



IB PHYSICS

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SYLLABUS, 2019-2020

Course Overview

Welcome to International Baccalaureate Diploma Physics at Shanghai American School! This course will help students to develop the ability to analyze, evaluate and synthesize scientific information. Emphasis is placed on critical thinking, inquiry, and investigation. Students will develop an awareness of the value of science as a collaborative endeavor. IB DP Physics is a two-year course, culminating in the IB Exam at the end of grade 12.

Students study IB Physics at either Higher (HL) or Standard Level (SL). The main difference has to do with the time and depth of study required. Higher grades are also required of students in HL Subjects for earning the IB Diploma, for university acceptance and for the possibility of college credit.

Physics is one of the most useful (and challenging!) courses that secondary students can take. This class will particularly be useful to college-bound students interested in majoring in such diverse fields as: Computer Science, Engineering (including Electrical, Mechanical, Civil, Aerospace and so on), Mathematics, Biology, Pre-Med, Nursing, Physical Therapy, and Sports Medicine. However, this class will also be of great value to students going into fields of a non-scientific or technical nature - students who simply enjoy discovering the beauty of nature and what physics is all about, and are willing to do homework/laboratory work and enjoy an intellectual challenge.

In this class, I will use class discussions, lectures, demonstrations, videos, reviews of general science principles, sample IB exam problems, etc...all with an emphasis on teaching students to solve complex problems in physics. Laboratory (practical) work is also a significant facet of this class. Student's grades will be composed of laboratories (25%) and quizzes/tests (75%). *Suggested homework* will include readings, solving book problems, and worksheets. Among other things, students will find that being organized and taking good notes will help them to succeed in this class.

The primary text for the course is *Pearson Baccalaureate Physics* by Chris Hamper. Supplemental texts for the course are *Physics for the IB Diploma (6th Edition)* by Tsokos, *Physics Principles and Applications (6th Edition)* by Giancoli, *Physics (8th Edition)* by Cutnell and Johnson, and *Physics at Standard and Higher Level* by Kirk.

Students also need a scientific calculator, maturity, and a strong will to succeed in this course. This course relies heavily on technology for the delivery of the curriculum. Course materials are available through the course Schoology site at <https://saschina.schoology.com> which is linked to the course website at <http://mrsmithsphysics.weebly.com/>.

A final note to students: Physics is NOT difficult, contrary to popular belief! In fact, physics is one of the simplest and most elemental of sciences. But it does require patience, maturity, and diligence to understand it and to apply it. Students who put the time and effort into this class will be rewarded with a unique appreciation of the world, the universe, and the way things work. ☺

IB PHYSICS COURSE CONTENT (2 YEAR COURSE)

Core Topics for both SL and HL	Hours	Additional Topics for HL	Hours
1. Measurement and Uncertainties	5	9. Wave phenomena	17
2. Mechanics	22	10. Fields	11
3. Thermal Physics	11	11. Electromagnetic induction	16
4. Waves	15	12. Quantum physics and nuclear physics	16
5. Electricity and Magnetism	15		
6. Circular Motion and Gravitation	5		
7. Atomic, Nuclear, and Particle Physics	14		
8. Energy Production	8		
+ Extended Study (Option)	15	+ Extended Study (Option)	25
Practical work	40	Practical work	60
Minimum teaching hours	150	Minimum teaching hours	240

Course Guidelines and Details

Internal Grading and Assessment: SAS grades are generally predictive of final IB Exams and Assessment. SAS grades may also be used by universities to give preliminary admissions or offers which must be followed up by similar results on the IB exams. There are two sets of indicators for internal grades in Physics. First, a grade is indicated by percentage grade boundaries. Second, student overall performance is checked with the IB Grade Descriptors and modified. We will discuss these issues in detail later.

The approximate grading scale:

7	85-100%
6	70-84%
5	55-69%
4	45-54%
3	30-44%
2	15-29%
1	0-14%

Attendance and expectations: Students are expected to be in class EVERY CLASS period. Missing significant amounts of classes can make this class very difficult. Students are expected to be prepared each day and bring the following materials: pencil or pen, class notebook (I will talk about this in class), eraser, calculator, lined and graph paper, laptop, and any other physics materials.

Homework: Homework will not be factored into a student's grade numerically; however, this is a very important facet of a student's grade. For each topic, a homework packet will be provided, with *suggested problems* to work through outside of class each day as well as *suggested readings*. If students choose not to keep up with homework, experience shows that they are very unlikely to do well in the class.

Laboratories (practicals): In IB Physics, laboratory work is very important throughout the course and counts for 25% of the final grade. Every major topic will have laboratories associated with them. Students will work both individually and in groups depending on the task. If working in pairs or groups, each student is responsible for taking and reporting their own data. Lab write-ups must be typed and follow a specific laboratory report format that will be discussed in advance of the first laboratory session. Handwritten labs will not be accepted.

