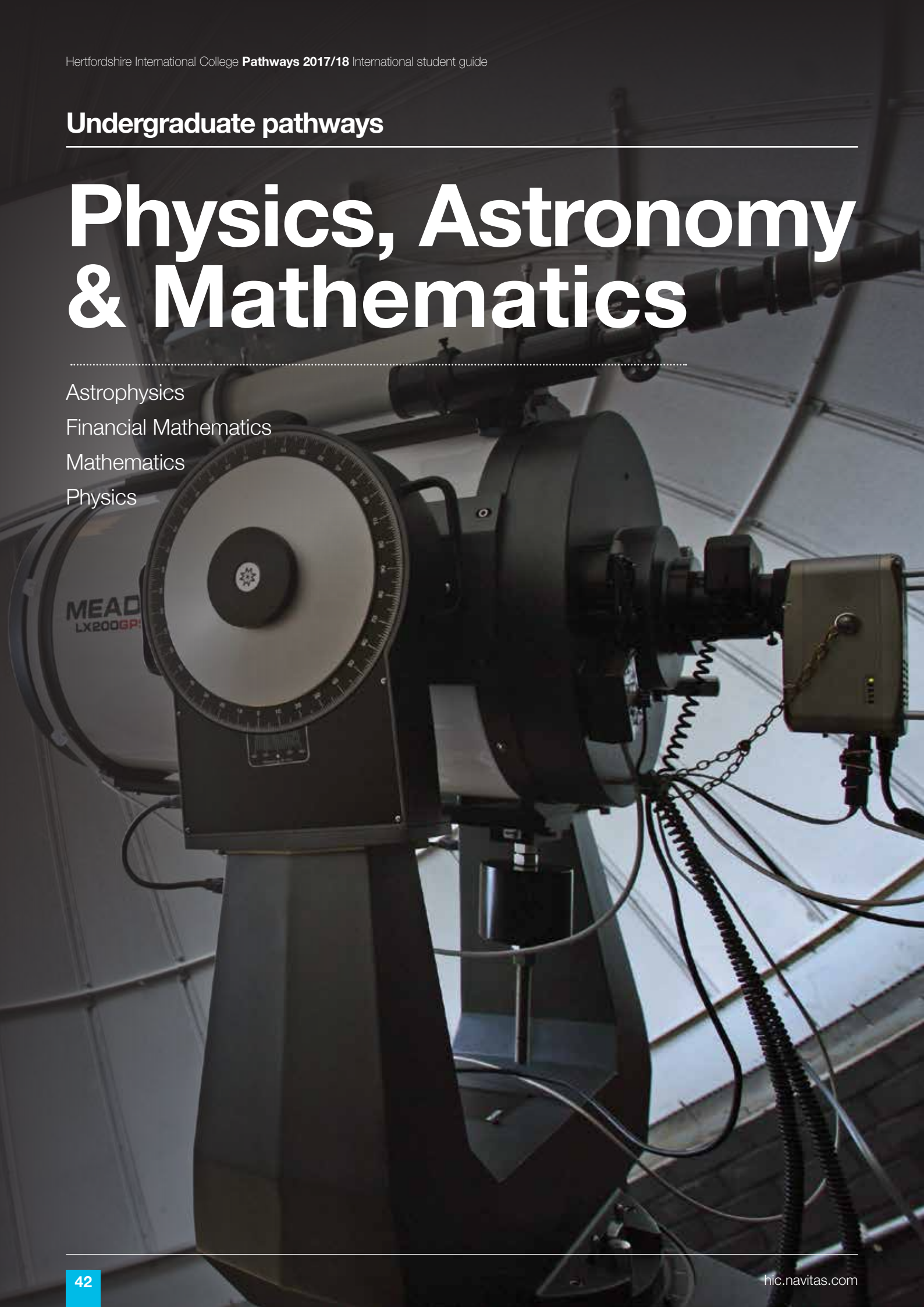
Undergraduate pathways

Physics, Astronomy & Mathematics

Astrophysics
Financial Mathematics
Mathematics
Physics



Stage 1: University Foundation

Physics, Astronomy & Mathematics

Intakes
September and January

Duration
Two semesters

Modules

Semester one

- Interactive Learning Skills and Communication (ILSC)
- Physics A
- Principles of Computing
- Maths 1

Semester two

- Programming
- Statistics
- Physics B
- Maths 2

Progression rule to Stage 2
Minimum 50% pass mark in all modules except ILSC which is 60% with minimum 85% attendance required across all modules.

