



OLLSCOIL NA GAILLIMHE
UNIVERSITY OF GALWAY

Bachelor of Science Degree
College of Science and Engineering
2023/2024

BSc PHYSICS APPLIED PHYSICS, ASTROPHYSICS, BIOMEDICAL, CLIMATE, THEORETICAL

Overview

Year 1	Year 2	Year 3	Year 4
[60 Credits]	[60 Credits]	[60 Credits]	[60 Credits]
<p>Physics and Applied Physics: There are 30 credits of Core modules.</p> <p>Choose one module to a value of 15 credits: Mathematics (Honours) Mathematical Studies</p> <p>Choose one module to a value of 15 credits: Biology Applied Mathematics Chemistry</p> <p>Physics with Astrophysics: There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits: Mathematics (Honours) Mathematical Studies</p> <p>Physics with Biomedical Physics: There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits: Mathematics (Honours) Mathematical Studies</p> <p>Physics and Climate Physics: There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits: Applied Mathematics Mathematics (Honours) Mathematical Studies</p> <p>Physics and Theoretical Physics: There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits: Mathematics (Honours) Mathematical Studies</p>	<p>Physics and Applied Physics: There are 30 credits of Core modules.</p> <p>Choose 1 pathway to a total value of 20 credits: Mathematical Studies Mathematics</p> <p>Choose Electives to a value of 10 credits from the list available</p> <p>Physics with Astrophysics: There are 60 credits of Core modules.</p> <p>Physics with Biomedical Physics: There are 60 credits of Core modules.</p> <p>Physics and Climate Physics: There are 40 credits of Core modules.</p> <p>Choose 1 Pathway to a total value of 20 credits: Chemistry Earth and Ocean Sciences</p> <p>Physics and Theoretical Physics: There are 40 credits of Core modules.</p> <p>Choose 1 Pathway to a total value of 20 credits: Astrophysics Mathematical Studies Mathematics</p>	<p>Physics and Applied Physics: There are 50 credits of Core modules.</p> <p>Choose Electives to a value of 10 credits from the list available.</p> <p>Physics with Astrophysics: There are 60 credits of Core modules.</p> <p>Physics with Biomedical Physics: There are 60 credits of Core modules.</p> <p>Physics and Climate Physics: There are 60 credits of Core modules.</p> <p>Physics and Theoretical Physics: There are 60 credits of Core modules.</p>	<p>Physics and Applied Physics: There are 55 credits of Core modules.</p> <p>Choose an Electives to a value of 5credits from the list available.</p> <p>Physics with Astrophysics: There are 60 credits of Core modules.</p> <p>Physics with Biomedical Physics: There are 60 credits of Core modules.</p> <p>Physics and Climate Physics: There are 55 credits of Core modules.</p> <p>Choose Electives to a value of 5 credits from the list available.</p> <p>Physics and Theoretical Physics: There are 45 credits of Core modules.</p> <p>Choose 1 project to a value of 10 credits: Final Year Project Physics Project</p> <p>Choose one Elective to a value of 5 credits: Algebraic Foundations of Quantum Computing Modelling I</p>

