30 of the Teaching Council Act is commenced, Registration will be a mandatory requirement for all teachers.

Each applicant for registration as a post primary teacher must possess, among other things, a third-level degree (*or equivalent*) which the Teaching Council considers to be adequate to enable the holder to teach at least one of the approved second level curricular subjects.

### Recognised Degrees:

**List A** (*extract of Science Degrees, NUI Galway listed below*) overleaf outlines the degree qualifications which may be recognised by the Teaching Council as being appropriate to teaching in a recognised post primary school. This List must however be read in conjunction with the **General and Special Requirements for Teachers of Recognised Subjects in Mainstream Post Primary Education** (see Blue pages) to ensure your degree, including subject and module options taken, meets all the requirements for Post Primary teaching.

**All degrees listed are also recognised for the purposes of admission to the Postgraduate Diploma in Education course as offered by any constituent College of NUI or University of Dublin, Trinity College.**

*NATIONAL UNIVERSITY OF IRELAND, GALWAY  
Science Degrees only*

Qualification code	Qualification Title	Subjects
GY03P	Bachelor of Science <sup>1</sup>	See below
GY04P	Bachelor of Science Degree in Marine Science <sup>2</sup>	Biology
GY05P	Bachelor of Science Degree in Environmental Science <sup>3</sup>	Biology
GY06P	Bachelor of Science Degree in Computer Studies	Mathematics and Computer Studies
GY10P	Bachelor of Science Degree in Biotechnology	Biology
GY11P	Bachelor of Science Degree in Physiology	Biology
GY12P	Bachelor of Science Degree in Anatomy	Biology
GY13P	Bachelor of Science Degree in Microbiology	Biology
GY18P	Bachelor of Science – Applied Physics and Electronics	Physics
GY22P	Bachelor of Science Degree – Applied Mathematics	Mathematics & Applied Mathematics
GY23P	Bachelor of Science Degree in Chemistry & Applied Chemistry	Chemistry
GY24P	Bachelor of Science in Biomedical Science <sup>4</sup>	Biology
GY25P	Bachelor of Science – Financial Mathematics and Economics	Economics and Mathematics
GY30P	Bachelor of Science in Physics and Astronomy	Physics

1 Provided one or more of the following subjects are taken in the third or fourth year of an honours degree or the third year of a general degree:

Microbiology, Biotechnology, Physiology, Anatomy, Biochemistry, Biology, Botany, Chemistry, Experimental Physics, Food Chemistry, Geography, Mathematics, Mathematical Physics, Applied Mathematical Science, Plant Science, Science of Materials, Statistics, Theoretical Physics, Zoology.

- 2 Recognised in the subject area Biology provided that the 3<sup>rd</sup> year of the honours degree (Final year of B.Science General degree) contains in addition to the Fundamentals of Marine Science, one of the core subject 24 ECTS courses (Botany or Zoology).
- 3 Recognised in the subject area Biology provided that the 3<sup>rd</sup> Year of the honours degree (Final year of B.Science General degree) contains in addition to stated obligatory subjects, both of the 9 ECTS courses Botany (BT303) **AND** Zoology (ZO303).
- 4 Subject to an applicant taking the following modules in 3<sup>rd</sup> and 4<sup>th</sup> year. Anatomy, Biochemistry or Physiology.

Queries regarding teacher registration and information on recognised courses should be directed to:

The Teaching Council  
Block A  
Maynooth Business Campus  
Maynooth  
Co. Kildare

**Telephone:** LoCall 1890 224 224 or +353 1 6517900

**Fax:** +353 1 6517901

**E-mail** [info@teachingcouncil.ie](mailto:info@teachingcouncil.ie)

**Web Address:** <http://www.teachingcouncil.ie>

# Scholarships and Prizes available to College of Science students

## THE SIR JOSEPH LARMOR PRIZE

1. The Prize was founded, under the Trusts of the Will of the late Sir Joseph Larmor, F.R.S., former Professor of Physics at Queen's College, Galway, in remembrance of his Professorship in that College.

