| **IMMACULATE CONCEPTION HIGH SCHOOL****PHYSICS SYLLABUS SEQUENCE 2023/2024** |
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| **GRADE:** | **11** |  |  |
| **TERM:** | **1** |  |  |
| **WEEK:** | **DATE** | **TOPICS** | **OBJECTIVES** |
| **1** | **Sept.** **11 - 15** | **Revision**  | **Review the grade 10 End of Year Exam Paper****Meet with IP students** |
| **2** | **Sept.****18 – 22** |  **Thermal Physics** | **Conduct an experiment to** determine ***c*** for metals and liquids using:* Methods of Mixtures

**Discuss Experiment**: - Determine the specific latent heat of vaporization ***lv***, and fusion, ***lf*** of water Review Thermal Physics group assignments. |
| **3** | **Sept.** **25 – 29** | **Thermal Physics** | Gas Laws1. Use the relationship between Kelvin and Celsius scale. T/K = θ/℃ + 273;
2. Relate pressure/volume against temperature graphs to the establishment of the Kelvin temperature scale
3. Explain gas pressure in terms of molecular motion
4. Apply the gas laws: Boyle’s Law; Charles’ Law; Pressure Law; General Gas Law;
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| **4** | **Oct. 2 - 6**  | **Physics of the atom** | **Course Work # 1 - Thermal Physics**Models of the Atom* describe the work done in establishing the modern view of the atom;
* describe the Geiger-Marsden experiment which established the nuclear structure of the atom.

Particles in the Atom* sketch the structure of simple atoms;
* compare the mass and charge of the electron with the mass and charge of the proton;
* explain why an atom is normally neutral and stable;
* recall and use the relationship A = Z + N;
* explain what is meant by the term “isotope”;

 relate the shell model of the atom to the periodic table. |
| **5** | **Oct.** **9 - 13****(3 Teaching days)****Mid-term : Oct 12 – 16** | **Radioactivity** | Radioisotopes* discuss the useful applications of radioisotopes;

Radioactive Emissions* describe Marie Curie’s work in the field of radioactivity;
* state the nature of the three types of emissions from radioactive substances;
* describe experiments to compare the ranges of ∝, β and γ emission
* interpret nuclear reactions in the standard form;
* describe the appearance of the tracks of radioactive emissions in a cloud chamber;
* predict the effects of magnetic and electric fields on the motion of ∝,β particles and γ rays;
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| **6** | **Oct.** **16 - 20** | **Oct. 16 is Heroes Day** | **Same as Week 5** |
| **7** | **Oct.** **23 – 27** |  | **FIRST SIX WEEKS TEST** |
| **8** | **Oct.** **30 - Nov. 3** | **Radioactivity** | Half-life* use graphs of random decay to show that such processes have constant half-lives;
* solve simple problems involving half-life;
* recall that the decay process is independent of the conditions external to the nucleus;

Nuclear Energy* relate the release of energy in a nuclear reaction to a change in mass;
* cite arguments for and against the utilization of nuclear energy.
* Application of Einstein’s equation: **E = mc2**.
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| **9** | **Nov.** **6 - 10** | **Magnetism** | LAB: Half-Life (Coins)**Permanent Magnets** * 6.1 differentiate between magnetic and non-magnetic materials;
* 6.2 explain how a magnet can attract an object;
* 6.3 distinguish between materials used to make "permanent" and "temporary" magnets;
* 6.4 identify the poles of a magnetic dipole;

**Magnetic Forces*** 6.5 investigate the forces between magnetic poles;
* 6.6 define a magnetic field;
* 6.7 map magnetic fields.

NOTE: Magnetism was taught in Grade 9 so treat it as a revision topic.  |
| **10** | **Nov.** **13 - 17** | **Electrostatics****Current Electricity****Circuits and Components** |

| **Electric Charge, Q** * + explain the charging of objects;
	+ describe the forces that electric charges exert on each other;
	+ explain charging by induction;
	+ describe one hazard and one useful application of static charge
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**Electric Field*** + define an electric field;
	+ Draw the electric fields around and between point charges, and between charged parallel plates;
	+ distinguish between conductors and insulators;
	+ state that an electric current in a metal consists of a flow of electrons;
	+ differentiate between electron flow and conventional current;
	+ state the unit of electrical current;
	+ apply the relationship Q = I t

**Power, P and Energy, E**

| * cite examples of the conversion of electrical energy to other forms and vice versa;
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* apply the relationship V = E/Q;
* apply the relationship P =IV ;
* discuss the importance of conserving electrical energy and the means of doing so.

**Circuit Diagrams*** use symbols to construct circuit diagrams;
* differentiate between series and parallel circuits
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| **11** | **Nov.** **20 – 24** | **Circuits and Components****Current Electricity** | **Cells** * explain the functions of the various parts of a zinc-carbon cell;
* distinguish between primary and secondary cells;
* draw a circuit diagram to show how a secondary cell can be recharged;

| **Resistance, R*** explain the concept of resistance;
* State Ohm’s Law
* apply the relationship R= V/I
* explain why it is necessary for an ammeter to have a very low resistance;
* explain why it is necessary for a voltmeter to have a very high resistance;
* solve problems involving series and parallel resistance;
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| **I - V Relationships**  |
| * solve problems involving series, parallel and series-parallel circuits;
* investigate the relationship between current and potential difference;
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| **12** | **Nov. 27 – Dec. 1** | **Electronics** | **Alternating Current*** differentiate between direct and alternating currents;
* analyze current-time or voltage-time graphs.
* deduce the period and frequency of ac. or voltages

**Rectification*** describe how a semi-conductor dioxide can be used in half wave rectification;
* differentiate between direct current from batteries and rectified alternating current by a consideration of the V – t graphs for both cases;

LAB: I-V relationships  |
| **13** | **Dec. 4 - 8** |  | **SECOND SIX WEEKS TEST** |
| **14** | **Dec.** **11 - 15** | **Electromagnetism** | LAB: Series and Parallel Circuits**Electricity in the Home*** discuss the reasons for using parallel connections of domestic appliances;
* explain the purpose of a fuse or circuit breaker and the earth wire;
* select a fuse or circuit breaker of suitable current rating for a given appliance;
* state the adverse effects of connecting electrical appliances to incorrect or fluctuating voltage supplies.

**Logic Gates*** recall the symbols for AND, OR, NOT, NAND, NOR logic gates;
* state the function of each gate with the aid of truth tables;
* analyze circuits involving the combinations of not more than three logic gates;
* discuss the impact of electronic and technological advances on society.
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| **15** | **Dec.** **18 - 19****Dec. 19****Sports’ Day** |  | **REVISION**END OF TERM – Dec. 19 |