



OLLSCOIL NA GAILLIMHÉ  
UNIVERSITY OF GALWAY

Bachelor of Science Degree  
College of Science and Engineering  
2024/2025

# Bachelor of Science Degree

[www.universityofgalway.ie/science-engineering/](http://www.universityofgalway.ie/science-engineering/)



Year 1	Year 2	Year 3	Year 4
<b>[60 Credits]</b>	<b>[60 Credits]</b>	<b>[60 Credits]</b>	<b>[60 Credits]</b>
<p>Choose four of the following modules: Each module is 15 Credits.</p> <p>At least one of:</p> <ul style="list-style-type: none"> <li>MP180 Applied Mathematics</li> <li>MA180 Mathematics</li> <li>MA161 Mathematical Studies</li> </ul> <p>At least two of:</p> <ul style="list-style-type: none"> <li>BO101 Biology</li> <li>CH101 Chemistry</li> <li>CS102 Computer Science</li> <li>PH101 Physics</li> </ul> <p>Eligibility to Year 2 pathways of study require certain combinations of Year 1 modules, see page 26.</p>	<p>Choose at least two pathways from:</p> <ul style="list-style-type: none"> <li>Anatomy</li> <li>Applied Mathematics</li> <li>Biochemistry</li> <li>Botany and Plant Science</li> <li>Chemistry</li> <li>Computing</li> <li>Data Science</li> <li>Earth and Ocean Sciences</li> <li>Mathematics</li> <li>Mathematics and Applied Mathematics</li> <li>Mathematics and Computing</li> <li>Mathematical Studies and Computing</li> <li>Medicinal Chemistry</li> <li>Microbiology</li> <li>Pharmacology</li> <li>Physics and Applied Physics</li> <li>Physics and Climate Physics</li> <li>Physiology</li> <li>Plant and AgriBiosciences</li> <li>Zoology</li> </ul> <p>Pathways will be allocated in accordance to student preferences with consideration to quota, timetable compatibility and satisfying a viable Year 3 programme of study. See page 3 and pages 30-31.</p> <p>Electives: Where the total credit of modules allocated via pathways is less than 60, modules are selected from the Year 2 elective offerings, see page 27.</p>	<p>Choose up to two pathways from:</p> <ul style="list-style-type: none"> <li>Anatomy</li> <li>Applied Mathematics</li> <li>Biochemistry</li> <li>Botany and Plant Science</li> <li>Chemistry</li> <li>Computing</li> <li>Data Science</li> <li>Earth and Ocean Sciences</li> <li>Mathematics</li> <li>Mathematics and Applied Mathematics</li> <li>Mathematics and Computing</li> <li>Mathematical Studies and Computing</li> <li>Medicinal Chemistry</li> <li>Microbiology</li> <li>Pharmacology</li> <li>Physics and Applied Physics</li> <li>Physics and Climate Physics</li> <li>Physiology</li> <li>Plant and AgriBiosciences</li> <li>Zoology</li> </ul> <p>Select <b>OPTION A or B</b></p> <p><b>Option A – Dual Pathways, retaining two options for study in Year 4.</b> <b>Option B – Single Pathway.</b></p> <p>OPTION A is REQUIRED if taking one of the following, Anatomy, Biochemistry, Botany and Plant Science, Microbiology, Pharmacology, Physiology, Plant and AgriBiosciences, or Zoology.</p> <p>Approved Year 3 study paths are provided on page 30.</p>	<p>Choose your honours degree:</p> <ul style="list-style-type: none"> <li>Anatomy</li> <li>Applied Mathematics</li> <li>Biochemistry</li> <li>Botany and Plant Science</li> <li>Chemistry</li> <li>Computing</li> <li>Data Science</li> <li>Earth and Ocean Sciences</li> <li>Mathematics</li> <li>Mathematics and Applied Mathematics</li> <li>Mathematics and Computing</li> <li>Mathematical Studies and Computing</li> <li>Medicinal Chemistry</li> <li>Microbiology</li> <li>Pharmacology</li> <li>Physics and Applied Physics</li> <li>Physics and Climate Physics</li> <li>Physiology</li> <li>Plant and AgriBiosciences</li> <li>Zoology</li> </ul>

