



AUDENTES
ERAKOOL

Teacher: Tanel Peets
Name of the course: Physics HL

Teaching time: 240 hours – 180 hours of theory and 60 hours of practical scheme of work (PSOW)

Course description:

Word Physics is derived from Ancient Greek and means “knowledge of nature. It is the most fundamental natural science that in principle can explain other scientific disciplines and the whole Universe. It involves the study of matter and its motion through space and time, along with related concepts such as energy and force.

The core of the Physics HL course is the same as in Physics SL course. These topics are easy to understand although often may appear abstract and contradict our ‘common senses’. You will learn how to make sense of the abstract ideas and apply mathematics and laws of nature in order to make sense of the world around us. Regardless of your future career choices these skills will become useful in any professional life that you may choose.

Additional HL topics offer more rigorous and mathematical look into the core topics. Good understanding of mathematics is essential for taking the physics HL course.

Main elements of the Physics HL course are theory and practical scheme of work (PSOW). In the PSOW we will learn how to use scientific method, how to gather and analyse data, make computer simulations and basic programming skills. Physics HL course includes more practical work than in the SL course hence allowing deeper learning of practical skills. These skills will be applied in internal assessment which is an individual scientific investigation.

Aims of the Physics HL course:

1. appreciate scientific study and creativity within a global context through stimulating and challenging opportunities
2. acquire a body of knowledge, methods and techniques that characterize science and technology
3. apply and use a body of knowledge, methods and techniques that characterize science and technology
4. develop an ability to analyse, evaluate and synthesize scientific information
5. develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities
6. develop experimental and investigative scientific skills including the use of current technologies
7. develop and apply 21st-century communication skills in the study of science
8. become critically aware, as global citizens, of the ethical implications of using science and technology
9. develop an appreciation of the possibilities and limitations of science and technology

10. develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge

Topics:

Core:

1. Measurement and uncertainty (5 hours)
2. Mechanics (22 hours)
3. Thermal physics (11 hours)
4. Waves (15 hours)
5. Electricity and magnetism (15 hours)
6. Circular motion and gravitation (5 hours)
7. Atomic, nuclear and particle physics (14 hours)
8. Energy production (8 hours)

Additional higher level:

9. Wave phenomena (17 hours)
10. Fields (11 hours)
11. Electromagnetic induction (16 hours)
12. Quantum and nuclear physics (16 hours)

Options:

One option is chosen according to the students' interests. Each option is 40 hours.

1. Relativity
2. Engineering physics
3. Imaging
4. Astrophysics

Practical scheme of work:

1. Practical activities (40 hours)
2. Individual investigation (10 hours)
3. Group 4 project (10 hours)

Assessment:

Assessment is in two parts. Internal assessment is an individual scientific investigation that students carry out on their own. 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.

External assessment is composed of 3 exam papers. Paper 1 is a multiple choice paper that constitutes 20% of the final grade. Paper 2 is a short-answer and extended-response questions on core material and constitutes 36% of the final grade. Paper 3 has questions on the core (experimental and data analysis skills) and option. Paper constitutes 24% of the final grade.