2. The value of the prize is now €300.

3. The Prize will be awarded in National University of Ireland, Galway, each year on the results of the B.A. or B.Sc. (Honours) Examination in any ONE of the subjects:—

Mathematics, Mathematical Physics, Experimental Physics or degree subjects in Physics in which Experimental Physics is a major component.

4. The standard required shall be that of First Class Honours in the Degree in that subject.

5. In case the Prize be not awarded in any year, Údarás na hOllscoile shall apply the money so accruing either by adding to the value of the Prize or to the giving of an additional Prize in the next or following years in the same subjects and under the same regulations.

6. The successful candidate must take out a course leading to the M.A., M.Sc., or Ph.D. Degree, or other approved course of study, in one of the subjects of the Degree Examination on the results of which he/she has been awarded the Prize. The course may be taken out either in National University of Ireland, Galway, or in a University approved by the Professor of the subject.

7. One half of the Prize will be paid in October and one half in the following April, if the Professor under whom he/she has taken the course is satisfied with the successful candidate's progress.

## THE ELI LILY HEALTH & SAFETY SYSTEMS PRIZE

The Prize, valued at €650, will be awarded annually to the first placed student in the Final Year of the B.Sc. in Health & Safety Systems degree programme.

## THE MERIT MEDICAL PRIZE

The Prize, valued at €500, will be awarded annually to the best Final Year project submitted by a B.Sc. in Health & Safety Systems student.

## ISOTRON WESTPORT PRIZE IN PHYSICS

The Prize, donated by Isotron Westport Ltd., is awarded to the final year student who achieves the best overall mark from among the three Physics degree programmes: Physics & Applied Physics, Physics with Astrophysics and Physics with Medical Physics. The Prize is valued at €250. The winner will also receive a gold medal.

## IVAN HEFFERNAN MEMORIAL MEDAL IN MARINE SCIENCE

The medal is awarded annually on the results of the Honours Denominated B.Sc. Degree Examination in Marine Science. It is funded jointly by the School of Marine Programs, The University of Georgia (USA) and The Martin Ryan Marine Science Institute, National University of Ireland, Galway.

The value of the prize is €300.

## HEWLETT-PACKARD AWARD

The Hewlett-Packard Award is presented to the best final-year undergraduate student whose project in Engineering, Science or Information Technology best displays innovation, originality, commercial relevance and excellence. A cash prize of €2540 will be presented to the winning student in October. In addition a matching sum in the form of HP equipment will be presented to the student's University.

## DELTA INDEX PRIZE FOR ECONOMICS WITHIN FINANCIAL MATHEMATICS AND ECONOMICS

Delta Index, an Irish financial services company, agreed to make a prize available for this programme. The prize valued at €500, will be awarded annually on the recommendation of the Head of the Department of Economics.

It will be given to the student in the fourth year of the B.Sc. in Financial Mathematics and Economics with the highest aggregate mark in the three modules EC410 (Seminar in Economics of Financial Markets I), EC411 (Seminar in Economics of Financial Markets II), and EC420 (International Monetary Economics) provided a minimum overall results of Second Class Honours, Grade I, has been achieved.

### ALPHA TECHNOLOGIES PRIZE

The Alpha Technologies prize is a gold medal plus €300 (each), for the best mark in the undergraduate laboratory research project in 4<sup>th</sup> Year Biochemistry, and in 4<sup>th</sup> Year Biotechnology.

### SPORTS SCHOLARSHIPS

The University offers a number of sports scholarships to student-athletes of outstanding calibre who register as students of the University. These scholarships are aimed at persons who have the potential to achieve a high level of performance in sport while pursuing a full-time undergraduate degree course, postgraduate degree course, or postgraduate diploma course.

Scholarship Application Forms are available from the Sports Officer, National University of Ireland, Galway. Tel: (091) 524411, Extn. 2165; Fax (091) 750545.

### UNIVERSITY PRIZES

Students of this University may compete for the Prizes, Medals, Scholarships and Studentships offered for competition by the National University of Ireland.