<p><b>Allocation of 2nd Year Pathway/Elective Places:</b></p> <p>In 2nd Year, there is a capacity limit on the places available in each pathway/elective. Students are allocated their pathways based on their overall 1st Year results and submitted pathway preferences for 2nd Year.</p> <p>Details on the Procedure/Guidelines for allocating places is in the Student Guide issued to all 1st Year students and available on the web:</p> <p><a href="https://www.universityofgalway.ie/media/collegeofscienceandengineering/First-Year-Academic-Booklet_print.pdf">https://www.universityofgalway.ie/media/collegeofscienceandengineering/First-Year-Academic-Booklet_print.pdf</a></p>	<p><b>Module Descriptors:</b></p> <p>Module descriptors are available at:            Years 1 and 2: <a href="https://www.universityofgalway.ie/course-information/programme/BS1">https://www.universityofgalway.ie/course-information/programme/BS1</a>            Year 3: <a href="https://www.universityofgalway.ie/course-information/programme/BS9">https://www.universityofgalway.ie/course-information/programme/BS9</a>            Year 4: <a href="https://www.universityofgalway.ie/course-information/programme/BS2">https://www.universityofgalway.ie/course-information/programme/BS2</a></p>
<p><b>Module Options within Pathways:</b></p> <p>Where module options are indicated within a pathway, these modules are highlighted in colour.</p>	

## Module Codes

<p><b>AN</b> Anatomy</p> <p><b>BG</b> Biotechnology</p> <p><b>BI</b> Biochemistry</p> <p><b>BM</b> Biomedical Science</p> <p><b>BO</b> Biology</p> <p><b>BPS</b> Botany &amp; Plant Science</p> <p><b>CH</b> Chemistry</p>	<p><b>CS</b> Computer Science</p> <p><b>EC</b> Economics</p> <p><b>EOS</b> Earth &amp; Ocean Sciences</p> <p><b>EV</b> Environmental Science</p> <p><b>FR</b> French</p> <p><b>GR</b> German</p> <p><b>HP</b> Occupational Health</p>	<p><b>IE</b> Engineering</p> <p><b>MA</b> Mathematics / Mathematical Studies</p> <p><b>MI</b> Microbiology</p> <p><b>MP</b> Applied Mathematics</p> <p><b>MR</b> Marine Science</p> <p><b>PH</b> Physics &amp; Applied Physics</p> <p><b>PM</b> Pharmacology</p>	<p><b>SI</b> Physiology</p> <p><b>PAB</b> Plant and AgriBiosciences</p> <p><b>ST</b> Statistics</p> <p><b>TI</b> Geography</p> <p><b>ZO</b> Zoology</p>
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# Physics and Applied Physics Pathway

Year 1	Year 2	Year 3	Year 4
[60 Credits]	[Core: 20 credits]	[Core: 40 credits]	[Core: 55 credits; Options: 5 credits]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH101    <b>Physics [15]</b></p>	<p><i>Semester 1</i></p> <p>PH2105    <b>Mechanics and Thermodynamics [5]</b> PH2109    <b>Physics Laboratory and Computational Physics I [5]</b></p> <p><i>Semester 2</i></p> <p>PH2106    <b>Atomic Physics and Electromagnetism [5]</b> PH2110    <b>Physics Laboratory and Computational Physics II [5]</b></p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH3101    <b>Experimental and Computational Physics [15]</b></p> <p><i>Semester 1</i></p> <p>PH338    <b>Properties of Materials [5]</b> PH333    <b>Quantum Physics [5]</b> PH331    <b>Wave Optics [5]</b></p> <p><i>Semester 2</i></p> <p>PH335    <b>Nuclear and Particle Physics [5]</b> PH337    <b>Thermal Physics [5]</b></p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102    <b>Final Year Project [20]</b> PH4101    <b>Physics Problem Solving</b></p> <p><i>Semester 1</i></p> <p>PH424    <b>Electromagnetism and Special Relativity [5]</b> PH421    <b>Quantum Mechanics [5]</b> PH422    <b>Solid State Physics [5]</b> <b>PH428    Atmospheric Physics &amp; Climate Change [5]*</b> <b>PH430    Biophotonics [5]*</b></p> <p><i>Semester 2</i></p> <p>PH423    <b>Applied Optics &amp; Imaging [5]</b> PH425    <b>Lasers &amp; Spectroscopy [5]</b> PH429    <b>Nanotechnology [5]</b> <b>PH4109    Exoplanets and Planet Formation [5]*</b></p>
			* Select one 5-credit module