Stage 2: First Year Degree

- Astrophysics
- Financial Mathematics
- Mathematics
- Physics

Intake
September

Duration
Two semesters

Modules
HIC provides subject specialist skill progression classes during integrated First Year Degree.

Students need to pass all modules to progress. All students study a collection of modules, totalling 120 credits.

More information about the University's degree modules can be found on their website: www.herts.ac.uk/apply/schools-of-study/schools/physics,-astronomy-and-mathematics.

Progression rule to Stage 3
Minimum 40% pass mark in all modules with minimum 85% attendance required.

Stage 3: Second & Final Year Degree

- BSc (Hons) Astrophysics
- BSc (Hons) Financial Mathematics
- BSc (Hons) Mathematics
- BSc (Hons) Physics

Intake
September

Duration
Two semesters

Modules
More information about the University's degree modules can be found on their website: www.herts.ac.uk/apply/schools-of-study/schools/physics,-astronomy-and-mathematics.

Employment & career options

A physics or mathematics degree opens up opportunities for careers in industry, teaching, telecommunications, computing and research. The analytical skills you'll gain are also highly valued. A small selection of careers that our previous graduates have pursued are financial consultants, business analysts, engineering consultants, programmers, statisticians, credit analysts, meteorologists, environmental analysts, teachers, actuaries and many more.

Bayfordbury Observatory

Foundation in Science & Engineering (Two Semesters)

Engineering & Technology

Core Modules			Credit Points	Pass Mark %	Exam %	Coursework %
Contact Hrs/Week	College Module Code	Module Name				
Semester 1:						
4	ILS001	Interactive Learning Skills and Communication	15	60	30	70
4	BUS107	Principles of ICT	15	50	60	40
4	BUS104	Mathematics 1	15	50	50	50
4	PHY102	Physics 1	15	50	70	30
Semester 2:						
4	MTH002	Mathematics 2	15	50	70	30
4	COM101	Introduction to Programming	15	50	50	50
4	BUS105	Statistics	15	50	70	30
4	PHY102	Physics 2	15	50	70	30
Undergraduate Stage 1 : Science and Engineering			**Engineering/ PAM Pathway: 120 credit points**			

Physics, Astronomy & Mathematics

Core Modules			Credit Points	Pass Mark %	Exam %	Coursework %
Contact Hrs/Week	College Module Code	Module Name				
Semester 1:						
4	ILS001	Interactive Learning Skills and Communication	15	60	30	70
4	BUS107	Principles of ICT	15	50	60	40
4	BUS104	Mathematics 1	15	50	50	50
4	PHY102	Physics 1	15	50	70	30
Semester 2:						
4	MTH002	Mathematics 2	15	50	70	30
4	COM101	Introduction to Programming	15	50	50	50
4	BUS105	Statistics	15	50	70	30
4	PHY102	Physics 2	15	50	70	30
Undergraduate Stage 1 : Science and Engineering			**Engineering/ PAM Pathway: 120 credit points**			

Interactive Learning Skills & Communications (ILS001)

The aims of this module are to develop a range of academic and communicative skills necessary for successful study in Higher Education; to develop independent learning and encourage students to take responsibility for their personal, academic and professional development; and to develop the knowledge and ability to use a range of digital technologies.
Assessment: 70% coursework and 30% examination

Principles of ICT (BUS107)

