



NUI Galway
OÉ Gaillimh

College of Science and Engineering
2022/2023

Fullscreen

Next page

BSc PHYSICS

Applied Physics, Astrophysics,
Biomedical, Climate, Theoretical



(V.1)

www.nuigalway.ie/science-engineering

Overview

Year 1	Year 2	Year 3	Year 4
[60 credits]	[60 credits]	[60 credits]	[60 credits]
<p>Physics and Applied Physics:</p> <p>There are 30 credits of Core modules.</p> <p>Choose one module to a value of 15 credits:</p> <ul style="list-style-type: none"> Mathematics (Honours) Mathematical Studies <p>Choose one module to a value of 15 credits:</p> <ul style="list-style-type: none"> Biology Applied Mathematics Chemistry <p>Physics with Astrophysics:</p> <p>There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits:</p> <ul style="list-style-type: none"> Mathematics (Honours) Mathematical Studies <p>Physics with Biomedical Physics:</p> <p>There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits:</p> <ul style="list-style-type: none"> Mathematics (Honours) Mathematical Studies <p>Physics and Climate Physics:</p> <p>There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits:</p> <ul style="list-style-type: none"> Applied Mathematics Mathematics (Honours) Mathematical Studies <p>Physics and Theoretical Physics:</p> <p>There are 45 credits of Core modules.</p> <p>Choose one module to a value of 15 credits:</p> <ul style="list-style-type: none"> Mathematics (Honours) Mathematical Studies 	<p>Physics and Applied Physics:</p> <p>There are 30 credits of Core modules.</p> <p>Choose 1 pathway to a total value of 20 credits:</p> <ul style="list-style-type: none"> Mathematical Studies Mathematics <p>Choose Electives to a value of 10 credits from the list available</p> <p>Physics with Astrophysics:</p> <p>There are 60 credits of Core modules.</p> <p>Physics with Biomedical Physics:</p> <p>There are 60 credits of Core modules.</p> <p>Physics and Climate Physics:</p> <p>There are 40 credits of Core modules.</p> <p>Choose 1 Pathway to a total value of 20 credits:</p> <ul style="list-style-type: none"> Chemistry Earth and Ocean Sciences <p>Physics and Theoretical Physics:</p> <p>There are 40 credits of Core modules.</p> <p>Choose 1 Pathway to a total value of 20 credits:</p> <ul style="list-style-type: none"> Astrophysics Mathematical Studies Mathematics 	<p>Physics and Applied Physics:</p> <p>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:</p> <p>There are 60 credits of Core modules.</p> <p>Physics with Biomedical Physics:</p> <p>There are 60 credits of Core modules.</p> <p>Physics and Climate Physics:</p> <p>There are 60 credits of Core modules.</p> <p>Physics and Theoretical Physics:</p> <p>There are 60 credits of Core modules.</p>	<p>Physics and Applied Physics:</p> <p>There are 55 credits of Core modules.</p> <p>Choose an Electives to a value of 5 credits from the list available.</p> <p>Physics with Astrophysics:</p> <p>There are 60 credits of Core modules.</p> <p>Physics with Biomedical Physics:</p> <p>There are 60 credits of Core modules.