Loughborough University - Department of Physics

Physics

QUALIFICATION	LENGTH	UCAS CODE
BSc (Hons)	3 years full time	F300
BSc (Hons) DIS/DPS	4 years full time sandwich	F301
MPhys (Hons)	4 years full time	F303
MPhys (Hons) DIS/DPS	5 years full time sandwich	F304

Degree Structure

PART A

SEMESTER 1	Foundations of Physics (Core Physics I)	Physics Laboratory I	Computational Physics	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I
SEMESTER 2	Classical Physics of Particles, Fields and Devices (Core Physics II)	Physics Laboratory I	Computational Physics	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART B

SEMESTER 1	Quantum Physics (Core Physics III)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Astro Physics and Astronomy	Mathematics for Physics II	
SEMESTER 2	Thermal and Statistical Physics (Core Physics IV)	Solid State Physics (Core Physics V)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Astro Physics and Astronomy	Mathematics for Physics II

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART C

SEMESTER 1	Group Project and Individual Project	Research Methods in Physics (MPhys)	Option	Option
SEMESTER 2		Research Methods in Physics (MPhys)	Option	Option

Current options:

Semester 1

- Nuclear Physics
- Advanced Statistical Physics
- Surfaces Thin Films & High Vacuum
- Condensed Matter Physics
- Introduction to Dynamical Systems

Semester 2

- High Energy Particle Physics
- Photonics
- Medical Physics
- Physics of Nanodevices
- Studies in Science and Mathematics Education

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time
Loughborough University 2023/24

Loughborough University - Department of Physics

PART D

SEMESTER 1	MPhys Research Project	Option	Option	
SEMESTER 2		Option	Option	

Current options:

Semester 1

- Topics in Advanced Quantum Mechanics
- Fluid Mechanics
- Characterisation Techniques in Solid State Physics
- Mathematical Modelling I
- Mathematical Methods for Interdisciplinary Science

Semester 2

- Spectral Theory
- Physics of Complex Systems
- Superconductivity and Nano-Science
- Quantum Computing
- Mathematical Modelling II
- Monte Carlo Methods Applied to Medical Physics

Loughborough University - Department of Physics

Engineering Physics

QUALIFICATION	LENGTH	UCAS CODE
BSc (Hons)	3 years full time	F311
BSc (Hons) DIS/DPS	4 years full time sandwich	F382
MPhys (Hons)	4 years full time	F312
MPhys (Hons) DIS/DPS	5 years full time sandwich	F313

Degree Structure

PART A

SEMESTER 1	Foundations of Physics (Core Physics I)	Physics Laboratory I	Computational Physics	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I
SEMESTER 2	Classical Physics of Particles, Fields and Devices (Core Physics II)	Physics Laboratory I	Computational Physics	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART B

SEMESTER 1	Quantum Physics (Core Physics III)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Engineering Module by Stream	Mathematics for Physics II	
SEMESTER 2	Thermal & Statistical Physics (Core Physics IV)	Solid State Physics (Core Physics V)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Engineering Module by Stream	Mathematics for Physics II

Materials Engineering Stream

Semester 1

- Materials Modelling

Semester 2

- Materials Modelling

Electrical Engineering Stream

Semester 1

- Control System Design I

Semester 2

- Electrical Power and Machines

Mechanical and Manufacturing Stream

Semester 1

- Manufacturing Technology

Semester 2

- Mechanics of Materials

Systems Engineering Stream

Semester 1

- Manufacturing Process Technology

Semester 2

- Manufacturing Process Technology

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART C

SEMESTER 1	Group Project	Individual Project (BSc)/Research Methods (MPhys)	Physics Optional Modules	Engineering Module by Stream	Engineering Module by Stream
SEMESTER 2				Engineering Module by Stream	Engineering Module by Stream

Materials Engineering Stream

Semester 1

- Nanomaterials
- Advanced Principles of Materials

Semester 2

- Composite Materials
- Functional Materials

Electrical Engineering Stream

Semester 1

- Electronics
- State Space Control
- Interfacing for Mechatronic Systems

Semester 2

- Electronics

Mechanical and Manufacturing Stream

Semester 1

- Laser Materials Processing
- Mechanics of Materials II

Semester 2

- Computational Fluid Dynamics I
- Fracture and Failure

Systems Engineering Stream

Semester 1

- Engineering Management: Finance, Law and Quality

Semester 2

- Control System Design 2
- Manufacturing Automation and Control

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART D

SEMESTER 1	MPhys Research Project	Physics Optional Modules	Engineering Modules Across Semester 1 & 2
SEMESTER 2		Physics Optional Modules	