This Principles of ICT module attempts to deliver an accurate snapshot of the state of ICT as it exists currently, as well as to equip the student with a useful set of skills in the use of common productivity software and Internet based applications. The module introduces candidates to the interesting challenges that ICT presents today and covers many anchor points that may serve as a bridge to their interests and lifestyles. These bridges include the technology in their mobile telephones, computing equipment, home appliances, motor vehicles, shopping, movies and entertainment software.
Assessment: 60% examination and 40% coursework

Maths 1 (BUS104)

On this module you will study the basis of algebra including, indices, surds and use of brackets within statements and basic equations; Solutions of quadratic equations, factorization, and the laws of logarithms and surds; Simultaneous equations involving 2 and 3 variables; Trigonometrical ratios, equations of tangents, and the normal to a curve; Sequences, Arithmetic and Geometric transfers; Simple and compound interest formulae. Binomial expansions; Differentiation by first principles and other topics.

Assessment: 50% Coursework and 50% Examination

Physics 1 (PHY101)

During this module you will study: Newton's laws of motion, inertial reference frames; An understanding of the Universal Laws of Gravitation; The laws of kinematics and importance of reference frames. Free falling bodies and projectile motion; Forces due to friction and gravity. Conservative and non-conservative forces; The work energy principle, conservation of mechanical, and energy due to momentum in elastic and inelastic collisions; The three common phases of matter. Basic fluid dynamics including Bernoulli's principle. Applications of hydraulics; The ideal gas laws, Kinetic theory in relation to physical properties of atoms related to heat, temperature and pressure; and other topics

Assessment: 30% Coursework and 70% Examination

Statistics (BUS105)

By the end of this module you will be able to: Explain the foundations underlying and relevant to statistics and statistical principles; Examine measures of Central Tendency as a means of describing data; Examine and interpret measures of dispersion as a means of describing data. Sampling techniques to data collection; Determine probabilities in a variety of situations; Explain Normal Probability Distribution and Central Limit Theorem; Collect bivariate data and interpret patterns and relationships with that data; Determine and interpret measures of association; Draw and interpret tables; Examine and interpret Time Series data and Trend Analysis; and Use a statistical calculator to complete basic statistical operations.

Assessment: 30% Coursework and 70% Assessment

Mathematics 2 (MTH002)

During this module you will study: Integration techniques involving, products and quotients, exponential, logarithmic and trig functions; General and particular solutions of homogeneous and inhomogeneous differential equations of the first and second order; Numerical techniques for the manipulation of matrices, the law of matrices; The identity matrix and its function; The determinant of a matrix, cofactors and minors, conditions for trivial and non-trivial solutions; The augmented matrix and its row echelon form; Solutions of a system of equations via Gaussian elimination/ and Matrix algebra techniques; Eigenvalues and associated eigenvectors for non-trivial solutions of a system of equations; Three-dimensional Cartesian coordinates; The unit vectors; Direction cosines; and The vector and scalar products rules and definitions.

Assessment: 30% Coursework and 70% Examination

Introduction to Programming (COM101)

On this module you will study about the following: algorithms and computer programs designed to solve problems; The success of a program depends on how well the problem is understood and then broken down into Identifiable components; Control structures such as conditions and iteration can be used to effect an algorithm; Data can be represented using variables of different types; and Understanding of Boolean arithmetic and its use in conditional statements.

Assessment: 50% Coursework and 50% Examination

Physics 2 (PHY102)

During this module you will study: The conservation of energy principles; The physical quantities and measurements used in the SI system of units; Simple dimensional analysis techniques coupled with vector and scalar quantities; Simple harmonic and circular motion. Energy considerations within in a simply harmonic oscillator; Wave theory, types of waves and the principles of superposition, interference and resonance; Electric charge, field and potential: the interrelated laws; Gauss's law, capacitance and the energy density of a field. The current flow in DC and AC circuits. Ohms and Kirchhoff's laws and rules; Magnetic properties of matter; Faradays and Lenz's laws of electromagnetic induction; The establishment of EM fields, Maxwell hypothesis/equations; The EM spectrum; Atomic physics; Plank's Hypothesis of radiation; Photon theory of Einstein; and the photoelectric effect.
Assessment: 30% Coursework and 70% Examination