</p> <p>Physics and Climate Physics:</p> <p>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:</p> <p>There are 45 credits of Core modules.</p> <p>Choose 1 project to a value of 10 credits:</p> <ul style="list-style-type: none"> Final Year Project Physics Project <p>Choose one Elective to a value of 5 credits:</p> <ul style="list-style-type: none"> Algebraic Foundations of Quantum Computing Modelling I
<p>Module Descriptors for Years 1 to 4 are available at: https://www.nuigalway.ie/science-engineering/undergraduateprogrammes/physics-with-options.html</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]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH101 Physics [15]</p> <p>PH109 Physics Special Topics [10]</p> <p>One of:</p> <p>MA180 Mathematics (Honours) [15]*</p> <p>MA161 Mathematical Studies [15]*</p> <p>One of:</p> <p>BO101 Biology [15]*</p> <p>CH101 Chemistry [15]*</p> <p>MP180 Applied Mathematics [15]*</p> <p>-----</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]</p> <p>PH2105 Mechanics and Thermodynamics [5]</p> <p>-----</p> <p>MP236 Mechanics I [5]*</p> <p>PH2102 Physics Laboratory and Problem Solving I [5]</p> <p>CS2101 Programming for Science and Finance [5]</p> <p>ST2001 Statistics in Data Science I [5]*</p> <p>-----</p> <p><i>Semester 2</i></p> <p>PH2016 Atomic Physics and Electromagnetism [5]</p> <p>MP232 Mathematical Methods II [5]</p> <p>MP237 Mechanics II [5]*</p> <p>PH2104 Physics Laboratory and Problem Solving II [5]</p> <p>CS211 Programming and Operating Systems [5]*</p> <p>ST2002 Statistics in Data Science II [5]*</p> <p>-----</p> <p><i>Continued...</i></p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH3101 Experimental and Computational Physics [15]</p> <p>-----</p> <p><i>Semester 1</i></p> <p>ST311 Applied Statistics I [5]*</p> <p>PH222 Astrophysical Concepts [5]*</p> <p>MP345 Mathematical Methods I [5]</p> <p>MP305 Modelling I [5]*</p> <p>PH328 Physics of the Environment I [5]*</p> <p>PH338 Properties of Materials [5]</p> <p>PH333 Quantum Physics [5]</p> <p>PH331 Wave Optics [5]</p> <p>-----</p> <p><i>Semester 2</i></p> <p>ST312 Applied Statistics II [5]*</p> <p>MP346 Mathematical Methods II [5]</p> <p>MP307 Modelling II [5]*</p> <p>PH335 Nuclear and Particle Physics [5]</p> <p>PH329 Physics of the Environment II [5]*</p> <p>PH362 Stellar Astrophysics [5]*</p> <p>PH337 Thermal Physics [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102 Final Year Project [20]</p> <p>PH4101 Physics Problem Solving [5]</p> <p>-----</p> <p><i>Semester 1</i></p> <p>PH423 Applied Optics & Imaging [5]</p> <p>PH428 Atmospheric Physics & Climate Change [5]*</p> <p>PH430 Biophotonics [5]*</p> <p>PH421 Quantum Mechanics [5]</p> <p>PH422 Solid State Physics [5]</p> <p>-----</p> <p><i>Semester 2</i></p> <p>PH424 Electromagnetism and Special Relativity [5]</p> <p>PH466 Astrophysics [5]*</p> <p>PH425 Lasers & Spectroscopy [5]</p> <p>PH429 Nanotechnology [5]</p>