BSc Physics – Stream: Physics and Applied Physics

Year 1	Year 2	Year 3	Year 4
[Core: 30 credits; Options: 30 credits]	[Core: 30 credits; Options: 10 credits; Pathway: 20 credits]	[Core: 50 credits; Options: 10 credits]	[Core: 55 credits; Options: 5 credits]
<i>Full Year – Semester 1 and Semester 2</i>	<i>Semester 1</i>	<i>Full Year – Semester 1 and Semester 2</i>	<i>Full Year – Semester 1 and Semester 2</i>
PH101 Physics [15] PH109 Physics Special Topics [10] One of: MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]* One of: BO101 Biology [15]* CH101 Chemistry [15]* MP180 Applied Mathematics [15]* <i>Semester 1</i> CS103 Computer Science [5]	MP231 Mathematical Methods I [5] PH2105 Mechanics and Thermodynamics [5] PH2102 Physics Laboratory and Problem Solving I [5] CS2101 Programming for Science and Finance [5]* ST2001 Statistics in Data Science I [5]* MP236 Mechanics I [5]* <i>Semester 2</i> PH2016 Atomic Physics and Electromagnetism [5] MP232 Mathematical Methods II [5] PH2104 Physics Laboratory and Problem Solving II [5] CS211 Programming and Operating Systems [5]* ST2002 Statistics in Data Science II [5]* MP237 Mechanics II [5]* <i>Continued...</i>	PH3101 Experimental and Computational Physics [15] <i>Semester 1</i> MP345 Mathematical Methods I [5] PH338 Properties of Materials [5] PH333 Quantum Physics [5] PH331 Wave Optics [5] MP305 Modelling I [5]* PH328 Physics of the Environment I [5]* ST311 Applied Statistics I [5]* PH222 Astrophysical Concepts [5]* PH2108 Scaling Big Ideas [5]* <i>Semester 2</i> MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH337 Thermal Physics [5] PH329 Physics of the Environment II [5]* PH362 Stellar Astrophysics [5]* MP307 Modelling II [5]* ST312 Applied Statistics II [5]*	PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5] <i>Semester 1</i> PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5] PH428 Atmospheric Physics & Climate Change [5]* PH430 Biophotonics [5]* <i>Semester 2</i> PH423 Applied Optics & Imaging [5] PH425 Lasers & Spectroscopy [5] PH429 Nanotechnology [5] PH466 Astrophysics [5]*
* Select two 15-credit modules	* Select modules to a value of 10 credits – 5 credits per semester. Select 1 Pathway to a value of 20 credits.	* Select modules to a value of 10 credits – 5 credits per semester	* Select one 5-credit module
Module Descriptors for Years 1 to 4 are available at: https://www.universityofgalway.ie/science-engineering/undergraduateprogrammes/physics-degreeoptionsinappliedastrophysicsbiomedicalclimatetheoretical/			

BSc Physics – Stream: Physics and Applied Physics

Year 1	Year 2	Year 3	Year 4
[Core: 30 credits; Options: 30 credits]	[Core: 30 credits; Options: 10 credits; Pathway: 20 credits]	[Core: 50 credits; Options: 10 credits]	[Core: 55 credits; Options: 5 credits]
	<p>MATHEMATICAL STUDIES PATHWAY*</p> <p><i>Semester 1</i></p> <p>MA211 Calculus I [5]* MA284 Discrete Mathematics [5]*</p> <p><i>Semester 2</i></p> <p>MA212 Calculus II [5]* MA203 Linear Algebra [5]*</p> <p>MATHEMATICS PATHWAY*</p> <p><i>Semester 1</i></p> <p>MA2286 Differential Forms [5]* MA284 Discrete Mathematics [5]*</p> <p><i>Semester 2</i></p> <p>MA2287 Complex Analysis [5]* MA283 Linear Algebra [5]*</p>		
* Select two 15-credit modules	* Select modules to a value of 10 credits – 5 credits per semester. Select 1 Pathway to a value of 20 credits.	* Select modules to a value of 10 credits – 5 credits per semester	* Select one 5-credit module

BSc Physics – Stream: Physics with Astrophysics

Year 1	Year 2	Year 3	Year 4
[Core: 45 credits; Options: 15 credits]	[Core: 60 credits]	[Core: 60 credits]	[Core: 60 credits]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>MP180 Applied Mathematics [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]*</p> <p><i>Semester 1</i></p> <p>CS103 Computer Science [5]</p>	<p><i>Semester 1</i></p> <p>PH222 Astrophysics Concepts [5] MP231 Mathematical Methods I [5] MP236 Mechanics I [5] PH2105 Mechanics and Thermodynamics [5] PH2102 Physics Laboratory and Problem Solving I [5] CS2101 Programming for Science and Finance [5]</p> <p><i>Semester 2</i></p> <p>PH2016 Atomic Physics and Electromagnetism [5] MP232 Mathematical Methods II [5] MP237 Mechanics II [5] PH223 Observational Astronomy [5] PH2104 Physics Laboratory and Problem Solving II [5] CS211 Programming and Operation Systems [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH363 Astronomical Data Analysis [5] PH3101 Experimental and Computational Physics [15]</p> <p><i>Semester 1</i></p> <p>MP345 Mathematical Methods I [5] PH338 Properties of Materials [5] PH333 Quantum Physics [5] PH331 Wave Optics [5]</p> <p><i>Semester 2</i></p> <p>MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH362 Stellar Astrophysics [5] PH337 Thermal Physics [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5]</p> <p><i>Semester 1</i></p> <p>MP403 Cosmology and General Relativity [5] PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5]</p> <p><i>Semester 2</i></p> <p>PH466 Astrophysics [5] PH423 Applied Optics & Imaging [5] PH425 Lasers & Spectroscopy [5]</p>
* Select one 15-credit module			