For information regarding these Prizes, etc., students are referred to the Registrar, The National University of Ireland, 49 Merrion Square, Dublin 2; Tel. No. 01 - 4392424.

## SCOLÁIREACHTAÍ NA GAELTACHTA CURTHA AR BUN AG ÚDARÁS NA hOLLSCOILE

### Fuagraí Faoi Leith

*Ní bheidh costas taistil ná costas aóchta le fáil ag aon duine dá dtiúrfaidh Coiste Scoláireachtaí na Gaeltachta cuireadh dhó teacht ag an scrúdú Gaeilge le haghaidh na Scoláireachtaí.*

Caithfear iarratais le haghaidh na Scoláireachtaí a chur isteach ar 1 Meán Fómhair nó roimhe, chuig an Oifig Iontrála, Ollscoil na hÉireann, Gaillimh

I.

Is ionann an “Ghaeltacht”, maidir leis an gCóras seo, agus an chuid d’Éirinn atá fá dhath dearg agus buí ar léarscáil Choimisiúin na Gaeltachta.

II.

1. Tá Údarás na hOllscoile ag tairscint roinnt áirithe Scoláireachtaí san Ollscoil do chainteoirí dúchais Gaeilge a rugadh nó a tóigeadh sa nGaeltacht, a bhfuil Scrúdú na hArdteistiméireachta bainte amach acu.

Má bhíonn iarrthóirí istigh as an mbreac-Ghaeltacht nach bhfuil ina gcainteoirí dúchais amach agus amach agus má bhíonn an scrúdaitheoir Gaeilge sásta gur Gaeilgeoirí maithe iad, tig leis an gCoiste, má bhíonn airgead sparála sa gciste, scoláireachtaí a thabhairt do dhaoine den tsórt seo.

2. Is fiú €254 sa mbliain ar feadh cheithre mbliain gach Scoláireacht acu seo, ach beidh cead ag Coiste Scoláireachtaí na Gaeltachta scoláire a bhfuil an chéim bainte amach aige nó aici, d’ainmniú, ar chuntair áirithe, le haghaidh Scoláireachtaí den 5ú bhliain.

3. Duine ar bith atá ag cur isteach ar cheann de na Scoláireachtaí seo ní mór dhó Foirm Iarratais a fhail ón Oifig Iontrála, agus é a bheith istigh aige, líonta go dlisteanach, ar 1 Meán Fómhair, nó roimhe.

4. Ní mór don Iarrthóir na scrúduithe seo a sheasamh:—

(a) Scrúdú na hArdteistiméireachta.

(b) Scrúdú béil agus scríofa i nGaeilge.

Bronnfar na Scoláireachtaí do réir iarmhartha na scrúduithe tuasríofa. Ligfear 300 marcanna le haghaidh na Gaeilge ag an Scrúdú béil agus scríofa i nGaeilge ((b) thuas). Cuirfear na gráid a bainfear amach (taobh amuigh den Ghaeilge) ag Scrúdú na hArdteistiméireachta san áireamh le haghaidh na Scoláireachtaí.

Má bhíonn pas faighte ag iarrthóir i níos mó ná cúig ábhair (taobh amuigh den Ghaeilge) is iad gráid na gcúig n-ábhar is fearr ar éirigh leis an iarrthóir iontu, a cuirfear san áireamh.

5. Ní mór d’iarrthóir an Ardteistiméireacht a bhaint amach in aon iarracht amháin, na hábhair a bheith do réir mar tá luaite i rial 4 thuas.

6. Gheobhaidh gach iarrthóir dlisteanach cuireadh go dtí an scrúdú Gaeilge le haghaidh na Scoláireachtaí.

7. Beidh an scrúdú seo i nGaeilge ar bun san Ollscoil chomh luath agus faightear toradh Scrúdú na hArdteistiméireachta. Is é Ollamh na Nua-Ghaeilge san Ollscoil a chuirfeas na hiarrthóirí faoi scrúdú. Gheobhaidh gach iarrthóir fuagra roimh ré fá dháta an scrúduithe.

