

Physics course outline (first exam 2016) both Standard and Additional Higher Level (SL and AHL)

General course description

Physics is the most fundamental of the experimental sciences, as it seeks to explain the universe itself from the very smallest particles—currently accepted as quarks, which may be truly fundamental—to the vast distances between galaxies.¹ It is a truly all-encompassing subject that can appeal to many and provide both a deep philosophy of thought and a practical description of the world around us. It is a gateway into many areas of study and/or career paths; architecture, space exploration, engineering, medicine, telecommunications, nanotechnology and climate science to name just a few. For more inspirational careers have a look at physics.org.

The Diploma Programme physics course includes the essential principles of the subject, such as; Measurements and uncertainties, Mechanics, Thermal physics, Waves, Electricity and magnetism, Circular motion and gravitation, Atomic, nuclear and particle physics, Energy production. Higher level students will also cover some aspects in further depth; Wave phenomena, Fields, Electromagnetic induction, Quantum and nuclear physics. Additionally one option shall be covered.

The course is available at both SL and HL, and therefore accommodates students who wish to study physics as their major subject in higher education and those who do not.

Topics /core/options

		Recommended teaching hours	
Core		SL	HL
1.	Measurements and uncertainties	5	5
2.	Mechanics	22	22
3.	Thermal physics	11	11
4.	Waves	15	15
5.	Electricity and magnetism	15	15
6.	Circular motion and gravitation	5	5
7.	Atomic, nuclear and particle physics	14	14
8.	Energy production	8	8

¹ IB Physics Guide (First Exams 2016)

Additional higher level (AHL)		60
9. Wave phenomena		17
10. Fields		11
11. Electromagnetic induction		16
12. Quantum and nuclear physics		16

Option – only one is studied*	15	25
A. Relativity		
B. Engineering physics		
C. Imaging		
D. Astrophysics		

Practical scheme of work	40	60
Practical activities	20	40
Individual investigation (internal assessment – IA)	10	10
Group 4 project	10	10
Total teaching hours	150	240

²

*One option out of four is studied. The option studied will be decided by the teacher together with the students and can change between different classes and years.

The time spent on the different topics is presented below:

SL = core + option + practical scheme of work = 95 + 15 + 40 = 150 hours

HL = core + AHL + option + practical scheme of work = 95 + 60 + 25 + 60 = 240 hours

Methods

A variety of methods are used in our Physics classes, both theoretical and practical. Concepts and ideas are introduced theoretically and then explored and deepened through practical investigations or research (Simulations and databases are utilised as learning aids). Scientific methods are promoted and encouraged, students will be expected to create their own hypotheses, research questions and predictions. The application of data analysis tools is an essential skill that will be developed throughout the course as is a critical evaluation of the processes used and results collected.



Katedralskolan Skara IB Diploma Programme



Link to the core

The links between science and TOK are not only great in number but also incredibly engaging. Stimulating discussions about what science actually is and what, if any, constraints should be placed on the pursuit of knowledge in these disciplines are considered in multiple scenarios. It also provides an opportunity for students to reflect on the methodologies of science, and how these compare to the methodologies of other areas of knowledge. During the course attention will be drawn to knowledge questions arising from the course content. Knowledge questions are open-ended questions about knowledge such as:

How do we distinguish science from pseudoscience?

When performing experiments, what is the relationship between a scientist's expectation and their perception?

How does scientific knowledge progress?

What is the role of imagination and intuition in the sciences?

What are the similarities and differences in methods in the natural sciences and the human sciences?

Knowledge questions from IB Physics Guide (First Exams 2016)

Assessment

Internal:

The internal assessment (10 hours) is a compulsory part of the course. Students are required to design their own scientific investigation, which they will then carry out. It should then be presented as a laboratory report including their own evaluation of the investigation. This is an individual piece of work, internally assessed by the teacher and externally moderated by the IB at the end of the course. It constitutes 20% of the final grade.

There is also the group 4 project (10 hours) which is the same for all group 4 subjects. The group 4 project is an activity where the students learn to interact with other people and to solve problems together in a group to come up with solutions to given problems.



Katedralskolan Skara IB Diploma Programme



External:

External assessment details—SL

Paper 1 Duration: 3/4 hour Weighting: 20% Marks: 30

- 30 multiple-choice questions on core, about 15 of which are common with HL

Paper 2 Duration: 1¼ hours Weighting: 40% Marks: 50

- Short-answer and extended-response questions on core material.

Paper 3 Duration: 1 hour Weighting: 20% Marks: 35

- This paper will have questions on core and SL option material.

External assessment details—HL

Paper 1 Duration: 1 hour Weighting: 20% Marks: 40

- 40 multiple-choice questions on core & AHL, about 15 of which are common with SL.

Paper 2 Duration: 2¼ hours Weighting: 36% Marks: 95

- Short-answer and extended-response questions on the core and AHL material.

Paper 3 Duration: 1¼ hours Weighting: 24% Marks: 45

- This paper will have questions on core, AHL and option material.

Course material/Textbook

Chris Hamper & Keith Ord: *Physics - developed specifically for the IB Diploma* (2009). Pearson Education Limited

Teacher and email

Teacher: Thomas Woodgate

email: thomas.woodgate@skara.se

Further information

[Link to Diploma Programme Curriculum briefs](#)