*optional modules

Materials Engineering Stream

Semester 1

- Materials Modelling
- Nanomaterials and Composites

Semester 2

- Advances in Biomaterials
- Advanced Processing of Materials

Electrical Engineering Stream

Semester 1

- Digital Signal Processing*
- Information Theory and Coding*
- Solar Power*
- Antennas, Radar and Metamaterials*
- Wind Power*

Semester 2

- Mobile Network Technologies
- Radio Frequency and Microwave Integrated Circuit Design

Mechanical and Manufacturing Stream

Semester 1

- Instrumentation Using Computer Control
- Composite Fluid Dynamics II
- Non Linear Dynamics

Semester 2

- Additive Manufacturing and Reverse Engineering
- Healthcare Engineering
- Laser and Optical Measurements

Systems Engineering Stream

Semester 1

- Systems Architecture
- Mechatronic Systems Design

Semester 2

- Holistic Engineering
- Validation and Verification

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

Mathematics and Physics

QUALIFICATION	LENGTH	UCAS CODE
BSc (Hons)	3 years full time	F341
BSc (Hons) DIS/DPS	4 years full time sandwich	F340
MPhys (Hons)	4 years full time	F344
MPhys (Hons) DIS/DPS	5 years full time sandwich	F345

Degree Structure

PART A

SEMESTER 1	Foundations of Physics (Core Physics I)	Physics Laboratory I	Computational Physics I	Mathematics for Physics I	Analysis I
SEMESTER 2	Classical Physics of Particles, Fields and Devices (Core Physics II)	Physics Laboratory I	Computational Physics, Simulation and Good Practice	Mathematics for Physics I	Analysis II

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time
Loughborough University 2023/24

Loughborough University - Department of Physics

PART B

SEMESTER 1	Quantum Physics (Core Physics III)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Mathematics for Physics II	Analysis III	
SEMESTER 2	Thermal & Statistical Physics (Core Physics IV)	Solid State Physics (Core Physics V)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Mathematics for Physics II	Elements of Topology

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART C

<table>
<tr><td>SEMESTER 1</td><td rowspan="2">Group Project</td><td rowspan="2">Individual Project (BSc)/Research Methods (MPhys)</td><td>Option*</td></tr>
<tr><td>SEMESTER 2</td><td>Option*</td></tr>
</table>

*30 credit module

Current options:

Semester 1

- Introduction to Dynamical Systems
- Number Theory
- Graph Theory
- Introduction to Differential Geometry
- Nuclear Physics
- Advanced Statistical Physics
- Condensed Matter Physics
- Surfaces, Thin Film & High Vacuums

Semester 2

- Mathematics Report
- Studies in Science and Mathematics Education
- Linear Differential Equations
- Game Theory
- Photonics
- Medical Physics
- High Energy and Particle Physics
- Physics of Nanodevices

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART D

SEMESTER 1	MPhys Research Project	Option	Option
SEMESTER 2		Option	Option

Current options:

Semester 1

- Topics in Advanced Quantum Mechanics
- Mathematical Methods for Interdisciplinary Sciences
- Characterisation Techniques in Solid State Physics
- Mathematical Modelling I
- Lie Groups and Lie Algebras
- Measure Theory

Semester 2

- Quantum Computing
- Physics of Complex Systems
- Superconductivity and Nano-Science
- Monte Carlo Methods Applied to Medical Physics
- Mathematical Modelling II
- Spectral Theory

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time
Loughborough University 2023/24

Loughborough University - Department of Physics

Physics with Computing

QUALIFICATION	LENGTH	UCAS CODE
BSc (Hons)	3 years full time	FG33
BSc (Hons) DIS/DPS	4 years full time sandwich	FG34
MPhys (Hons)	4 years full time	F331
MPhys (Hons) DIS/DPS	5 years full time sandwich	F330

Degree Structure

PART A

SEMESTER 1	Foundations of Physics (Core Physics I)	Physics Laboratory I	Computational Physics, Simulation and Good Practice	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I
SEMESTER 2	Classical Physics of Particles, Fields and Devices (Core Physics II)	Physics Laboratory I	Computational Physics, Simulation and Good Practice	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART B

