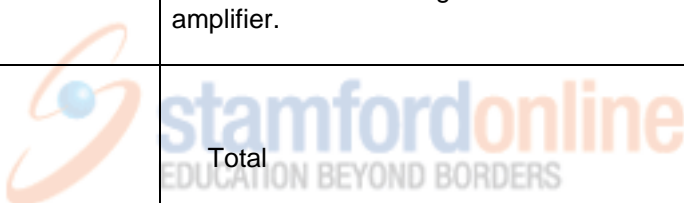


No.	Title		
1.	Subject	Physical Electronics & Fields	
2.	Subject Code	KE019	
3.	Status	Major	
4.	Credit Hours	Four (4) [(3L + 1T) × 14 weeks + 12 hours Lab]	
5.	Semester and Year	Semester 2	
6.	Pre-requisite	-	
7.	Mode of Delivery	Lectures, Assignments and Practical	
8.	Assessment	Assignments	10%
		Class Test	10%
		Lab work/ Test	20%
		Final Examination	60%
9.	Objectives	This unit is designed to introduce the student to the basic electrical properties of conductors, insulators and semi-conductors, which form the basic elements of electronic devices. The fundamental operations and application of two such devices (diode and bi-polar transistors) are then described.	
10.	Learning Outcomes	<p>Upon the completion of the unit, the students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the fundamental difference between conductors, insulators and semi-conductors. 2. Explain qualitatively the d.c. characteristics of silicon diodes and transistors. 3. Show the application of the diodes and that of the bi-polar transistors. 	
11.	Details of subject	Contents	Hours
		Chapter 1: Electricity and Matter Electrostatic phenomena. Electric field. Charge and electrons. Uniform field between charged parallel conducting plates. Electric potential at a point in an electric field. Non-uniform electric fields, strengths and patterns. Coulomb's Law. Electric potential due to a point charge or a charged spherical conductor.	6L 2T
		Chapter 2: Capacitance Parallel plate capacitor. Capacitors in series and parallel. Energy stored in capacitor.	3L 1T
		Chapter 3: Conductors and Resistors Properties of conductors. Potential gradient and current density. Ohm's Law at a point. Drift velocity and mobility and their effect on resistivity and conductivity of a material. Resistor band notation.	3L 1T
		Chapter 4: Insulators and Semiconductors Properties of insulators and semiconductors generation and recombination. Conduction in pure semiconductor. Doping and its effect on conductivity.	6L 2T

		<p>Chapter 5: Electromagnetism</p> <p>Permanent magnets, magnetic fields, force on a current in a magnetic field, field strength (B). Motion of charged particles in a magnetic field (and in electric field). Magnetic fields due to current in straight wire, and a solenoid. Forces on currents in long straight parallel wires. Definition of the ampere. Magnetic flux linkage, induced e.m.f Laws of electromagnetic induction (Faraday's and Lenz's). Fleming's right hand rule.</p>	<p>9L 3T</p>
		<p>Chapter 6: P-N Junction</p> <p>Forward and reverse-bias of a p-n junction. Drift and diffusion currents.</p>	<p>6L 2T</p>
		<p>Chapter 7: Diodes</p> <p>Specifications of diodes. Concept of rectification.</p>	<p>3L 1T</p>
		<p>Chapter 8: Transistors</p> <p>Base, collector and emitter regions of a bi-polar transistor. Operation of the NPN transistor in the active mode. Relationship between emitter, collector and base currents. Current gain. Equivalent circuit of a transistor. Circuit configuration of a transistor as an amplifier.</p>	<p>6L 2T</p>
		 <p>Total</p>	<p>L = 42 hrs T = 14 hrs P = 12 hrs</p> <p>68 hours</p>
12.	Main Reference	<ol style="list-style-type: none"> 1. Serway, R. A., and Faughn, J. S. (2003). <i>College Physics</i> (6th ed.). Thomson Brooks Cole. 2. Brodie, D. (2001). <i>Further Advanced Physics</i>. John Murray. 	
13.	Additional Reference	<ol style="list-style-type: none"> 1. Theraja, B. L., and Theraja, A. K. (1998). <i>A Textbook of Electrical Technology</i>. S. Chand & company Ltd. 	
14.	Practical/Lab Classes	<p>The students are required to conduct the following practical laboratory experiments, each of 2 hours duration:</p> <ol style="list-style-type: none"> 1. Ohm's law. 2. Verification of Kirchoff's voltage law. 3. Verification of Kirchoff's current law. 4. Investigation of the Junction diode characteristics. 5. Half wave Rectifier. 6. Full wave Rectifier. 	