

# BSc (Hons) Physics\* - SC 341

**\*Optional Minor: Astrophysics/Biology/Chemistry/Instrumentation/  
Mathematics/Renewable Energy**

## 1. Objectives

One of the most important concepts in physics is that, behind the apparent complexity of the world around us, nature has an underlying simplicity and unity which can be expressed in terms of all-embracing fundamental principles and laws. As well as being concerned with such fundamental questions, physics is a widely applicable subject and forms the basis of much of modern and, more importantly, future technologies. Moreover, the distinction between certain traditional branches of other disciplines and physics is rapidly fading out, resulting in an increasing number of employment opportunities in technical areas requiring expertise at the interface of physics and these disciplines.

Our BSc (Hons) degree programme has been developed to provide a solid grounding in physics as a fundamental discipline while providing a secure foundation to a wide range of careers. To enhance accessibility to the various existing and probable future career opportunities, apart from modules in core areas of physics, we also offer a variety of electives in applied and theoretical areas of physics as well as in other optional scientific disciplines. Overall, our programme combines the study of a fundamental discipline with the opportunity to develop skills in experimental and theoretical methods of problem solving.

Depending on their specific interests and aptitudes, our graduates may opt for traditional careers like teaching or for jobs in technical areas of research and development in industry, laboratories and universities. The analytical and problem solving skills of physicists are also appreciated worldwide in areas like computing and even in areas like management, finance and law. In addition, our programme offers the appropriate background for specialisation through further studies, or research at postgraduate level, both locally and overseas. Some of our successful graduates have pursued further studies in Physics, Computer Applications, Medical Physics and PhDs in Solid State Physics, Radio Astronomy (related to the Mauritius Radio Telescope), High Energy Physics, Computational Physics and Functional Magnetic Resonance Imaging.

## 2. General Entry Requirements

As per General Entry Requirements for admission to the University for undergraduate degrees.

## 3. Programme Requirement

Passes at GCE 'A' Level in Mathematics and Physics.

## 4. Programme Duration

BSc (Hons) Physics	<b>Normal</b> 6 Semesters (i.e. 3 years)	<b>Maximum</b> 10 Semesters (i.e. 5 years)
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## 5. Credit System

15 Hours Lectures and/or Tutorials - 1 Credit  
15 Hours of Practical Work - 0.5 Credit

## 6. Credits per Semester

Minimum: 9 credits; Maximum (including retake modules): 27 credits

## 7. Minimum Credits Required for Award of Undergraduate Degree: 101

**Breakdown as follows:**

Degree	Credits from		
	Core Taught modules	Project(s)	Electives
BSc (Hons) Physics	75	8	18 <sup>a</sup>

<sup>a</sup> Minimum of 18 elective credits from years 2 and 3, for the pure BSc(Hons) Physics degree, including a minimum of 12 credits in one of the following areas: Astrophysics, Instrumentation, Renewable Energy, Biology, Chemistry, Mathematics, for the degree with an optional minor.

Students may exit with a Certificate or a Diploma, by making a written request, provided that they satisfy the corresponding requirements for award of a Certificate or a Diploma, as per University Regulations.

## 8. Assessment

Each module can either be taught in semester 1 only or in semester 2 only or throughout the two semesters. Modules wholly taught in one semester are termed semester modules whereas modules taught throughout two semesters are termed yearly modules. Each module will be assessed over 100 marks with details as follows (unless otherwise specified).

Assessment will be based on a written examination of a paper of 2 to 3 hours duration (normally a paper of 2 hour duration for modules carrying 3 credits or less, 2½ hour paper for modules carrying 3.5 - 4.5 credits, and a 3 hour paper for modules carrying 5 to 6 credits) and on continuous assessment done during the semester or year.

Written examinations for semester modules will be held in the semester they are taught in. Yearly modules will be examined at the end of the year.

The continuous assessment will count for 20 - 30% of the overall percentage mark for the module(s) unless specified otherwise. Continuous assessment may be based on laboratory work, seminars and/or assignments and should include at least two (2) assignments/tests per year per module.

There will be a compulsory class test at the end of semester 1 for all modules taught in semester 1 and which are examined at the end of semester 2 of the given academic year, unless otherwise specified.

An overall total of 40% for combined continuous assessment and written examination components would be required to pass the module, without minimum thresholds within the individual continuous assessment and written examination.

In case of yearly modules, special examinations (e.g. class tests) will be arranged at the end of semester 1 or semester 2 for exchange students who have registered only for one semester; credits will be assigned on a pro-rata basis.