Module Descriptors for Years 1 to 4 are available at: [https://www.universityofgalway.ie/science-engineering/undergraduateprogrammes/science-undenominated.html#course\\_outline](https://www.universityofgalway.ie/science-engineering/undergraduateprogrammes/science-undenominated.html#course_outline)

**Module Options within Pathways:** Where module options are indicated within a pathway, these modules are highlighted in colour.

# Physics and Climate Physics Pathway

Year 1	Year 2	Year 3	Year 4
<b>[60 Credits]</b>	<b>[Core: 40 credits; Options: 20 credits]</b>	<b>[Core: 60 credits]</b>	<b>[Core: 60 credits]</b>
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>CH101 <b>Chemistry [15]</b> PH101 <b>Physics [15]</b></p>	<p><i>Semester 1</i></p> <p>PH2105 <b>Mechanics and Thermodynamics [5]</b> PH2109 <b>Physics Laboratory and Computational Physics I [5]</b> MP231 <b>Mathematical Methods I [5]</b> MG3113 <b>Megatrends [5]</b></p> <p><i>Semester 2</i></p> <p>PH2106 <b>Atomic Physics and Electromagnetism[5]</b> PH2110 <b>Physics Laboratory and Computational Physics II [5]</b> BSS2104 <b>Introduction to Sustainability I [5]</b> MP232 <b>Mathematical Methods II [5]</b></p> <p><b>Chemistry*</b> <i>Semester 1</i></p> <p>CH204 <b>Inorganic Chemistry [5]</b> CH203 <b>Physical Chemistry [5]</b></p> <p><i>Semester 2</i></p> <p>CH202 <b>Organic Chemistry [5]</b> CH205 <b>Analytical and Environmental Chemistry [5]</b></p> <p><b>Earth and Ocean Sciences*</b> <i>Semester 1</i></p> <p>EOS213 <b>Introduction to Ocean Science [10]</b></p> <p><i>Semester 2</i></p> <p>EOS2102 <b>The Earth: From Core to Crust [10]</b></p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH3101 <b>Experimental and Computational Physics [15]</b></p> <p><i>Semester 1</i></p> <p>MP345 <b>Mathematical Methods I [5]</b> PH328 <b>Physics of the Environment I [5]</b> PH338 <b>Properties of Materials [5]</b> PH333 <b>Quantum Physics [5]</b> PH331 <b>Wave Optics [5]</b></p> <p><i>Semester 2</i></p> <p>MP346 <b>Mathematical Methods II [5]</b> PH329 <b>Physics of the Environment II [5]</b> PH335 <b>Nuclear and Particle Physics [5]</b> PH337 <b>Thermal Physics [5]</b></p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102 <b>Final Year Project [20]</b> PH4101 <b>Physics Problem Solving [5]</b></p> <p><i>Semester 1</i></p> <p>PH428 <b>Atmospheric Physics &amp; Climate Change [5]</b> PH424 <b>Electromagnetism and Special Relativity [5]</b> PH421 <b>Quantum Mechanics [5]</b> PH422 <b>Solid State Physics [5]</b></p> <p><i>Semester 2</i></p> <p>PH425 <b>Lasers &amp; Spectroscopy [5]</b> EOS4101 <b>Remote Sensing [5]</b> PH4105 <b>Ocean Climate Physics [5]</b></p>
	<p>*Students can pursue this pathway in year 2 by choosing the above modules in either Chemistry, or in Earth and Ocean Sciences</p>		

Module Descriptors for Years 1 to 4 are available at: [https://www.universityofgalway.ie/science-engineering/undergraduateprogrammes/science-undenominated.html#course\\_outline](https://www.universityofgalway.ie/science-engineering/undergraduateprogrammes/science-undenominated.html#course_outline)

**Module Options within Pathways:** Where module options are indicated within a pathway, these modules are highlighted in colour.