BSc Physics – Stream: Physics with Biomedical Physics

Year 1	Year 2	Year 3	Year 4
[Core: 45 credits; Options: 15 credits]	[Core: 60 credits]	[Core: 60 credits]	[Core: 60 credits]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>BO101 Biology [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]*</p> <p><i>Semester 1</i></p> <p>CS103 Computer Science [5]</p>	<p><i>Semester 1</i></p> <p>AN2102 Histology of the Fundamental Tissues [5] MP231 Mathematical Methods I [5] MA215 Mathematical Molecular Biology I [5] PH2105 Mechanics and Thermodynamics [5] PH2102 Physics Laboratory and Problem Solving I [5] ST2001 Statistics in Data Science I [5]</p> <p><i>Semester 2</i></p> <p>PH2016 Atomic Physics and Electromagnetism [5] MP232 Mathematical Methods II [5] MA216 Mathematical Molecular Biology II [5] PH2104 Physics Laboratory and Problem Solving II [5] ST2002 Statistics in Data Science II [5] AN226 Systems Histology [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH3101 Experimental and Computational Physics [15]</p> <p><i>Semester 1</i></p> <p>MP345 Mathematical Methods I [5] PH338 Properties of Materials [5] PH333 Quantum Physics [5] PH339 Radiation & Medical Physics [5] PH331 Wave Optics [5]</p> <p><i>Semester 2</i></p> <p>PH340 Biomedical Physics [5] MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH337 Thermal Physics [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5]</p> <p><i>Semester 1</i></p> <p>PH430 Biophotonics [5] PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5]</p> <p><i>Semester 2</i></p> <p>PH423 Applied Optics & Imaging [5] PH425 Lasers & Spectroscopy [5] PH4108 Soft Condensed Matter [5]</p>
* Select one 15-credit module			

BSc Physics – Stream: Physics and Climate Physics

Year 1	Year 2	Year 3	Year 4
[60 credits]	[Core: 40 credits; Options: 20 credits]	[60 credits]	[60 credits]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>MP180 Applied Mathematics [15]* CH101 Chemistry [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA161 Mathematical Studies [15]* MA180 Mathematics (Honours) [15]*</p> <p><i>Semester 1</i></p> <p>CS103 Computer Science [5]</p>	<p><i>Semester 1</i></p> <p>PH2105 Mechanics and Thermodynamics [5] PH2102 Physics Laboratory and Problem Solving I [5] MP231 Mathematical Methods I [5] MG3113 Megatrends [5]</p> <p><i>Semester 2</i></p> <p>PH2106 Atomic Physics and Electromagnetism [5] BSS2104 Introduction to Sustainability I [5] PH2104 Physics Laboratory and Problem Solving II [5] MP232 Mathematical Methods II [5]</p> <p>CHEMISTRY PATHWAY*</p> <p><i>Semester 1</i></p> <p>CH204 Inorganic Chemistry [5]* CH203 Physical Chemistry [5]*</p> <p><i>Semester 2</i></p> <p>CH202 Organic Chemistry [5]* CH205 Analytical and Environmental Chemistry [5]*</p> <p>EARTH AND OCEAN SCIENCES PATHWAY*</p> <p><i>Semester 1</i></p> <p>EOS213 Introduction to Ocean Science [10]*</p> <p><i>Semester 2</i></p> <p>EOS2102 The Earth: From Core to Crust [10]*</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH3101 Experimental and Computational Physics [15]</p> <p><i>Semester 1</i></p> <p>MP345 Mathematical Methods I [5] PH328 Physics of the Environment I [5] PH338 Properties of Materials [5] PH333 Quantum Physics [5] PH331 Wave Optics [5]</p> <p><i>Semester 2</i></p> <p>MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH329 Physics of the Environment II [5] PH337 Thermal Physics [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5]</p> <p><i>Semester 1</i></p> <p>PH428 Atmospheric Physics & Climate Physics [5] PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5]</p> <p><i>Semester 2</i></p> <p>PH425 Lasers & Spectroscopy [5] EOS4101 Earth Observation and Remote Sensing [5] PH4105 Ocean Climate Physics [5]</p>
* Select one 15-credit module	* Select one 20-credit pathway		

