PHYSICS

syllabus

(based on Physics guide, first assessment 2025)

HL: 6h/week,   SL: 4h/week

1. Aims

- develop conceptual understanding that allows connections to be made between different areas of the subject, and to other DP sciences subjects
- acquire and apply a body of knowledge, methods, tools and techniques that characterize science
- develop the ability to analyse, evaluate and synthesize scientific information and claims
- develop the ability to approach unfamiliar situations with creativity and resilience
- design and model solutions to local and global problems in a scientific context
- develop an appreciation of the possibilities and limitations of science
- develop technology skills in a scientific context
- develop the ability to communicate and collaborate effectively
- develop awareness of the ethical, environmental, economic, cultural and social impact of science.

2. Assessment objectives

- Demonstrate knowledge of:

a. terminology, facts and concepts

b. skills, techniques and methodologies.

- Understand and apply knowledge of:

a. terminology and concepts

b. skills, techniques and methodologies.

- Analyse, evaluate, and synthesize:

a. experimental procedures

b. primary and secondary data

c. trends, patterns and predictions.

- Demonstrate the application of skills necessary to carry out insightful and ethical investigations.

3. Course overview

3.1 Course content

Syllabus component	Recommended teaching hours	
	SL	HL
Syllabus content	**110**	**180**
A. Space, time and motion	27	42
B. The particulate nature of matter	24	32
C. Wave behaviour	17	29
D. Fields	19	38
E. Nuclear and quantum physics	23	39
Experimental programme	**40**	**60**
Practical work	20	40
Collaborative sciences project	10	10
Scientific investigation	10	10
Total teaching hours	**150**	**240**

3.2 Textbook

K. A. Tsokos, Physics for the IB Diploma, Seventh Edition

3.3 Other requirements

Mathematical requirements

- Use basic arithmetic and algebraic calculations to solve problems.
- Calculate areas and volumes for simple shapes.
- Carry out calculations involving decimals, fractions, percentages, ratios, reciprocals, exponents and trigonometric ratios.
- Carry out calculations involving logarithmic and exponential functions.
- Determine rates of change.
- Calculate mean and range.
- Use and interpret scientific notation (for example, 3.5×10^6).
- Select and manipulate equations.
- Derive relationships algebraically.
- Use approximation and estimation.
- Appreciate when some effects can be neglected and why this is useful.
- Compare and quote ratios, values and approximations to the nearest order of magnitude.
- Distinguish between continuous and discrete variables.
- Understand direct and inverse proportionality, as well as positive and negative relationships or correlations between variables.
- Determine the effect of changes to variables on other variables in a relationship.
- Calculate and interpret percentage change and percentage difference.
- Calculate and interpret percentage error and percentage uncertainty.
- Construct and use scale diagrams.
- Identify a quantity as a scalar or vector.
- Draw and label vectors including magnitude, point of application and direction.
- Draw and interpret free-body diagrams showing forces at point of application or centre of mass as required.
- Add and subtract vectors in the same plane (limited to three vectors).
- Multiply vectors by a scalar.
- Resolve vectors (limited to two perpendicular components).
- Sketch graphs, with labelled but unscaled axes, to qualitatively describe trends.

- Construct and interpret tables, charts and graphs for raw and processed data including bar charts, pie charts, histograms, scatter graphs and line and curve graphs.
- Construct and interpret graphs using logarithmic scales.
- Plot linear and non-linear graphs showing the relationship between two variables with appropriate scales and axes.
- Draw lines or curves of best fit.
- Draw and interpret uncertainty bars.
- Extrapolate and interpolate graphs.
- Linearize graphs (only where appropriate).
- On a best-fit linear graph, construct lines of maximum and minimum gradients with relative accuracy (by eye) considering all uncertainty bars.
- Determining the uncertainty in gradients and intercepts.
- Interpret features of graphs including gradient, changes in gradient, intercepts, maxima and minima, and areas under the graph

Data booklet

contains electrical symbols, mathematical equations, constants, and physics equations relevant to the course. Students must have access to a copy for the duration of the course so that they can become familiar with its contents. A clean copy of the Physics data booklet must also be made available to candidates for all examination papers at both SL and HL.

Scientific calculator

4. Assessment

4.1 SL

Assessment component	Weighting
External assessment (3 hours)	**80%**
Paper 1 (1 hour and 30 minutes) Paper 1A—Multiple-choice questions Paper 1B—Data-based questions (Total 45 marks)	36%
Paper 2 (1 hour and 30 minutes) Short-answer and extended-response questions on standard level material only. (Total 55 marks)	44%
Internal assessment (10 hours)	**20%**
The internal assessment consists of one task: the scientific investigation. This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. (Total 24 marks)	

4.2 HL

Assessment component	Weighting
External assessment (4 hours 30 minutes)	**80%**
Paper 1 (2 hours) Paper 1A—Multiple-choice questions Paper 1B—Data-based questions (Total 60 marks)	36%
Paper 2 (2 hours and 30 minutes) Short-answer and extended-response questions on standard level and additional higher level material. (Total 90 marks)	44%
Internal assessment (10 hours)	**20%**
The internal assessment consists of one task: the scientific investigation. This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. (Total 24 marks)	

4.3 Internal assessment - details

Criterion	Maximum number of marks available	Weighting (%)
Research design	6	25
Data analysis	6	25
Conclusion	6	25
Evaluation	6	25
Total	**24**	**100**