

2018-19 Onwards (MR-18)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 80201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: To introduce the concept of electrical circuits and its components. To introduce the characteristics of various electronic devices. To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

Module 1 : DC Circuits

[9 hours]

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws - Series, parallel, series-parallel, star-to-delta and delta-to-star transformation-analysis of simple circuits with dc excitation. Superposition, Thevenin's and Maximum Power Transfer Theorems with DC excitation.

Module 2: AC Circuits

[9 hours]

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel).

Module 3: Introduction to Electrical Machines

[10 hours]

A: DC Machines : Construction & Principle of Operation of DC Generators – E.M.F Equation. Principle of operation DC Motors – Back E.M.F. - Torque equation – Brake Test - Characteristics.

B: AC Machines: Construction and Principle of operation of Transformer- EMF Equation. Construction and Principle of Operation of 3 Phase Induction Motors - Brake test on 3-Phase Induction Motor – Applications.

Module 4: P-N Junction Diode

[10 Periods]

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances. Zener diode operation, Zener diode as voltage regulator.

Rectifiers : P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier.

Filters : Filters – Inductor Filters, Capacitor Filters, L- section Filters, π - section Filters.

Module 5: BJT and Junction Field Effect Transistor (JFET)

[10 Periods]

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations and Input-Output Characteristics, Comparison of CE, CB and CC configurations

Junction Field Effect Transistor and MOSFET: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

TEXT BOOKS

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, “ **Basic Electrical and Electronics Engineering**”, S.Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R.L.Boylestad and Louis Nashlesky, “**Electronic Devices & Circuit Theory**”, Pearson Education, 2007.

REFERENCES

1. V.K. Mehtha and Rohit Mehta, “**Principles of Electrical Engineering and Electronics**”, S.Chand & Co., 2009.
2. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), “**Electronic Devices and Circuits**”, 3rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, “**Digital Fundamentals**”, Pearson Education, 2009.
4. David A. Bell, “**Electronic Devices and Circuits**”, Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, “**Basic Electrical Engineering**”, Tata McGraw Hill, 2001.
6. Mittle N., “**Basic Electrical Engineering**”, Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E - RESOURCES

1. <https://www.electrical4u.com/ohms-law-equation-formula-and-limitation-of-ohms-law/>
2. <https://www.eeweb.com/passives>
3. <http://nptel.ac.in/courses/108108076/>
4. <http://nptel.ac.in/downloads/108105053/>

COURSE OUTCOMES:

At the end of the course, students should be able to

- CO1:** Apply basic laws in electrical circuit.
- CO2:** Analyze the single phase circuits.
- CO3:** Comprehend the construction and Operation of DC and AC machines.
- CO4:** Know the practical importance of Diode and its characteristics.
- CO5:** Recognize the construction and operation of BJT and JFET.