# Year 2 Pathways and their pre-requisite modules

Year 2 Pathway	Pathway Prerequisite	Pathway Credits
Anatomy (AN)	BO101 and CH101 and PH101 and [one of MA161/MA180/MP180]	20
Pharmacology (PM)	BO101 and CH101 and PH101 and [one of MA161/MA180/MP180]	20
Physiology (SI)	BO101 and CH101 and PH101 and [one of MA161/MA180/MP180]	20
Medicinal Chemistry(MDCH)	BO101 and CH101 and PH101 and [one of MA161/MA180/MP180]	40
Chemistry (CH)	CH101 and [at least one of MA161/MA180/MP180]	20
Biochemistry(BI)	BO101 and CH101 and PH101 and [one of MA161/MA180/MP180]	20
Microbiology (MI)	BO101 and CH101 and [at least one of MA161/MA180/MP180]	20
Plant and AgriBiosciences (PAB)	BO101 and [at least one of MA161/MA180/MP180]	20
Botany and Plant Science (BPS)	BO101 and [at least one of MA161/MA180/MP180]	20
Earth and Ocean Science (EOS)	BO101 and CH101 and PH101 and [one of MA161/MA180/MP180]	20
Zoology (ZO)	BO101 and [at least one of MA161/MA180/MP180]	20
Physics and Climate Physics (PHCP)	PH101 and CH101 and [at least one of MA161/MA180/MP180] <i>(Taken with either CH pathway or EOS pathway. If taken with EOS pathway, BO101 required)</i>	40
Physics and Applied Physics (PHAP)	PH101 and [at least one of MA161/MA180/MP180]	20
Mathematics (MA)	MA180	20
Applied Mathematics (MP)	MP180	20
Computing (CS)	CS102 and [at least one of MA161/MA180/MP180]	20
Data Science (DS)	CS102 and MA180	40
Mathematical Studies and Computing (MSCS)	[MA161 or MA180] and CS102	40
Zoology (ZO)	BO101	20
For details on allocation procedures, refer to Overview, page 2, and Pathway Selection, page 3.		

# Year 2 Electives and their pre-requisite modules

Module	Module Name	Credits	Semester	Pre-Requisites	Notes
BO201	Molecular and Cellular Biology	5	Sem 1	BO101	
BO202	Evolution and the Tree of Life	5	Sem 1	BO101	
BPS202	Fundamentals in Aquatic Plant Science	5	Sem 1	BO101	See Note 1)
EOS213	Introduction to Ocean Science	10	Sem 1	BO101 & CH101 & PH101	See Note 1)
ZO2101	Entomology	5	Sem 1	BO101	
BO2101	Scientific Writing Skills	5	Sem 1	BO101	
ST2001	Statistics for Data Science 1	5	Sem 1	none	
ST1111	Probability Models	5	Sem 1	MA180	
MA211	Calculus I	5	Sem 1	At least one of MA161, MA180 or MP180	
MA215	Mathematical Molecular Biology I	5	Sem 1	At least one of MA161 or MA180	
MA284	Discrete Mathematics	5	Sem 1	At least one of MA161, MA180 or MP180	
MP231	Mathematical Methods I	5	Sem 1	At least one of MA161, MA180 or MP180	
MP236	Mechanics I	5	Sem 1	MP180	
PM208	Fundamental Concepts in Pharmacology	5	Sem 1	BO101 & CH101 & PH101	See Note 2)
PM209	Applied Concepts in Pharmacology	5	Sem 1	PM208	See Note 2)
PH2111	Makerspace Creative Technologies I	5	Sem 1	none	
PS3108	Design Thinking	5	Sem 1	none	
PS3123	Exploring Routes to Wellbeing	5	Sem 1	none	
MG3117	Intercultural Encounters	5	Sem 1	none	
HI2155	Cultural Heritage & Public History	5	Sem 1	none	
DT2114	Fail Better: Taking Risks and Developing Resilience	5	Sem 1	none	
LN2210	Scileanna Gaeilge don Eolaíocht 1	5	Sem 1	none	

