



## IB Physics SL Candidate Syllabus and Class Expectations

**Welcome to IB Physics!** Thank you for choosing to take this rigorous, conceptual, mathematically-based experimental science course which involves study of the world around us. This is a two-year course which meets on alternating days (A or B) and covers such major topics as motion, forces, gravity, energy, gases, mechanical waves and sound, electrostatics, electric fields, magnetism, nuclear physics, energy production, and other topics.

Listed below are some of the terms used in the IB approach to physics and the other Group 4 sciences, specifically “aims” and “objectives.”

### Experimental Sciences - AIMS

Through studying biology, chemistry or physics, students should become aware of how scientists work and communicate with each other. While the scientific method may take on a wide variety of forms, it is the emphasis on a practical approach through experimental work that characterizes these subjects. The aims enable students, through the overarching theme of the Nature of Science, to:

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.

### Experimental Sciences - OBJECTIVES

The assessment objectives for biology, chemistry and physics reflect those parts of the aims that will be formally assessed either internally or externally. These assessments will centre upon the nature of science. It is the intention of these courses that students are able to fulfill the following assessment objectives:

1. Demonstrate knowledge and understanding of:
  - a. facts, concepts and terminology
  - b. methodologies and techniques
  - c. communicating scientific information.
2. Apply:
  - a. facts, concepts and terminology
  - b. methodologies and techniques
  - c. methods of communicating scientific information.

3. Formulate, analyse and evaluate:
  - a. hypotheses, research questions and predictions
  - b. methodologies and techniques
  - c. primary and secondary data
  - d. scientific explanations.
4. Demonstrate the appropriate research, experimental, and personal skills necessary to carry out insightful and ethical investigations.

### **Assessment**

Students will be formally assessed at the end of their second year through an external assessment developed by the IBO. This counts as 76% of the students' final IB Physics score. Internal assessment for laboratory investigations will be incorporated into the final IB grade through IB moderation. The internal assessment laboratory investigation will count for 24% of the students' final IB grade. Other assessments throughout the two year course will be through tests, quizzes, classwork, homework, exams, and other assignments assigned within the class, and will be reflected on the Marvin Ridge quarterly report cards using the Union County grading scale. Exams, with the exception of the final external assessment exam taken in May the 2<sup>nd</sup> year, will be scheduled according to Marvin Ridge High School and Union County policies.

### **Supplies you will need to provide:**

Graphing composition booklet (sold by the Student Marvin Ridge store through Mr. Price hopefully!)

3 ring binder for class notes, handouts, labwork

Dividers

College-rule notebook paper

Pencil, #2

Ruler (15 or 30 cm)

Calculator (graphing)

Small plastic protractor (you can keep this at home)

1 box of Kleenex. I will try and keep a box at the front of the room!

### **Format for Class Assignments**

Assignments that are to be turned in for assessment must be written in blue/black ink. Any lines drawn must be made with a ruler.

Do not write on the back of any paper unless indicated.

All papers must be stapled with appropriate student identification.

Class notes, rough drafts, study sheets that are not graded may be written in any style, any format desired.

Specific format for laboratory investigations (those to be used for Internal Assessment) will follow the format as stated in the handout: IB Lab Report that is based on the Internal Assessment Criteria (see handout: Internal Assessment Criteria) as labs will be externally moderated.

### **Behaviour**

Maintain appropriate behavior, both verbal and non-verbal, at all times. Students will be given a warning for inappropriate behavior or behavior that interrupts learning for others. If inappropriate behavior continues, an immediate conference with the student will occur, a phone call to parents will be made, and appropriate consequences as set forth by the school policy will be applied.

## Daily Expectations

Students will:

- Be in assigned seats when the bell rings;
- Cell phones will not be used in class (per UCPS policy) unless there is a special circumstance;
- Have appropriate materials for class out and ready to use;
- Begin any daily assignments posted;
- Have all assignments due ready to hand in, using proper format;
- Follow classroom management rules;
- Adhere to all school rules, regulation, and policies set forth by the school and Union County;
- Return all class materials and supplies to their proper place;
- Remain seated until dismissed;
- Leave the room neat and orderly, with chairs pushed in and desks straightened.

Mr. Price will:

- Post daily objectives and assignments on board;
- Class notes will be posted on Canvas or Google Drive;
- Assess all work in accordance with IB assessment criteria and established grading standards;
- Be available for conferences and assistance during posted times before/after school if the student has shown evidence of effort;
- Maintain accurate records of assessment, attendance, and classroom behavior;
- State expectations that are attainable by providing quality learning experiences.

## Late Work Policy

Due to the nature of the International Baccalaureate external assessments, certain assignments cannot be accepted late. Students will be given these due dates well in advance. Most assignments turned in the following class period **after an absence** will not be penalized if the date of the absences is noted at the top of the assignment. A 10% penalty will often be applied to work turned in one day late. Work will not be accepted after that. Please see me individually or email me if there are extenuating circumstances **PRIOR** to the due date and I will consider options that are acceptable. If a student misses test day but was in class for all class presentations of the material, the expectation is that the student will make up the test upon returning to school.

## Course Syllabus:

The IB Physics Standard Level (SL) Syllabus is on the next page. This does not represent the order of study nor the units that will be followed; however, it is the organized topics that will be studied and assessed over the next two years. This is a new syllabus as of August 2014 and May of 2016 was the first year of external assessment. Of the four Options presented, one will be chosen and externally assessed.

## Student Agreement

By signing below, the student has read and understood the guidelines for Mr. Price's IB Physics SL class and will keep this and all handouts in their class notebook for reference.

STUDENT SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

## Parent Agreement

By signing below, the parent has read and understood the guidelines for Mr. Price's IB Physics SL class and will refer to this sheet for reference.

PARENT SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

# IB Physics SL Syllabus Outline

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(Teaching hours in parentheses – one option will be studied and assessed)

<b>Topic 1: Measurements &amp; Uncertainties (5)</b> 1.1 Measurements in physics 1.2 Uncertainties and errors 1.3 Vectors and scalars	<b>Topic 6: Circular motion &amp; gravitation (5)</b> 6.1 Circular motion 6.2 Newton's law of gravitation
<b>Topic 2: Mechanics (22)</b> 2.1 Motion 2.2 Forces 2.3 Work, energy, and power 2.4 Momentum and impulse	<b>Topic 7: Atomic, nuclear, and particle physics (14)</b> 7.1 Discrete energy and radioactivity 7.2 Nuclear reactions 7.3 The structure of matter
<b>Topic 3: Thermal physics (11)</b> 3.1 Thermal concepts 3.2 Modeling a gas	<b>Topic 8: Energy production (8)</b> 8.1 Energy sources 8.2 Thermal energy transfer
<b>Topic 4: Waves (15)</b> 4.1 Oscillations 4.2 Traveling waves 4.3 Wave characteristics 4.4 Wave behaviour 4.5 Standing waves	<b>Option A: Relativity (15)</b> A.1 The beginnings of relativity A.2 Lorentz transformations A.3 Spacetime diagrams
<b>Topic 5: Electricity and magnetism (15)</b> 5.1 Electric fields 5.2 Heating effects of electric currents 5.3 Electric cells 5.4 Magnetic effects of electric currents.	<b>Option B: Engineering physics (15)</b> B.1 Rigid bodies and rotational dynamics B.2 Thermodynamics
	<b>Option C: Imaging (15)</b> C.1 Introduction to imaging C.2 Imaging instrumentation C.3 Fibre optics
	<b>Option D: Astrophysics (15)</b> D.1 Stellar quantities D.2 Stellar characteristics & stellar evolution D.3 Cosmology