The following modules will be assessed solely by continuous assessment:

Physics Lab I – PHYSI 1006Y(3)  
Physics Lab II – PHYSI 2106(3)  
Experiment Design – PHYSI 2206(3)  
Numerical and Scientific Computing I – PHYCO 1201(1)  
Operating Systems and Scientific Softwares – PHYCO 1100(1)

Modules will carry the weightings of 1, 3 or 5 depending on their status (Introductory, Intermediate or Advanced). Weighting for a particular module is indicated within parentheses in the module code.

## 9. List of Modules

### A. Physics core modules (75 + 8 credits)

Code	Module Name	Hrs /Wk L+P	Credits
PHYCO 1100(1)	Operating Systems and Scientific Softwares	2+2	3
PHYCO 1201(1)	Numerical & Scientific Computing I	2+2	3
PHYSI 1101(1)	Mathematical Techniques for Physicists I	3+0	3
PHYSI 1201(1)	Mathematical Techniques for Physicists II	3+0	3
PHYSI 1102(1)	Mechanics I	3+0	3
PHYSI 1203(1)	Physics of Matter	3+0	3
PHYSI 1104(1)	Waves & Optics I	3+0	3
PHYSI 1204(1)	Electromagnetism I	3+0	3
PHYSI 1105(1)	Electric Circuits & Electronics	3+0	3
PHYSI 1006Y(3)	Physics Lab I	0+3	3
PHYSI 1107(1)	Thermal Physics	3+0	3
PHYSI 1208(1)	Quantum Physics	3+0	3
PHYSI 1009(1)	Introduction to Astronomy	3+0	3
PHYSI 2101(3)	Maths for Physicists I	3+0	3
PHYSI 2201(3)	Maths for Physicists II	3+0	3
PHYSI 2002(3)	Mechanics II	3+0	3
PHYSI 2203(3)	Optics II	3+0	3
PHYSI 2104(3)	Electromagnetism II	3+0	3
PHYSI 2005(3)	Quantum Mechanics I	3+0	3
PHYSI 2106(3)	Physics Lab. II	0+3	1.5
PHYSI 2206(3)	Experiment Design	0+3	1.5
PHYSI 3000Y(5)	Project/Dissertation	–	8
PHYSI 3001(5)	Nuclear Physics	3+0	3
PHYSI 3102(5)	Atomic & Molecular Physics	3+0	3
PHYSI 3003(5)	Elementary Particle Physics	3+0	3
PHYSI 3104(5)	Statistical Physics	3+0	3
PHYSI 3006(5)	Solid State Physics I	3+0	3

### B. Physics Electives (Not all electives may be on offer)

#### Departmental

PHYEL 2007(3)	Electronics & Communications	2+2	3
PHYEL 2010(3)	Computational Physics	2+2	3
PHYEL 3005(5)	Classical Mechanics	3+0	3
PHYEL 3007(5)	Medical Physics	3+0	3
PHYEL 3009(5)	Electromagnetic Theory	3+0	3

## C. Other Electives

And/or modules approved by the department

### Optional Minors

#### **Astrophysics**

PHYAS 2008(3)	Astrophysics I	2.5+1	3
PHYAS 2011(3)	Astronomical Techniques I	2+2	3
PHYAS 3008(5)	Astrophysics II	2.5+1	3
PHYAS 3011(5)	Astronomical Techniques II	2+2	3
PHYAS 3012(5)	Extragalactic Astronomy and Cosmology	2.5+1	3

#### **Instrumentation**

PHYIN 2012(3)	Electronics in Instrumentation I	2.5+1	3
PHYIN 2013(3)	Measurement & Sensors	2.5+1	3
PHYIN 2015(3)	Statistical Methods for Physicists	2.5+1	3
PHYIN 3012(5)	Electronics in Instrumentation II	2+2	3

#### **Renewable Energy**

PHYRE 2016(3)	Renewable Energy Resources I	2.5+1	3
PHYRE 2017(3)	Renewable Energy Resources II	2.5+1	3
PHYRE 2018(3)	Automatic Control and Regulation	2.5+1	3
PHYRE 2019(3)	Climate Dynamics	2.5+1	3
PHYRE 3014(5)	Energy Conservation	2.5+1	3
PHYRE 3015(5)	Energy Systems	2.5+1	3
PHYRE 3016(5)	Physics of the Atmosphere	2.5+1	3

#### **Biology/Chemistry/Mathematics**

Students will have to choose the optional minor modules for Biology, Chemistry or Mathematics from the respective department.

