Overview
Physics and Applied Physics
Physics with Astrophysics
Physics with Biomedical Physics
Physics with Climate Physics
Physics and Theoretical Physics

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

www.universityofgalway.ie/science-engineering/

Overview

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

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]**
Full Year – Semester 1 and Semester 2 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]* *Semester 1* CS103 Computer Science [5]	*Semester 1* 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]* *Semester 2* 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]* *Continued...*	*Full Year – Semester 1 and Semester 2* PH3101 Experimental and Computational Physics [15] *Semester 1* 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]* *Semester 2* 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]*	*Full Year – Semester 1 and Semester 2* PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5] *Semester 1* PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5] PH428 Atmospheric Physics & Climate Change [5]* PH430 Biophotonics [5]* *Semester 2* 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]**
	MATHEMATICAL STUDIES PATHWAY*		
	Semester 1		
	MA211 **Calculus I [5]***		
	MA284 **Discrete Mathematics [5]***		
	Semester 2		
	MA212 **Calculus II [5]***		
	MA203 **Linear Algebra [5]***		
	MATHEMATICS PATHWAY*		
	Semester 1		
	MA2286 **Differential Forms [5]***		
	MA284 **Discrete Mathematics [5]***		
	Semester 2		
	MA2287 **Complex Analysis [5]***		
	MA283 **Linear Algebra [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 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]**
Full Year – Semester 1 and Semester 2 MP180 Applied Mathematics [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]* *Semester 1* CS103 Computer Science [5]	*Semester 1* 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] *Semester 2* 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]	*Full Year – Semester 1 and Semester 2* PH363 Astronomical Data Analysis [5] PH3101 Experimental and Computational Physics [15] *Semester 1* MP345 Mathematical Methods I [5] PH338 Properties of Materials [5] PH333 Quantum Physics [5] PH331 Wave Optics [5] *Semester 2* MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH362 Stellar Astrophysics [5] PH337 Thermal Physics [5]	*Full Year – Semester 1 and Semester 2* PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5] *Semester 1* MP403 Cosmology and General Relativity [5] PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5] *Semester 2* PH466 Astrophysics [5] PH423 Applied Optics & Imaging [5] PH425 Lasers & Spectroscopy [5]
* Select one 15-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 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]**
Full Year – Semester 1 and Semester 2 BO101 Biology [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]* *Semester 1* CS103 Computer Science [5]	*Semester 1* 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] *Semester 2* 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]	*Full Year – Semester 1 and Semester 2* PH3101 Experimental and Computational Physics [15] *Semester 1* MP345 Mathematical Methods I [5] PH338 Properties of Materials [5] PH333 Quantum Physics [5] PH339 Radiation & Medical Physics [5] PH331 Wave Optics [5] *Semester 2* PH340 Biomedical Physics [5] MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH337 Thermal Physics [5]	*Full Year – Semester 1 and Semester 2* PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5] *Semester 1* PH430 Biophotonics [5] PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5] *Semester 2* PH423 Applied Optics & Imaging [5] PH425 Lasers & Spectroscopy [5] PH4108 Soft Condensed Matter [5]
* Select one 15-credit module			

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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]**
Full Year – Semester 1 and Semester 2 MP180 Applied Mathematics [15]* CH101 Chemistry [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA161 Mathematical Studies [15]* MA180 Mathematics (Honours) [15]* *Semester 1* CS103 Computer Science [5]	*Semester 1* PH2105 Mechanics and Thermodynamics [5] PH2102 Physics Laboratory and Problem Solving I [5] MP231 Mathematical Methods I [5] MG3113 Megatrends [5] Semester 2 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] **CHEMISTRY PATHWAY*** *Semester 1* CH204 Inorganic Chemistry [5]* CH203 Physical Chemistry [5]* *Semester 2* CH202 Organic Chemistry [5]* CH205 Analytical and Environmental Chemistry [5]* **EARTH AND OCEAN SCIENCES PATHWAY*** *Semester 1* EOS213 Introduction to Ocean Science [10]* *Semester 2* EOS2102 The Earth: From Core to Crust [10]*	*Full Year – Semester 1 and Semester 2* PH3101 Experimental and Computational Physics [15] *Semester 1* 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] *Semester 2* MP346 Mathematical Methods II [5] PH335 Nuclear and Particle Physics [5] PH329 Physics of the Environment II [5] PH337 Thermal Physics [5]	*Full Year – Semester 1 and Semester 2* PH4102 Final Year Project [20] PH4101 Physics Problem Solving [5] *Semester 1* PH428 Atmospheric Physics & Climate Physics [5] PH424 Electromagnetism and Special Relativity [5] PH421 Quantum Mechanics [5] PH422 Solid State Physics [5] *Semester 2* PH425 Lasers & Spectroscopy [5] EOS4101 Earth Observation and Remote Sensing[5] PH4105 Ocean Climate Physics [5]
* 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]**
Full Year – Semester 1 and Semester 2 MP180 Applied Mathematics [15] PH101 Physics [15] PH109 Physics Special Topics [10] MA180 Mathematics (Honours) [15]* MA161 Mathematical Studies [15]* *Semester 1* CS103 Computer Science [5]	*Semester 1* MP231 Mathematical Methods I [5] PH2105 Mechanics and Thermodynamics [5] MP236 Mechanics I [5] PH2102 Physics Laboratory and Problem Solving I [5] *Semester 2* PH2016 Atomic Physics and Electromagnetism [5] MP232 Mathematical Methods II [5] MP237 Mechanics II [5] PH2104 Physics Laboratory and Problem Solving II [5] **MATHEMATICAL STUDIES PATHWAY*** *Semester 1* MA211 Calculus I [5]* MA284 Discrete Mathematics [5]* *Semester 2* MA212 Calculus II [5]* MA203 Linear Algebra [5]*	*Full Year – Semester 1 and Semester 2* PH3102 Experimental and Computational Physics for Theoretical Physics [10] *Semester 1* MP345 Mathematical Methods II [5] MP366 Electromagnetism [5]^ PH333 Quantum Physics [5]^ MP494 Partial Differential Equations [5]^ PH331 Wave Optics [5] *Semester 2* MP346 Mathematical Methods II [5] MP307 Modelling II [5] PH335 Nuclear and Particle Physics [5] PH337 Thermal Physics [5] MP365 Fluid Mechanics [5]^	*Full Year – Semester 1 and Semester 2* MM4000 Final Year Project [10]* PH4101 Physics Problem Solving [5] *Semester 1* 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] *Semester 2* MP365 Fluid Mechanics [5]^ PH423 Applied Optics & Imaging [5] PH4107 Project Theoretical Physics [10]* MP491 Non Linear Systems [5]
* 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]**
	MATHEMATICS PATHWAY* *Semester 1* MA2286 **Differential Forms [5]*** MA284 **Discrete Mathematics [5]*** *Semester 2* MA2287 **Complex Analysis [5]*** MA283 **Linear Algebra [5]*** **ASTROPHYSICS PATHWAY*** *Semester 1* PH222 **Astrophysical Concepts [5]*** CS2101 **Programming for Science and Finance [5]*** *Semester 2* PH223 **Observational Astronomy [5]*** CS211 **Programming and Operating Systems [5]***		
* 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.

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