	<p>MATHEMATICAL STUDIES PATHWAY*</p> <p><u>Semester 1</u></p> <p>MA211 Calculus I [5]</p> <p>MA284 Discrete Mathematics [5]</p> <p>-----</p> <p><u>Semester 2</u></p> <p>MA212 Calculus II [5]</p> <p>MA203 Linear Algebra [5]</p> <p>MATHEMATICS PATHWAY*</p> <p><u>Semester 1</u></p> <p>MA2286 Differential Forms [5]</p> <p>MA284 Discrete Mathematics [5]</p> <p>-----</p> <p><u>Semester 2</u></p> <p>MA2287 Complex Analysis [5]</p> <p>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

Module Descriptors for Years 1 to 4 are available at: <https://www.nuigalway.ie/science-engineering/undergraduateprogrammes/physics-with-options.html>

BSc Physics – Stream: Physics with Astrophysics

Year 1	Year 2	Year 3	Year 4
[Core: 45 credits; Options: 15 credits]	[Core: 60 credits]	[60 credits]	[60 credits]
<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>MP180 Applied Mathematics [15]</p> <p>PH101 Physics [15]</p> <p>PH109 Physics Special Topics [10]</p> <p>MA180 Mathematics (Honours) [15]*</p> <p>MA161 Mathematical Studies [15]*</p> <p>-----</p> <p><i>Semester 1</i></p> <p>CS103 Computer Science [5]</p>	<p><i>Semester 1</i></p> <p>PH222 Astrophysical Concepts [5]</p> <p>MP231 Mathematical Methods I [5]</p> <p>PH2105 Mechanics and Thermodynamics [5]</p> <p>MP236 Mechanics I [5]</p> <p>PH2102 Physics Laboratory and Problem Solving I [5]</p> <p>CS2101 Programming for Science and Finance [5]</p> <p>-----</p> <p><i>Semester 2</i></p> <p>PH2016 Atomic Physics and Electromagnetism [5]</p> <p>MP232 Mathematical Methods II [5]</p> <p>MP237 Mechanics II [5]</p> <p>PH223 Observational Astronomy [5]</p> <p>PH2104 Physics Laboratory and Problem Solving II [5]</p> <p>PH2103 Thermodynamics & Atomic Physics [5]</p> <p>CS211 Programming and Operating Systems [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH363 Astronomical Data Analysis [5]</p> <p>PH3101 Experimental and Computational Physics [15]</p> <p>-----</p> <p><i>Semester 1</i></p> <p>MP345 Mathematical Methods I [5]</p> <p>PH338 Properties of Materials [5]</p> <p>PH333 Quantum Physics [5]</p> <p>PH331 Wave Optics [5]</p> <p>-----</p> <p><i>Semester 2</i></p> <p>MP346 Mathematical Methods II [5]</p> <p>PH335 Nuclear and Particle Physics [5]</p> <p>PH362 Stellar Astrophysics [5]</p> <p>PH337 Thermal Physics [5]</p>	<p><i>Full Year – Semester 1 and Semester 2</i></p> <p>PH4102 Final Year Project [20]</p> <p>PH4101 Physics Problem Solving [5]</p> <p>-----</p> <p><i>Semester 1</i></p> <p>PH423 Applied Optics & Imaging [5]</p> <p>MP403 Cosmology and General Relativity [5]</p> <p>PH421 Quantum Mechanics [5]</p> <p>PH422 Solid State Physics [5]</p> <p>-----</p> <p><i>Semester 2</i></p> <p>PH466 Astrophysics [5]</p> <p>PH424 Electromagnetism and Special Relativity [5]</p> <p>PH425 Lasers & Spectroscopy [5]</p>
* Select one 15-credit module			
Module Descriptors for Years 1 to 4 are available at: https://www.nuigalway.ie/science-engineering/undergraduateprogrammes/physics-with-options.html			

BSc Physics – Stream: Physics with Biomedical Physics

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

Module Descriptors for Years 1 to 4 are available at: <https://www.nuigalway.ie/science-engineering/undergraduateprogrammes/physics-with-options.html>

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]	[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>
MP180 Applied Mathematics [15]*	PH2105 Mechanics and Thermodynamics [5]	PH3101 Experimental and Computational Physics [15]	PH4102 Final Year Project [20]
CH101 Chemistry [15]	PH2102 Physics Laboratory and Problem Solving I [5]	-----	PH4101 Physics Problem Solving [5]
PH101 Physics [15]	MP231 Mathematical Methods I [5]	<i>Semester 1</i>	-----
PH109 Physics Special Topics [10]	MG3113 Megatrends [5]	MP345 Mathematical Methods I [5]	<i>Semester 1</i>
MA161 Mathematical Studies [15]*	-----	PH328 Physics of the Environment I [5]	PH4103 Atmospheric Composition & Climate Change [5]
MA180 Mathematics (Honours) [15]*	<i>Semester 2</i>	PH338 Properties of Materials [5]	PH424 Electromagnetism and Special Relativity [5]
-----	PH2106 Atomic Physics and Electromagnetism [5]	PH333 Quantum Physics [5]	PH421 Quantum Mechanics [5]
<i>Semester 1</i>	BSS2104 Introduction to Sustainability I [5]	PH331 Wave Optics [5]	PH422 Solid State Physics [5]
CS103 Computer Science [5]	PH2104 Physics Laboratory and Problem Solving II [5]	-----	-----
	MP232 Mathematical Methods II [5]	<i>Semester 2</i>	<i>Semester 2</i>
	CHEMISTRY PATHWAY*	MP346 Mathematical Methods II [5]	PH4104 Aerosol Physics and Climate Change [5]
	<i>Semester 1</i>	PH335 Nuclear and Particle Physics [5]	PH425 Lasers & Spectroscopy [5]
	CH204 Inorganic Chemistry [5]*	PH337 Thermal Physics [5]	EOS4101 Remote Sensing [5]*
	CH203 Physical Chemistry [5]*		PH4105 Ocean Climate Physics [5]*