## 10. Programme Plan

Code	Module Name	<u>YEAR 1</u>	
		Hrs/Wk L+P	Credits
<b>CORE</b>			
PHYSI 1101(1)	Mathematical Techniques for Physicists I	3+0	3
PHYSI 1201(1)	Mathematical Techniques for Physicists II	3+0	3
PHYSI 1102(1)	Mechanics I	3+0	3
PHYSI 1203(1)	Physics of Matter	3+0	3
PHYSI 1104(1)	Waves & Optics I	3+0	3

PHYSI 1204(1)	Electromagnetism I	3+0	3
PHYSI 1105(1)	Electric Circuits & Electronics	3+0	3
PHYSI 1006Y(3)	Physics Lab I	0+3	3
PHYSI 1107(1)	Thermal Physics	3+0	3
PHYSI 1208(1)	Quantum Physics	3+0	3
PHYSI 1009(1)	Introduction to Astronomy	3+0	3
PHYCO 1100(1)	Operating Systems and Scientific Softwares	2+2	3
PHYCO 1201(1)	Numerical & Scientific Computing I	2+2	3

## YEAR 2

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Wk L+P</b>	<b>Credits</b>
<b>CORE</b>			
PHYSI 2101(3)	Maths for Physicists I	3+0	3
PHYSI 2201(3)	Maths for Physicists II	3+0	3
PHYSI 2002(3)	Mechanics II	3+0	3
PHYSI 2104(3)	Electromagnetism II	3+0	3
PHYSI 2203(3)	Optics II	3+0	3
PHYSI 2005(3)	Quantum Mechanics I	3+0	3
PHYSI 2106(3)	Physics Lab. II	0+3	1.5
PHYSI 2206(3)	Experiment Design	0+3	1.5
<b>ELECTIVES</b>			
<b>Departmental</b>			
PHYEL 2007(3)	Electronics & Communications	2+2	3
PHYEL 2010(3)	Computational Physics	2+2	3
<b>Astrophysics</b>			
PHYAS 2008(3)	Astrophysics I	2.5+1	3
PHYAS 2011(3)	Astronomical Techniques I	2+2	3
<b>Instrumentation</b>			
PHYIN 2012(3)	Electronics in Instrumentation I	2.5+1	3
PHYIN 2013(3)	Measurement & Sensors	2.5+1	3
PHYIN 2015(3)	Statistical Methods for Physicists	2.5+1	3
<b>Renewable Energy</b>			
PHYRE 2016(3)	Renewable Energy Resources I	2.5+1	3
PHYRE 2017(3)	Renewable Energy Resources II	2.5+1	3
PHYRE 2018(3)	Automatic Control and Regulation	2.5+1	3
PHYRE 2019(3)	Climate Dynamics	2.5+1	3

And/or modules approved by the department.

### YEAR 3

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Wk L+P</b>	<b>Credits</b>
<b>CORE</b>			
PHYSI 3000Y(5)	Project/Dissertation	–	8
PHYSI 3001(5)	Nuclear Physics	3+0	3
PHYSI 3102(5)	Atomic & Molecular Physics	3+0	3
PHYSI 3003(5)	Elementary Particle Physics	3+0	3
PHYSI 3104(5)	Statistical Physics	3+0	3
PHYSI 3006(5)	Solid State Physics I	3+0	3
<b>ELECTIVES</b>			
<b>Departmental</b>			
PHYEL 3005(5)	Classical Mechanics	3+0	3
PHYEL 3007(5)	Medical Physics	3+0	3
PHYEL 3009(5)	Electromagnetic Theory	3+0	3
<b>Astrophysics</b>			
PHYAS 3008(5)	Astrophysics II	2.5+1	3
PHYAS 3011(5)	Astronomical Techniques II	2+2	3
PHYAS 3012(5)	Extragalactic Astronomy and Cosmology	2.5+1	3
<b>Instrumentation</b>			
PHYIN 3012(5)	Electronics in Instrumentation II	2+2	3
<b>Renewable Energy</b>			
PHYRE 3014(5)	Energy Conservation	2.5+1	3
PHYRE 3015(5)	Energy Systems	2.5+1	3
PHYRE 3016(5)	Physics of the Atmosphere	2.5+1	3

And/or modules approved by the department.

**Note:** Not all electives may be on offer. The list of modules is not exhaustive.

**IMPORTANT NOTE:** The student will be allowed to opt for the BSc (Hons) Physics, BSc (Hons) Physics with Computing, or any other future Physics undergraduate programme, offered by the department after the common first year, subject to the programme being offered by the department.

May 2017