# Year 2 Electives and their pre-requisite modules

Module	Module Name	Credits	Semester	Pre-Requisites	Notes
BPS203	Plant Diversity, Physiology & Adaptation	5	Sem 2	BO101	See Note 1)
EOS2102	The Earth: From Core to Crust	10	Sem 2	BO101 & CH101 & PH101	See Note 1)
PAB2101	AgriBiosciences	5	Sem 2	BO101	See Note 1)
ST2002	Statistics for Data Science 2	5	Sem 2	ST2001	
ST1112	Statistical Methods	5	Sem 2	MA180	
MA1993	Mathematics of Finance	5	Sem 2	MA180	
MA2111	Anailís	5	Sem 2	MA180	
MA2104	Matamaitic don Inbhuanaiteacht (Mathematics for Sustainability)	5	Sem 2	none	
MA203	Linear Alegbra	5	Sem 2	At least one of MA161, MA180 or MP180	
MA212	Calculus II	5	Sem 2	At least one of MA161, MA180 or MP180	
MA216	Mathematical Molecular Biology II	5	Sem 2	At least one of MA161 or MA180	
MP232	Mathematical Methods II	5	Sem 2	At least one MA161, MA180, or MP180	
MP237	Mechanics II	5	Sem 2	MP180	
PH2108	Scaling Big Ideas	5	Sem 2	none	
AJ2114	Communicating Through Storytelling	5	Sem 2	none	
SP3211	Empathy in Action	5	Sem 2	none	
SP3212	Navigating the Digital World	5	Sem 2	none	
HI2156	Revolutionary Technologies, from Steam to Green	5	Sem 2	none	
LN2211	Scileanna Gaeilge don Eolaíocht 2	5	Sem 2	none	



# Year 2 Electives and their pre-requisite modules

Module	Module Name	Credits	Semester	Pre-Requisites	Notes
BI3103	Career Development and Employability Skills	5	Sem 1 and Sem 2	none	
FR252	French	10	Sem 1 and Sem 2	none	
GR224	Beginner's German for Science	10	Sem 1 and Sem 2	none	
GR252	German	10	Sem 1 and Sem 2	none	
GR353	German	10	Sem 1 and Sem 2	none	

Module	Module Name	Credits	Semester	Pre-Requisites	Notes
BSS2103/BSS2104	Introduction to Sustainability	5	Sem 1 or Sem 2	none	
MG3113/ MG3115	Megatrends	5	Sem 1 or Sem 2	none	
ED2103/ ED2104	Design Your Life	5	Sem 1 or Sem 2	none	
PS3109/ PS3110/ PS3111/ PS3112	Vertically Integrated Project	5	Sem 1 or Sem 2	none	See Note 3)

Note 1). Some modules are offered as electives but subject to limited places.

Note 2). While PM208 and PM209 are offered as electives, only students assigned to the Pharmacology Pathway take the semester 2 module PM210.  
Conversely, students taking PM208 and/or PM209 alone without PM210 will not progress to study the Pharmacology pathway.

Note 3). Registration to Vertically Integrated Projects, is subject to a call for expression of interest.

