KU1DSCELE103: Basic Electronics

Semester	Course Type	Course Level	Course Code	Credits (L+T+P)	Total Hours (L+T+P)
1	Minor	100	KU1DSCELE103	3+0+1	45+0+30

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical	Tutorial	CE	ESE	Total	
3	2	0	35	65	100	2

Course Description:

This course aims to develop knowledge about Basic Electronics. The course cover basic netowrk theorems, passive components, semi conductor theory, PN junction diode and its characteristics, rectifiers, filters and regulator circuit.Practical sessions are also included in this course. After the successful completion of this course the student will be able to design simple circuits.

Course Prerequisite: Basic understanding of higher secondary level Physics and mathematics

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Explain basic elements of electronic circuits	U
2	Solve problems using network theorems	A
3	Explain the operation of PN Junction diode	U
4	Design regulated diode rectifiers	C
5	Design and develop electronic circuits and systems	C

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	2	2		2			
CO 2	3	3	2	3			
CO 3	2	2		2			
CO 4	3	3	2	3			
CO 5	3	3	3	3			3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**Module I**		**5**
	1.1	Resistor – different types, colour coding, power dissipation and rating	
	1.2	Current through series resistance, KVL, parallel resistance, KCL, Balanced bridge	
	1.3	DC voltage and current , Ohms law	
	1.4	Alternating Current, sine wave, peak r.m.s and average value, frequency, phase and period	
2	**Module II**		**10**
	2.1	Voltage and Current dividers, Kirchhoff's Laws (KCL, KVL)	
	2.2	Mesh & Node (DC analysis)	
	2.3	Source tranformation, Superposition theorem	
	2.4	Thevenin's theorem, Norton's theorem, Maximum power transfer	

		theorem	

3	**Module III**		**10**
	3.1	Capacitor - Different types, capacitance, charging and discharging , capacitor coding	
	3.2	Parallel and series C, energy stored, AC through C, XC, Volatge lags current, XC and R in series, XC and R parallel, impedance	
	3.3	Inductor – Self and mutual inductance, transformers, XL, Voltage leads current, phase angle, XL and R in series and parallel impedance	
	3.4	Q of a coil, Concept of L/R and RC time constant, wave shapes, long and short time constants	

4	**Module IV**		**15**
	4.1	Semiconductors – Intrinsic, extrinsic, N type, P type, Majority and minority charge carriers	
	4.2	PN junction, depletion layer, Barrier potential, biasing , reverse break down, depletion layer capacitance, PN junction diode, V-I characteristics, diode equation ,ideal and real diode	
	4.3	Zener diode , breakdown, characteristics, applications, Varactor diode, light emitting diode	
	4.4	Rectifiers (half and full wave), ripple factor, Efficiency, rectifier with capacitor-filter, Voltage regulator, Zener regulator	
5	**Teacher Specific Module**		**5**
	Directions: Teacher can design this module based on their expertise and demand from the students		
	Space to fill the selected		

area/ activity

Essential Readings:

1. Grob's Basic Electronics: Mitchel E Schultz, Tata McGraw Hill Education , 10thEdition
2. Circuits and Networks- Analysis and Synthesis: Sudhakar A and Shyammohan S Palli, McGraw Hill Education (India) Pvt Ltd , 5 th Edition
3. A text book of Applied Electronics : R. S. Sedha, S Chand Company Ltd

Suggested Readings:

1. Basic Electronics Solid state : B. L. Theraja, S Chand Company Ltd, 5 th edition
2. A text book of Electrical Technology: B.L.Theraja, S.Chand and Co.
3. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., TMH
3. Electronic Devices and Circuits: Bolyestad, TataMcGraw Hill.
4. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition.

Laboratory Sessions : Practical sessions to reinforce theoretical concepts

LAB EXPERIMENTS

1. Familiarization of components

Resistor, Capacitor, Inductor, Diode, Transistor, Cables, Connectors, Transformer,

Switches, Fuses, Relays, Batteries- Identification based on visual inspection/Datasheet/specification/Notation

2. Familiarization of multimeters & CROs (Analog and Digital)
3. Soldering practice - Simple circuits (through hole & SMD)
4. Verification of network theorems: KCL , KVL
5. V-I Characteristics of PN junction Diode
6. Half wave rectifier with and with out C filter - Evaluation of Ripple factor
7. Full wave centre tapped rectifier with and with out C filter - Evaluation of Ripple factor
8. Full wave bridge rectifier with and with out C filter - Evaluation of Ripple factor

9. Zener diode voltage regulator (Line regulation & Load regulation)

10. Design and setup an LED Lamp

Each laboratory experiment should be accompanied by a detailed lab note containing theoretical background, experimental procedures, circuit diagrams, program listings, and expected outcomes.

Assessment Rubrics:

	Marks
End Semester Evaluation	**65**
Continuous Evaluation	**35**