UNIT PLAN SUBJECT: PHYSICS UNIT: 2 YEAR: 2022 – 2023
TERM: 1

WEEK	DATE	TOPICS	OBJECTIVES
1	**September 11-15**	Electrical Quantities 1.1-1.7	● Use the equation Q = It to solve problems ● Define the coulomb ● Define the volt ● Use the equation V = IR to solve problems ● Define and use the term resistivity ρ using the equation R = (ρl)/A ● Explain drift velocity ● Derive and use the equation I = nevA
2	**September 18-22**	Electrical circuits 2.1-2.5	● I-V characteristics for metals, semiconductors and filament lamp ● Resistance versus temperature curves for thermistors with negative temperature coefficients. ● Distinguish between e.m.f. and p.d. ● Solve problems using terminal p.d. ● Draw and interpret circuit diagrams using Kirchoff's law.
3	**Sep 25-29**		● Use Kirchoff's laws to solve problems involving circuit networks ● **Revision and Graded class work # 1**
4	**Oct 2-6**	Electrical circuits continued 2.6-2.9	● Derive and use formula for two or more resistors a) in series b) in parallel. ● Use the potential divider as source of variable and fixed p.d. ● Use the Wheatstone bridge as a means of comparing resistance, treating it as a double potential divider.
5	**Oct 9-11**		● Revision and graded class work # 2
6	**Oct 12-16** **Oct 17-20** **Oct 23-27**		Mid term break Lab # 1 and Lab # 2 First Six week test
7	**Oct 30- Nov 3**	Electric Fields 3.1-3.13	● Explain the difference between electrical insulators and conductors ● Discuss a) applications of electrostatic phenomena and b) hazards associated with charging by friction. ● Explain the action of lightning rods in the protection of buildings. ● Use Coulomb's law to solve problems ● Use $E = \frac{Q}{4\pi\epsilon_0 r^2}$ for the field strength due to a point charge.

			● Calculate the field strength between two charged metal plates using E = V/d
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8	**Nov 6-10**	**Electric fields (Cont'd)**	● Calculate the force on a charge in a uniform electric field using F = EQ. ● Describe effect of electric field on charges moving in it. ● Compare motion of charged particles moving in electric field to movements in a gravitational field and solve numerical problems LAB #3
9	**Nov 13-17**	Electric fields (Cont'd)	● Recall that field strength is numerically equal to potential gradient ● Use the equation $V = Q/4\pi\epsilon_o r$ for the potential due to a point charge. Calculate the potential at a point due to several point charges ● Worksheet
10	**Nov 20- 24**	Capacitors 4.1-4.7	● Explain the 'farad' and use C = Q/V and C = ϵA/d to solve problems. ● Derive and use formulae for capacitors a) in series b) in parallel ● Use the formulae for energy stored as $W = CV^2/2 = QV/2 = Q^2/2C$ ● Recall and use the exponential equations for discharge of capacitors ● Sketch graphs for a) charging b) discharging a capacitor. ● Class quiz # 3
11	**Nov 27-Dec 1**	Magnetic Fields 5.1-5.3	● Explain magnetic flux density and the 'tesla'. ● Sketch magnetic flux patterns due to long straight wire, flat circular coil and solenoid ● Use expression for magnetic flux density associated with long straight wire, flat circular coil and solenoid Example: $B = \mu_o nI$
12	**Dec 4-8**		● 2nd six week test
13	**Dec 11- 15**	Magnetic forces 6.1-6.11	● Use Fleming's left hand rule effectively ● Recall and use the equation $F = BIL \sin\theta$ to solve problems. ● Explain how to measure flux density using a current balance. ● Predict the direction of the force on a moving charge in a magnetic field.

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(Cont'd)			● Use the expression F = BQvsinɵ to solve problems. ● Solve problems for charged particles moving in electric and magnetic fields perpendicular to each other. ● Describe the effect of soft iron core on the magnetic field due to a solenoid ● Explain principle of the electromagnet and how it is used in door locks, switches and other applications. ● Explain the origin of forces between current carrying conductors and predict the direction of the forces. ● Explain the Hall Effect. ● Use the Hall probe to measure Flux density.
13	**Optional**	Electromagnetic Induction 7.1-7.9	● Explain magnetic flux and magnetic flux linkage using the relevant equations $\Phi = BA$ and $\varphi = BAN$ to solve problems ● Explain the 'weber'. ● Describe and interpret experiments that demonstrate electromagnetic induction and the associated variables. ● Determine induced e.m.f. using Faraday's law. ● Use Lenz's law to determine direction of induced e.m.f. and discuss its application to energy conservation. ● Explain applications of electromagnetic induction. ● Explain the principle of operation of the simple transformer. ● Use the relationship $N_s/N_p = V_s/V_p = I_p/I_s$ for the ideal transformer