

Villiers School – IBDP Subject Brief

Group 4 Sciences

Physics (SL or HL)



Description and Aims

Physics is the most fundamental of the experimental sciences, as it seeks to explain the universe itself from the smallest particles to the vast distances between galaxies. International Baccalaureate Physics programme is a two-year rigorous pre-university course which is internationally well recognised. The focus of this programme is to impart in students the knowledge and skills required to excel in their university studies. By design, this course allows students to experience the challenges which are normally felt at undergraduate level. The course introduces the students to scientific methods and techniques which are needed for scientific investigations. Students are made aware of the moral and ethical social responsibility in the use of scientific knowledge. Students are encouraged to understand the relationship between the various scientific disciplines and carry out an interdisciplinary project. Practical investigations are an integral part of the curriculum. Students are required to research a scientific problem, develop hypothesis, design an experiment, conduct investigations and draw conclusions.

Special emphasis is given to manipulative skills required to carry out scientific investigations. Student assessment is conducted both externally through written examination and internally by means of practical investigations and an interdisciplinary project. The aims of the DP Physics course are to enable students to:

- appreciate scientific study and creativity within a global context through stimulating and challenging opportunities
- acquire a body of knowledge, methods and techniques that characterise science and technology
- apply and use a body of knowledge, methods and techniques that characterise science and technology
- develop an ability to analyse, evaluate and synthesize scientific information
- develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities
- develop experimental and investigative scientific skills including the use of current technologies
- develop and apply 21st century communication skills in the study of science
- become critically aware, as global citizens, of the ethical implications of using science and technology
- develop an appreciation of the possibilities and limitations of science and technology
- develop an understanding of the relationship between scientific disciplines and their influence on other areas of knowledge.



Course Outline/ Overview

Core Topics

- Measurements and uncertainties
- Mechanics
- Thermal physics
- Waves
- Electricity and magnetism
- Circular motion and gravitation
- Atomic, nuclear and particle physics
- Energy production

Additional Topics at HL

- Wave phenomena
- Fields
- Electromagnetic induction
- Quantum and nuclear physics

Practical Scheme of Work

Prescribed and other practical activities

Individual Investigation

Group 4 Project

Option (Choice of 1 out of 4)

- Relativity
- Engineering physics
- Imaging
- Astrophysics

Prescribed and other practical activities are completed throughout the two year DP to aid in understanding and develop an appreciation for the scientific method.

The individual investigation is carried out by students on a topic of their choosing, it includes both a practical and write up and accounts for 20% of the students final grade.

The group 4 project is a collaborative activity where students from the Physics, Biology and Chemistry classes, within the school work together. It allows for concepts and perceptions from across disciplines to be shared while appreciating the environmental, social and ethical implications of science and technology. It can be practically or theoretically based and aims to develop an understanding of the relationships between scientific disciplines and their influence on other areas. The emphasis is on interdisciplinary cooperation and the scientific processes.

Prior Learning/Pre-requisites

Successful completion of Junior Certificate Higher Level Science or equivalent is required to complete the IBDP Higher Level Physics course.



Resources required

Bowen-Jones, M. & Homer, D., eds 2014. Oxford IB Diploma Programme Physics. Oxford: University Press

External Assessment (Weighting 80%)

Paper 1

HL - 40 multiple choice questions (1 hour)

SL - 30 multiple choice questions (45 minutes)

Paper 2

Data based, short answer and extended response questions

HL (2 hours 15 minutes)

SL (1 hour 15 minutes)

Paper 3

Data based, short answer and extended response questions

HL (1 hour 15 minutes)

SL (1 hour)

Internal Assessment (Weighting 20%)

Investigation and Write up (6-12 pages)

SL or HL (10 hours)