Diploma Programme subject outline – Group 4: sciences			
School Name	High Point Central High School	School Code	0875
Name of DP Subject	SL IB Physics		
Level	Higher ☐ Standard completed in two years X Standard completed one year ☐		
Name of teacher who completed this outline	Enkhnasan Enkhbold	**Date of IB Training**	**October 2018**
Date when outline was completed	January 2019	**Name of workshop**	IB Physics

1. Course outline

	Topic (as identified in the IB subject guide) *State the topics in the order you are planning to teach them*	Contents	Allocated Time One class is: 90 minutes In one week there are: 2-3 classes	Assessment instruments to be used	Resources *List the main resources to be used, including information technology if applicable*
Year 1	1: Measurements & Uncertainties	1.1 to 1.3	3 classes	Tests and quizzes, practice internal assessments	Computers, scientific calculators, basic scientific equipment (carts, air tracks, circuit components, etc.) and personal protective equipment
	2: Mechanics	2.1 to 2.4	15 classes		
	3: Thermal Physics	3.1 to 3.2	7 classes		
	4: Waves	4.1-4.5	10 classes		
	5: Electricity & Magnetism	5.1 to 5.4	10 classes		
	6: Circular Motion & Gravitation	6.1-6.2	3 classes		
	7: Atomic, Nuclear, & Particle Physics	7.1-7.3	10 classes		
	8: Energy Production	8.1 to 8.2	5		
Year 2	1: Measurements & Uncertainties	1.1 to 1.3	1 classes	Rubric-based assessment of practice internal assessments. Tests based on short response and	Computers, scientific and/or graphing calculators, basic scientific equipment and
	2: Mechanics	2.1 to 2.4	7 classes		
	3: Thermal Physics	3.1 to 3.2	2 classes		

	4: Waves	4.1 to 4.5	5 classes	multiple choice from previous IB papers.	personal protective equipment
	5: Electricity & Magnetism	5.1 to 5.4	5 classes		
	6: Circular Motion & Gravitation	6.1-6.2	2 classes		
	7: Atomic, Nuclear, & Particle Physics	7.1-7.3	5 classes		
	8: Energy Production	8.1-8.2	1 class		
	Option A: Engineering Physics	A.1 to A.3	10 classes		

2. The group 4 project

As the IB guides say, "The group 4 project is a collaborative activity where students from different group 4 subjects work together on a scientific or technological topic, allowing for concepts and perceptions from across the disciplines to be shared in line with aim 10 – that is, to 'encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method." Describe how you will organize this activity. Indicate the timeline and subjects involved if applicable.

The Group 4 project is preformed collaboratively between IB Biology, IB Chemistry and IB Physics. Each group of students will consist of a mixture of disciplines of Biology, Chemistry, and Physics. All of the teachers involved work together to determine an appropriate topic that can be examined within their disciplines. Teachers then determine the groups and the students work to create and present an original research project. This project begins in the middle/ end of May during the junior year. Students have 8 class periods to work on the project and 1-2 days of presentations at the start of June.

3. IB practical work and the internal assessment requirement to be completed during the course

Name of the topic	Experiment	Any ICT used? *Remember you must use all five within your programme*
Topic 2: Mechanics	Determining "g" ; Verifying Newton's 2nd Law; Analyzing Energy Transformation; Impulse of Rockets	Yes
Topic 3: Thermal Physics	Energy of Phase Change	Yes
Topic 4: Waves	Pendulum Motion; Finding Wave Speed; Double Slit Experiment; Index of Refraction	Yes
Topic 5: Electricity & Magnetism	Electric Field Mapping; Resistivity Characteristics; Internal Resistance; 3D Magnetic Field Simulation	Yes
Topic 6: Circular Motion & Gravitation	Determining Centripetal Force	Yes
Topic 7: Atomic, Nuclear, & Particle Physics	Determining Energy Level Transitions	Yes
Option A: Engineering Physics	PhEt Torque Simulation, Fasteners in Construction Practical	Yes

4. Laboratory facilities

Describe the laboratory and indicate whether it is presently equipped to facilitate the practical work that you have indicated in the chart above. If it is not, indicate the timeline to achieve this objective and describe the safety measures that are applicable.

Year 1 / 2 - Rm 213: We have 5 lab sinks and lab counters along the left and back sides of the room. The students sit at lab tables. Room 213 is equipped with all of the necessary materials for the labs of year 1 & 2.

5. Other resources

Indicate what other resources the school has to support the implementation of the subject and what plans there are to improve them, if needed.

Computers are available for online labs to supplement any that cannot be done in the classroom due to a lack of supplies.

6. Links to TOK

You are expected to explore links between the topics of your subject and TOK. As an example of how you would do this, choose one topic from your course outline that would allow your students to make links with TOK. Describe how you would plan the lesson.

Topic	Link with TOK (including description of the lesson plan)
4.4 Wave Behavior	Huygens and Newton proposed two competing theories of the behavior of light. How does the scientific community decide between competing theories? The question to the students, "Is light a wave or a particle?" Students will perform Young's Double Slit Experiment, making the conclusion that light is a wave. Students will then research the Photoelectric Effect showing that light is a particle. Students will watch The Mechanical Universe, Chapter 50, Particles and Waves. In their lab groups, students will discuss the experimental findings and the information in the video. By accepting the validity of both experimental findings, the scientific community, and the students in turn, realize the dual nature of light.

7. Approaches to learning

Every IB course should contribute to the development of students' approaches to learning skills. As an example of how you would do this, choose one topic from your outline that would allow your students to specifically develop one or more of these skill categories (thinking, communication, social, self-management, or research).

Topic	Contribution to the development of students' approaches to learning skills (including one or more skill category)
2.4 Momentum And Impulse	Thinking, communication, and research: Momentum and Impulse explains the physics behind the development of the Air Bag that is now standard equipment in automobiles. However, the development of the Air Bag and its requirement to be standard equipment in all automobiles, was not without controversy. Students will research the Air Bag's history and discuss with their group why there was a controversy in the use of a device that would obviously save lives. Students will assessed on their research, and their ability to communicate respectfully with classmates.

8. International Mindedness

Every IB course should contribute to the development of international-mindedness in students. As an example of how you would do this, choose one topic from your outline that would allow your students to analyze it from different cultural perspectives. Briefly explain the reason for your choice and what resources you will use to achieve this goal

Topic	Contribution to the development of the attribute(s) of the IB learner profile

7.2 Nuclear Reactions	Atomic & nuclear physics brought the world a new and relatively clean energy source, but also brought a new level of destruction in global conflicts. We discuss the pros and cons of nuclear energy, specifically the transportation and storage of radioactive nuclear waste. The students research how different countries approach the benefits and drawbacks of using nuclear energy. We also discuss the proliferation of nuclear weapons and the international politics involved.

9. Development of the IB learner

Through the course it is also expected that students will develop the attributes of the IB learner profile. As an example of how you would do this, choose one topic from your course outline and explain how the contents and related skills would pursue the development of any attribute(s) of the IB learner profile that you will identify.

Topic	Contribution to the development of the attribute(s) of the IB learner profile
8.1 Energy Sources	Communicators, open-minded, reflective, problem-solving Continuation of the nuclear energy activity: The benefits and drawbacks of fossil fuels. By conducting whole class discussions, and small group discussions, students have the opportunity to reflect on how their thoughts and ideas are perceived by others. They are given the opportunity to consider perspectives different from their own, and collaborate with others in working toward solutions.