SEMESTER 1	Quantum Physics (Core Physics III)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Data, Algorithm and Optimisation	Mathematics for Physics II	
SEMESTER 2	Thermal & Statistical Physics (Core Physics IV)	Solid State Physics (Core Physics V)	Physics Laboratory II	Advanced Computational Modelling and Simulation	Data, Algorithm and Optimisation	Mathematics for Physics II

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART C

SEMESTER 1	Group Project	Individual Project (BSc)/Research Methods (MPhys)	AI Methods	Option	Option
SEMESTER 2				Option	Option

Current options:

Semester 1

- Advanced Statistical Physics
- Surfaces, Thin Films & High Vacuum
- Nuclear Physics
- Condensed Matter Physics

Semester 2

- Data Mining and Machine Learning
- Studies in Science or Mathematics Education
- Photonics
- Medical Physics
- High Energy Particle Physics
- Physics of Nanodevice

Loughborough University - Department of Physics

PART D

SEMESTER 1	MPhys Research Project	Option	Option
SEMESTER 2		Option	Option

Current options:

Semester 1

- Programming for Specialist Applications
- Programming for Data Science
- Artificial Intelligence
- Machine Learning
- Cryptography & Secure Systems
- Robotics & Intelligent Systems
- Programming and Numerical Methods
- Mathematical Modelling I
- Statistical Methods and Data Analysis
- Characterisation Techniques in Solid State Physics
- Topics in Quantum Mechanics
- Mathematical Methods for Interdisciplinary Sciences

Semester 2

- Quantum Computing
- Physics of Complex Systems
- Superconductivity and Nano-Science
- Mathematical Modelling II
- Computational Methods in Finance
- Stochastic Calculus & Theory of Pricing
- Statistics for Large Data
- Monte Carlo Methods Applied to Physics
- Computer Vision
- Big Data Analytics and Visualisation
- AI and Applied Machine Learning
- Data Mining

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time
Loughborough University 2023/24

Loughborough University - Department of Physics

Physics with Theoretical Physics

QUALIFICATION	LENGTH	UCAS CODE
BSc (Hons)	3 years full time	F346
BSc (Hons) DIS/DPS	4 years full time sandwich	F342
MPhys (Hons)	4 years full time	F348
MPhys (Hons) DIS/DPS	5 years full time sandwich	F347

Degree Structure

PART A

SEMESTER 1	Core Physics I; Foundations of Physics	Physics Laboratory I	Computational Physics	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I
SEMESTER 2	Core Physics II: Classical Physics of Particles, Fields and Devices	Physics Laboratory I	Computational Physics	Methods, Philosophy and Frontiers of Physical Science	Mathematics for Physics I

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART B

SEMESTER 1	Core Physics III: Quantum Physics	Physics Laboratory II	Advanced Computational Modelling and Simulation	Probability Theory	Mathematics for Physics II	
SEMESTER 2	Core Physics IV: Thermal & Statistical Physics	Core Physics V: Solid State Physics	Physics Laboratory II	Advanced Computational Modelling and Simulation	Complex Analysis	Mathematics for Physics II

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time

Loughborough University - Department of Physics

PART C

SEMESTER 1	Group Project and Individual Project (BSc)/Research Methods (MPhys)	Option	Option
SEMESTER 2		Option	Option

Current options:

Semester 1

- Advanced Statistical Physics
- Condensed Matter Physics
- Nuclear Physics
- Introduction to Dynamical Systems
- Introduction to Differential Geometry

Semester 2

- Medical Physics
- Photonics
- High Energy Particle Physics
- Physics of Nanodevices
- Linear Differential Equations
- Vibrations and Waves
- Studies in Science and Mathematics Education

Loughborough University

Modules listed should be treated as indicative and may be subject to change over time
Loughborough University 2023/24

Loughborough University - Department of Physics

PART D

SEMESTER 1	MPhys Research Project	Option	Option
SEMESTER 2		Option	Option

Current options:

Semester 1

- Topics in Advanced Quantum Mechanics
- Mathematical Methods for Interdisciplinary Science
- Characterisation Techniques in Solid State Physics
- Mathematical Modelling I
- Programming & Numerical Methods
- Fluid Mechanics

Semester 2

- Quantum Computing
- Physics of Complex Systems
- Superconductivity and Nano-Science
- Monte Carlo Methods Applied to Medical Physics
- Nonlinear Waves
- Spectral Theory
- Mathematical Modelling II