GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Bachelor of Vocation (B.Voc.), 5th Semester
Branch: Solar & Renewable Energy
Subject Name: Fundamental of Analog Electronics
Subject Code: 1110702

Type of course: Core

Prerequisite: NA

Rationale: Electronics is playing a key role in all engineering applications. Purpose of this subject is make students familiar with basic electronics concepts. Students will be able to operate electronic test and measurement equipment like multi-meter, CRO, DC power supply and function generator**.**

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical		
L	T	P	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	**Diode theory and applications:** Basics of Conductor, Insulator & Semiconductor. Energy Band Diagram, Semiconductor properties and bonds in semiconductor. Intrinsic and extrinsic semiconductor materials: P type, N type semiconductors. P-N junction diode, Forward & Reverse Biasing. Forward & Reverse Characteristics. Applications - Diode as rectifier, half wave, full wave and bridge rectifier. Need of Filters, C, L, LC, π filters.	12	30
2	**Special Purpose Diodes & Transistor**. Zener diode, Photo diode, Photo transistor, Light Emitting Diode, LDR, Photovoltaic Cell, Seven Segment LED display, LCD and Opto coupler.	05	10
3	**Transistor (BJT) and amplifiers:** PNP and NPN transistors, Biasing of Transistors, Current gains α, β & γ. Relationship between α and β. Transistor configuration & Characteristics for CB, CE, CC. Load line and biasing methods of Transistor. Transistor as an amplifier: CE Amplifier. Transistor as a Switch: Working and application.	12	30
4	**Field effect transistors (FET) and its biasing** Junction field effect transistors(JFET), Comparison of BJT and FET, JFET characteristics, FET Biasing , MOSFETs (D-type and E-type MOSFET), MOSFET Characteristics. Applications of FET & MOSFET.	08	20
5	**Regulated Power supply:** Difficulties with unregulated power supply. Need to have Regulated Power Supply. Regulated power	05	10

	supply, Shunt voltage regulator. Transistorized series voltage regulator (basic), 3-Terminal Fixed/variable voltage regulator IC: 78xx, 79xx, LM317. Introduction of SMPS & UPS		
	Total	**42**	**100**

Reference Books:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, Fifth edition
2. Albert Malvino & David, "Electronic Principles", Tata McGraw-Hill, Seventh edition
3. R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education
4. Jaccob Millman, Chritos Halkias, Chetan D Parikh, "Integrated Electronics", Tata McGraw-Hill, Second edition
5. Albert Malvino & David, "Problems and Solutions in Basic Electronics, McGraw Hill Education 2

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	15	15	10	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Course Outcomes:

Sr. No.	CO Statement	Marks %Weightage
CO-1	Analyze the general Purpose diode.	30
CO-2	Analyze the special-Purpose diode.	10
CO-3	Apply knowledge of transistor in amplifier circuits & Switch.	30
CO-4	Analyze basic FET Circuits	20
CO-5	Understanding the working of Regulated Power Supply.	10

List of Open Source Software/learning website:

1. http://nptel.ac.in/syllabus/117103063/
2. https://swayam.gov.in/course/3595-basic-electronics
3. eSIM available on FOSSEE website: https://fossee.in/