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| **BEE01T1003** | **Basic Electrical and Electronics Engineering** | **L** | **T** | **P** | **C** |
| Total Contact Hours | 2 | 0 | 2 | 3 |
| Prerequisite – | | | | |
| Department:Dept. of Electronics and Communication Engineering. | | | | |
| **COURSE OBJECTIVES:**  1. To understand the basic concepts of magnetic circuits, electro magnetism and electrostatics.  2. To understand and analyses AC & DC circuits.  3. To understand the Network Theorem and Semiconductor Devices.  4. To understand basic semiconductor devises  5. To understands sensors and transducers | | | | | |

**Unit I:D.C. Circuits**

Circuits Elements(R, L, C), Kirchhoff’s Laws, Superposition Principle and theorem, Norton’s theorem, Thevenin’s Theorem, Voltage source, (definition, characteristics of practical source, equivalent current source) Star-Delta transformation

**Unit II: Magnetic circuits**

Flux, mmf, reluctance, analogous electric circuits, simple calculations for composite magnetic circuits.

**Unit III: AC Circuits**

Periodic functions, average &rms values, Steady state behaviors with sinusoidal excitation, phasor representation, reactance and impedance, Series and Parallel A.C. circuits, resonance, power in A. C. circuits, power factor.

**Unit IV: Bipolar Junction Transistors**

Basic diode concept, different types of rectifier circuits, zener diode voltage regulation concept Bipolar junction transistors, CB, CE and CC configurations and characteristics.

**Unit V:Transducers and Sensors**

Sensor and Transducer Definitions, Criteria to Choose a Sensor, Basic Requirements of a Sensor or Transducer, Classification of Sensors, Analog and Digital Sensors, Biosensors- Advantages and limitations, biosensors for environmental monitoring, biosensors in healthcare applications

**Unit VI: Applications**

Application of network theorem, Application of Diodes, Application of Bipolar Junction Transistor

**Reference Books**

1.Textbook of Electrical Engineering, B.L. Theraja, Vol. I & II, Twenty, S. Chand & Co 1997 Second.

2. Basic Electrical Engineering, D C.Kulkshreshtha, McGraw,2012 , First.

3.Introduction to Electrical Engineering, Naidu, Kamakshaia, Tata McGraw Hill, 2000, Third

4. Basic Electrical Engineering, H. Cotton, CBC, 2005, Seventh

5.Laboratory courses in Electrical Engg, S G Tarnekar, P K Kharbanda, S B Bodkhe, S D Naik, S. Chand & Co, 2010, Second.

6. Brian R Eggins - Biosensors an Introduction , First edition, John Wiley & Sons Publishers, 1996.

7. Loic J Blum, Pierre R Coulet - Biosensors Principles and Applications, First edition, Marcel Dekker,Inc, 1991.

8. Donald G. Buerk - Biosensors Theory and Applications, First Edition Technomic Publishing. Co, Inc, 1993.

**At leat SIX experiments needs to be conducted**

* To familiarize with Electrical and Electronics Lab Equipment and basic Electronics Components
* To verify (i) Kirchhoff’s Current law (ii) Kirchhoff’s Voltage law.
* To verify Thevinin’s theorem.
* To verify Norton’s theorem.
* To verify maximum power transform theorem.
* Observe the given waveform (Sinusoidal/Square/Triangular) and calculate it's Frequency, Peak Value, Average Value, RMS Value and Form factor.
* To plot the V-I Characteristics of P-N Junction Diode and calculate the forward and reverse resistance of the Diode.
* Verification of Regulation action of ZENER Diode.
* To connect the Wave Shaping Circuits (Clipper Circuit) and observe and sketch the Wave form.
* To verify the working of Full Wave Rectifier Circuit (Bridge Rectifier) and calculate it's efficiency.
* To plot the input and output characteristics of a Bipolar Junction Transistor (BJT) in Common Emitter (CE) connection.
* To verify the working of Full Wave Rectifier Circuit (using Centre tapped transformer) and calculate it's efficiency.
* Project – Students should be encouraged to make a working model/Project to demonstrate any Transducer/Sensor action or any related field

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| Course outcomes (COs) | |
| CO1 | Understand relationship between different electrical parameters. |
| CO2 | Students will develop an ability to analyze DC and AC Circuits of different configurations. |
| CO3 | Understand magnetic aspects of electric current. |
| CO4 | Understand BJT and its characteristics, connections, diode biasing. |
| CO5 | Understand the sensor and transducer. |
| CO6 | Demonstrate the applications of network theorems and semiconductor devices |