Quizzes and tests: Quizzes and tests will be given frequently in this class and these comprise 75% of a student's grade. Therefore, they are important! Quizzes can be any assessment type as appropriate.

* Additionally, at the end of each semester, students can expect a summative exam which counts as 20% of the overall semester grade, as per SAS Puxi HS policy.

Assessment: The full assessment policy is located in the student handbook, which can be found on Schoology and Powerschool. Please make sure you are familiar with this policy. Noted below are key points:

Reassessment Policy

Additional attempts on summative assessments are at the discretion of the individual teachers but must be based on the following criteria:

- Puxi High School's, proficiency level is considered a B+ and any reassessment will not be awarded marks above a B+.
- Students desiring a reassessment opportunity must approach learning with fidelity.
- During a semester, upperclassmen may have one retake opportunity per course.

In Class Exam Based Assessments

- A student has the opportunity to reassess on an in class exam based assessment until the end of the unit that follows the assessment.
- If a student is absent for an assessment, the student must take that assessment at the first available opportunity, for example, the first day when they return from illness.
- If the absence is unexplained, the student will face discipline action for academic integrity, and must still take the assessment at the first available opportunity.

Non-Exam Based Assessments

- If a student fails to submit an assessment on the due date a mark will be awarded according to the evidence collected during the learning period.
- The student has the opportunity to submit the work for full grade until the conclusion of the next learning period (i.e. end of the next unit) but this will be considered a reassessment and the reassessment policy will be applied for that late assignment.
- If a student has an unexcused absence on the day work is due the teacher follows the same procedure as noted above.

In the event that the student does not submit a final version or does not submit additional evidence, the mark that was awarded, based on the evidence of learning available to the teacher on the due date becomes the student's permanent mark for that assessment

In addition to laboratories and tests for a final grade, students will be assessed on the **Individual Learner Profile Descriptors**. At the end of each semester, students will receive a mark from 1-4 in each of the categories below. A 4 will be awarded if a student consistently displays most of the descriptive behaviors throughout the semester.

Active learning:

- Engages with teachers and peers during class
- Focuses on the class task
- Contributes to the class through insightful comments
- Demonstrates a desire to learn by revising his/ her work and seeking feedback
- Takes risks in his/her learning
- Completes tasks as directed by the teacher
- Demonstrates learning as prompted by the teacher

Integrity:

- Demonstrates respect for teachers and other students
- Appreciates the learning
- Displays integrity in the use of technology

Responsibility:

- Brings necessary materials to class
- Thoroughly completes assigned preparatory work
- Completes assignments/ tasks
- Responds appropriately to setbacks
- Meets deadlines
- Comes to class on time and is ready to begin at the start of class

These ILPs are connected to the IB learner profile as follows:

Active Learning

-Knowledgeable -Thinkers -Inquirers -Reflective -Communicators- collaborating with others

Integrity

-Principled -Caring -Risk-takers -Open-minded

Responsibility

-Balanced -Communicators → communication about extensions/issues appropriately

Plagiarism & Academic Integrity: Academic honesty is of the utmost importance and is a vital part of maintaining a credible institution of learning. Academic dishonesty tarnishes the integrity of everyone involved and ruins careers and reputations. There is absolutely no excuse for academic dishonesty. If you are caught participating in any behavior that is academically dishonest as defined by the SAS Student Handbook, I will follow school guidelines in reporting your offence. If you are having difficulty keeping up with the workload for this course, please see me individually.

Plagiarism is using, copying or borrowing someone else's work and using that work as your own. This includes copying from a text or the Internet. In addition, plagiarism includes copying someone else's homework or working together and turning in the work as purely your own. Plagiarism will not receive a academic penalty, but other consequences will be assigned.

Student's behaviors will be separate from the letter grade based and be recorded on the *Individual Learner Profile*. The categories that students are scored on are: active learning, integrity, and responsibility. All students will have the opportunity to have a discussion in class about what it means to highest marks on the ILP in each category.

In summary.....

Any student who is caught copying from a source without citing the source, or who is caught copying another student's work (or allowing his/her work to be copied), subject to the procedures laid out in the handbook for violating the academic integrity code. DO THE RIGHT THING. ☺

PHYSICS 2019-2020 STUDENT AGREEMENT

I have read and understood the Physics syllabus, course description, and guidelines, and I agree to adhere to the policies of this class. I understand that my signature below binds me to the procedures and descriptions of the course as described above.

Student Name _____ Grade: _____
(printed):

Student Signature: _____

Date: _____

In a short paragraph, please tell me what topic in science you find most interesting and why:

Please state why you are taking this course (be honest!):

Anything else you would like Mr Smith to know about you....?