8. Ní bronnfar scoláireacht ar aon duine nach sroicheann an caighdeán atá ceaptha, le haghaidh na Scoláireachtaí, ag an gCoiste.

Ní bheidh feidhm le scoláireacht ach amháin sa mbliain ina mbronntar í — muna mbí cúis an-speisialta leis.

9. An té a n-éireoidh leis Scoláireacht a bhaint amach, cuirfidh sé/sí in iúl don Oifig Iontrála, i dtosach an tSeisiúin cé na hábhair léinn ar mian leis/léi freastal orthu.

Pér bith cúrsa a shocraíós Scoláire a dhéanamh, is ar na léachtaí i nGaeilge le haghaidh an chúrsa sin a dhéanfas sé/sí freastal. Mura bhfuil cúrsa iomlán le fáil i nGaeilge, déanfaidh sé/sí freastal ar phér bith léachtaí atá le fáil i nGaeilge le haghaidh an chúrsa.

Ní bheidh cead ag aon scoláire a chúrsa léinn d'athrú gan cead faoi leith ó'n gComhairle Acadúil.

10. Ina fo-choda a hócfaí an Scoláireacht. Is féidir fochuid nó an t-iomlán dá Scoláireacht a bhaint de mhac léinn, (a) mura mbí iompar ceart, oiriúnach air/uirthi, (b) má mbíonn sé/sí faillíoch ag freastal na léachtaí, (c) mura n-éirí leis/léi i bhfo-scrúduithe na dtéarmaí.

11. Is ar scrúdú na hOllscoile nó san Ollscoil a sheasamh don mhacléinn i ndeireadh na bliana atá coinneáil ar aghaidh na Scoláireachta dhó an bhliain dár gcionn, is é sin, mura dtuga an Chomhairle Acadúil toil ar a mhalairt.

12. Ní ghlacfaidh an Coiste le haon fhoirm iarratais nach bhfuil líonta go cúramach agus go hiomlán.

III.

Beidh cead ag Údarás na hOllscoile scoláireachtaí na Gaeltachta a bhronnadh ar Ghaeilgeoirí ó dhúchas ar éirigh leo an Chéad Scrúdú Ollscoile a bhaint amach, má mholann Coiste Scoláireachtaí na Gaeltachta a leitheid seo de dhaoine chuige.

*Tá tuilleadh eolas faoi Scoláireachtaí Gaeltachta ar fáil ó Peadar Uas. Mac an Iomaire, Stiúrthóir na Gaeilge Labhartha.*

## AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

### *Scoláireachtaí Ollscoile*

Bronnann an Roinn Oideachais agus Eolaíochta Scoláireachtaí Ollscoile atá intsealbhaithe i Ollscoil na hÉireann, Gaillimh faoi réir an dá scéim seo a leanas:

Scoláireachtaí Ollscoile do Mhicleinn ón nGaeltacht *agus*

Scoláireachtaí chun cur ar chumas Macléinn Cúrsaí Ollscoile a dhéanamh trí Ghaeilge.

Is féidir tuilleadh eolais a fháil faoi na Scoláireachtaí seo ó: An Rúnaí, An Roinn Oideachais agus Eolaíochta, Brainse an Iarbhuideochais, Teach Apollo, Baile Átha Cliath 2.

## ALIVE VOLUNTEERING PROGRAMME

The ALIVE Programme at NUI Galway seeks to support and recognise student volunteering through an integrated programme including:

- **volunteer opportunity** matching service,
- series of **volunteer training** workshops,
- **peer support** reflection sessions and social gatherings,
- **recognition** through the ALIVE Certificate

Contact name: Lorraine Tansey, Student Volunteer Coordinator, Community Knowledge Initiative.

Contact Number: 091 49 5346, ext. 5346

Email: [studentvolunteering@nuigalway.ie](mailto:studentvolunteering@nuigalway.ie)

Web: [www.nuigalway.ie/cki](http://www.nuigalway.ie/cki)