# Year 3 Configurations and Year 4 progression options

Approved Year 3 Configuration		Year 2 Pre-requisites	Year 4 progression mapping options [each 60 credits]
Anatomy & Physiology	60-credits core modules	AN [20]+SI [20]	Choose between Anatomy [60] or Physiology [60]
Pharmacology & Physiology	60-credits core modules	PM [20]+SI [20]	Choose between Pharmacology [60] or Physiology [60]
Biochemistry & Microbiology	60-credits core modules	BI [20]+MI [20]	Choose between Biochemistry [60] or Microbiology [60]
Biochemistry & PlantAgriBioSciences	50-credits core modules+options	BI [20]+PAB[20]	Choose between Biochemistry [60] or PlantAgriBioSc. [60]
Microbiology & PlantAgriBioSciences	50-credits core modules+options	MI [20]+PAB [20]	Choose between Microbiology [60] or PlantAgriBioSc. [60]
Chemistry	40-credits core modules+options	CH [20]	Chemistry [60]
Medicinal Chemistry	60-credits core modules	MedCH [35]	Medicinal Chemistry [60]
Biochemistry & Chemistry	60-credits core modules	BI[20]+CH[20]	Choose between Biochemistry [60] or Chemistry [60]
Microbiology & Chemistry	60-credits core modules	MI[20]+CH[20]	Choose between Microbiology [60] or Chemistry [60]
Anatomy & Biochemistry	60-credits core modules	AN[20]+BI[20]	Choose between Anatomy [60] or Biochemistry [60]
Anatomy & Microbiology	60-credits core modules	AN[20]+MI[20]	Choose between Anatomy [60] or Microbiology [60]
Chemistry & Pharmacology	60-credits core modules	CH[20]+PM[20]	Choose between Chemistry [60] or Pharmacology [60]
Biochemistry & Pharmacology	60-credits core modules	BI[20]+PM[20]	Choose between Biochemistry [60] or Pharmacology [60]
Biochemistry & Physiology	60-credits core modules	BI[20]+SI[20]	Choose between Biochemistry [60] or Physiology [60]
Microbiology & Physiology	60-credits core modules	MI[20]+SI[20]	Choose between Microbiology [60] or Physiology [60]
Botany and Plant Science & Zoology	40-credits core modules+options	BPS[20]+ZO[20]	Choose between Botany and Plant Sc. [60] or Zoology [60]
Earth and Ocean Sciences	50-credits core modules+options	EOS [20]	Earth and Ocean Sciences [60]
Earth and Ocean Sciences & Zoology	60-credits core modules	EOS[20]+ZO[20]	Choose between Earth and Ocean Sciences [60] or Zoology [60]
Earth and Ocean Sciences & Botany and Plant Science	60-credits core modules	BPS[20]+EOS[20]	Choose between Botany and Plant Sc. [60] or Earth and Ocean Sciences [60]
Physics and Applied Physics	40-credits core modules+options	PHAP[20] or PHCP[40]	Physics and Applied Physics [60]
Physics and Climate Physics	60-credits core modules	PHCP[40]	Choose between Physics and Climate Physics [60] or Physics and Applied Physics [60]
Anatomy & Botany and Plant Science	50-credits core modules+options	AN[20]+BPS[20]	Choose between Anatomy [60] or Botany and Plant Sc.[60]
Pharmacology & Zoology	50-credits core modules+options	PM[20]+ZO[20]	Choose between Pharmacology [60] or Zoology [60]

# Year 3 Configurations and Year 4 progression options

Approved Year 3 Configuration		Year 2 Pre-requisites	Year 4 progression mapping options [each 60 credits]
Physiology & Zoology	50-credits core modules+options	SI[20]+ZO[20]	Choose between Physiology [60] or Zoology [60]
Biochemistry & PlantAgriBioSciences	50-credits core modules+options	BI[20]+BPS[20]	Choose between Biochemistry [60] or Botany and Plant Sc. [60]
Biochemistry & Zoology	50-credits core modules+options	BI[20]+ZO[20]	Choose between Biochemistry [60] or Zoology [60]
Microbiology & Zoology	50-credits core modules+options	MI[20]+ZO[20]	Choose between Microbiology [60] or Zoology [60]
Botany and Plant Science & PlantAgriBioSciences	40-credits core modules+options	BPS[20]+PAB[20]	Choose between Botany and Plant Sc.[60] or PlantAgriBioSc.[60]
Mathematics & Applied Mathematics	60-credits core modules	MA[20]+MP[20]	Mathematics and Applied Mathematics [60]
Mathematics & Computing	50-credits core modules+options	MA[20]+CS[20]	Choose between Mathematics and Computing [60] or Mathematics [60] or Computing [60]
Mathematical Studies and Computing	60-credits core modules	MSCS[40]	Choose between Math.Studies and Computing [60] or Computing [60]
Data Science	30-credits core modules+options	DS[40]	Data Science [60]
Applied Mathematics	30-credits core modules+options	MP[20]	Applied Mathematics [60]
Mathematics	40-credits core modules+options	MA[20]	Mathematics [60]
Computing	25-credits core modules+options	CS[20]	Computing [60]
<p>Access to Year 3 pathways require relevant pre-requisites from Year 2. For module listings within each Approved Year 3 Configuration, please refer to the supplementary Year 3 Guide, issued separately.</p>			