Department of Electronics and Communication Engineering
Bennett University
Odd Semester 2018-19

Detailed Course Outline of the Course: Fundamentals of Electrical and Electronics Engineering (EECE105L)

EVALUATION COMPONENTS:

Components of Course Evaluation	**Percentage Distribution**
Mid Term Examination	20 Marks (20 %)
Assignments and Quizzes	2 quizzes for 10 marks each 20 Marks (20 %)
End Term Examination	40 Marks (40 %)
Lab Continuous evaluation	10 Marks (10 %)
Lab End Term Examination	10 Marks (10 %)
Total	100 Marks (100 %)

Course Name:	Fundamentals of Electrical and Electronics Engineering	**Course Code:**			EECE105L
Department:	Department of ECE	**Type:**			Foundation
L-T-P Structure	3-1-2	**Credits**	**5**	**Pre-requisite:**	NA
Course Objectives	To introduce the fundamental parameters governing an electrical circuit such as current, voltage. To provide an understanding of basic electronic components such as resistors, capacitors, and inductors To analyze electrical circuits using various techniques. To give an insight into the physics of a diode and their application in electrical circuits. To give a brief introduction to other basic solid-state devices such as BJT's and MOSFET To practically verify the concepts, working, and application of various circuits using the components on a breadboard.				
Course Outcome	This course covers the topics related to analysis of basic electronic circuits such as signals, current, voltage, resistor, inductor, capacitor, Kirchhoff's Voltage Law and Current Law (KCL and KVL), network theorems, RLC circuits, physics of semiconductor diode, diode circuits, operation of BJT, MOSFET, number system, digital gates, Boolean algebra and operational amplifiers				
Course Contents:	**Topics**				**No. of Hours**
Module 1	**Basic Circuit Theory:** Charge, current, voltage, electric field, conductance, resistance, Ohm's law; current source, voltage source, dc, ac, periodic signal concept, examples of different periodic signals, their average, RMS value, resistors in series and parallel, voltage and current division Kirchoff's current law (KCL) and Kirchhoff's voltage law (KVL), Nodal analysis and Mesh analysis Network theorems: Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, and Superposition theorem, Wheatstone bridge.				20

	Introduction to capacitor (C), introduction to phasor diagram, series and parallel combination of capacitors, Impedance and frequency dependency, Introduction to inductor (L), introduction to phasor diagram, series and parallel combination of inductors, Impedance and frequency dependency, units of L, C measurements, series and parallel RLC circuits, resonance phenomenon. RL and RC filter circuits (low pass, high pass), transfer function,	
Module 2	The need of the transformer, Mutual inductance, self-inductance, coefficient of coupling, Basics of voltage and current transformers, the equivalent circuit of the transformer, single phase motors, dc motors, stepper motors, induction motors and their applications	10
Module 3	**Diodes and its applications** **Semiconductor Materials:** Classification of materials based on energy-band theory, crystal structure, elemental and compound semiconductors, electrons and holes, intrinsic and extrinsic semiconductors, doping for n and p-type semiconductors; **Diode circuits:** PN Junction diode and its applications: Half wave, center tapped full wave rectifier circuit, bridge rectifier circuit, the efficiency of rectifier circuits, ripple factor, rectifiers with filter circuits. Zener diode, Voltage regulation. Working of LED, Working principle of photovoltaic cell **Three-terminal device characteristics (BJT and MOSFET):** Introduction to bipolar junction transistor (BJT), working of BJT as a switch, Structure of a MOSFET, working of a MOSFET, current-voltage characteristics of a MOSFET, MOSFET as a switch	16
Module 4	**Number systems and digital logic:** Number system, decimal, hexadecimal and binary numbers Digital gates: OR, AND, NOT, NOR, Ex-OR, Ex-NOR. Boolean algebra, Simplification of Boolean expressions, the realization of Boolean expressions using logic gates	8
Lab Work:	Introduction to CRO, Signal generator, multimeter, breadboard and DC voltage source Ohm' law, Kirchoff's current law and voltage law Thevenin's theorem, Norton's theorem Low pass and high pass Filters (using Resistor and Capacitor). Current-Voltage characteristics of a PN Junction Diode (Ge and Si) Half Rectifier with Filter Full-wave Rectifier Clipper circuits Clamper circuits Design of voltage regulator using Zener diode (load regulation and line regulation)	
Text Book:	Robert L. Boylestad, Introductory Circuit Analysis, Pearson Education. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, Pearson Education**.**	
References:	Leonard S Bobrow, Foundations of Electrical Engineering, Oxford Higher Education. Donald Neamen, Microelectronics Circuit Analysis and Design, Tata McGraw Hill. David A. Bell, Electronic Instrumentation and Measurements, Oxford Higher Education	