	<i>Semester 2</i>		
	CH202 Organic Chemistry [5]*		
	CH205 Analytical and Environmental Chemistry [5]*		
	EARTH AND OCEAN SCIENCES PATHWAY*		
	<i>Semester 1</i>		
	EOS213 Introduction to Ocean Science [10]*		

	<i>Semester 2</i>		
	EOS2102 The Earth: From Core to Crust [10]*		
* Select one 15-credit module	* Select one 20-credit pathway		*One 5-credit elective module

Module Descriptors for Years 1 to 4 are available at: <https://www.nuigalway.ie/science-engineering/undergraduateprogrammes/physics-with-options.html>

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]
<u>Full Year – Semester 1 and Semester 2</u>	<u>Semester 1</u>	<u>Full Year – Semester 1 and Semester 2</u>	<u>Full Year – Semester 1 and Semester 2</u>
MP180 Applied Mathematics [15]	MP231 Mathematical Methods I [5]	PH3102 Experimental and Computational Physics for Theoretical Physics [10]	MM4000 Final Year Project [10]*
PH101 Physics [15]	PH2105 Mechanics and Thermodynamics [5]	-----	PH4101 Physics Problem Solving [5]
PH109 Physics Special Topics [10]	MP236 Mechanics I [5]	<u>Semester 1</u>	-----
MA180 Mathematics (Honours) [15]*	PH2102 Physics Laboratory and Problem Solving I [5]	MP345 Mathematical Methods II [5]	<u>Semester 1</u>
MA161 Mathematical Studies [15]*	-----	MP410 Non Linear Elasticity [5]^	MA4102 Algebraic Foundations of Quantum Computing [5]*
-----	<u>Semester 2</u>	PH338 Properties of Materials [5]^	PH423 Applied Optics & Imaging [5]
<u>Semester 1</u>	PH2016: Atomic Physics and Electromagnetism [5]	MP356 Quantum Mechanics I [5]^	PH428 Atmospheric Physics & Climate Change [5]*
CS103 Computer Science [5]	MP232 Mathematical Methods II [5]	PH331 Wave Optics [5]	MP403 Cosmology and General Relativity [5]
	MP237 Mechanics II [5]	-----	MP356 Quantum Mechanics I [5]^
	PH2104 Physics Laboratory and Problem Solving II [5]	<u>Semester 2</u>	MP305 Modelling I [5]*
	MATHEMATICAL STUDIES PATHWAY*	MP346 Mathematical Methods II [5]	MP410 Non Linear Elasticity [5]^
	<u>Semester 1</u>	MP307 Modelling II [5]	PH422 Solid State Physics [5]
	MA211 Calculus I [5]	PH335 Nuclear and Particle Physics [5]	-----
	MA284 Discrete Mathematics [5]	PH337 Thermal Physics [5]	<u>Semester 2</u>
	-----	MP357 Quantum Mechanics II [5]^	MP357 Quantum Mechanics II [5]^
	<u>Semester 2</u>		PH4107 Project Theoretical Physics [10]*
	MA212 Calculus II [5]		MP491 Non Linear Systems [5]
	MA203 Linear Algebra [5]		

Continued...

	<p>MATHEMATICS PATHWAY*</p> <p><u>Semester 1</u></p> <p>MA2286 Differential Forms [5]</p> <p>MA284 Discrete Mathematics [5]</p> <p><u>Semester 2</u></p> <p>MA2287 Complex Analysis [5]</p> <p>MA283 Linear Algebra [5]</p> <p>ASTROPHYSICS PATHWAY*</p> <p><u>Semester 1</u></p> <p>PH222 Astrophysical Concepts [5]</p> <p>CS2101 Programming for Science and Finance [5]</p> <p>-----</p> <p><u>Semester 2</u></p> <p>PH223 Observational Astronomy [5]</p> <p>CS211 Programming and Operating Systems [5]</p>		
* Select one 15-credit module	* 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.nuigalway.ie/science-engineering/undergraduateprogrammes/physics-with-options.html>