BSc Physics – Stream: Physics and Theoretical Physics

Year 1	Year 2	Year 3	Year 4
[Core: 45 credits; Options: 15 credits]	[Core: 40 credits; Pathway: 20 credits]	[60 credits]	[Core 45 credits; Option: 15 credits]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>MP180 Applied Mathematics [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]*</p> <p><i>Semester 1</i></p> <p>CS103 Computer Science [5]</p>	<p><i>Semester 1</i></p> <p>MP231 Mathematical Methods I [5] PH2105 Mechanics and Thermodynamics [5] MP236 Mechanics I [5] PH2102 Physics Laboratory and Problem Solving I [5]</p> <p><i>Semester 2</i></p> <p>PH2016 Atomic Physics and Electromagnetism [5] MP232 Mathematical Methods II [5] MP237 Mechanics II [5] PH2104 Physics Laboratory and Problem Solving II [5]</p> <p>MATHEMATICAL STUDIES PATHWAY*</p> <p><i>Semester 1</i></p> <p>MA211 Calculus I [5]* MA284 Discrete Mathematics [5]*</p> <p><i>Semester 2</i></p> <p>MA212 Calculus II [5]* MA203 Linear Algebra [5]*</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH3102 Experimental and Computational Physics for Theoretical Physics [10]</p> <p><i>Semester 1</i></p> <p>MP345 Mathematical Methods II [5] MP366 Electromagnetism [5]^ PH333 Quantum Physics [5]^ MP494 Partial Differential Equations [5]^ PH331 Wave Optics [5]</p> <p><i>Semester 2</i></p> <p>MP346 Mathematical Methods II [5] MP307 Modelling II [5] PH335 Nuclear and Particle Physics [5] PH337 Thermal Physics [5] MP365 Fluid Mechanics [5]^</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>MM4000 Final Year Project [10]* PH4101 Physics Problem Solving [5]</p> <p><i>Semester 1</i></p> <p>MA4102 Algebraic Foundations of Quantum Computing [5]* PH428 Atmospheric Physics & Climate Change [5]* MP403 Cosmology and General Relativity [5] MP494 Partial Differential Equations [5]^ MP305 Modelling I [5]* MP366 Electromagnetism [5]^ PH422 Solid State Physics [5]</p> <p><i>Semester 2</i></p> <p>MP365 Fluid Mechanics [5]^ PH423 Applied Optics & Imaging [5] PH4107 Project Theoretical Physics [10]* MP491 Non Linear Systems [5]</p>
* Select one 15-credit module	* Select one 20-credit pathway		

BSc Physics – Stream: Physics and Theoretical Physics

Year 1	Year 2	Year 3	Year 4
[Core: 45 credits; Options: 15 credits]	[Core: 40 credits; Pathway: 20 credits]	[60 credits]	[Core 45 credits; Option: 15 credits]
	<p>MATHEMATICS PATHWAY*</p> <p><i>Semester 1</i></p> <p>MA2286 Differential Forms [5]* MA284 Discrete Mathematics [5]*</p> <p><i>Semester 2</i></p> <p>MA2287 Complex Analysis [5]* MA283 Linear Algebra [5]*</p> <p>ASTROPHYSICS PATHWAY*</p> <p><i>Semester 1</i></p> <p>PH222 Astrophysical Concepts [5]* CS2101 Programming for Science and Finance [5]*</p> <p><i>Semester 2</i></p> <p>PH223 Observational Astronomy [5]* CS211 Programming and Operating Systems [5]*</p>		
* Select two 15-credit modules	* Select 1 Pathway to a value of 20 credits.	^ These modules are only available every 2nd Year. Alternative modules are offered next academic year.	* Select one Project to a value of 10 credits. * Select one elective to a value of 5 credits. ^ These modules are only available every 2nd Year. Alternative modules are offered next academic year.
Module Descriptors for Years 1 to 4 are available at: https://www.universityofgalway.ie/science-engineering/undergraduateprogrammes/physics-degreeoptionsinappliedastrophysicsbiomedicalclimatetheoretical/			