GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

Course Title: Basic Electronics
(Code: 3320701)

Diploma Programmes in which this course is offered	**Semester in which offered**
Computer Engineering, Information Technology	Second Semester

1. RATIONALE

Electronics is an integral part of computers; hence students of computer engineering and information technology need to know the fundamental of electronics. This course has been designed to provide the needful inputs to handle simple electronic components and circuits. Students after studying this course will be able to understand the basics of analog electronics, various electronics components and develop skills to use simple electronic instruments needed for computer-based working environment.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- **Apply the basic electronic skills as required in the field of computers and information technology**.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			**Total Credits (L+T+P)**	**Examination Scheme**				
				Theory Marks		**Practical Marks**		**Total Marks**
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	**150**
3	0	2	5	70	30	20	30	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Student Activity; **P** - Practical; **C** – Credit;; **ESE** - End Semester Examination; **PA** - Progressive Assessment.

Note: It is the responsibility of the institute heads that marks for **PA of theory** & **ESE and PA of practical** for each student are entered online into the GTU Portal at the end of each semester within the dates specified by GTU.

DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I **Electronic Components and Signals**	1a. State the difference between active and passive electronic components 1b. Differentiate between voltage and current source. 1c. Explain the signal parameters	1.1 Active and passive components. 1.2 Voltage and Current Source. 1.3 Symbols of various Semiconductor components. 1.4 Definitions of: amplitude, Frequency, Phase, Wavelength 1.5 Definitions of: Signal, waveform, spectrum, Time and frequency domain representation 1.6 Test Signals: unit step, unit impulse, and unit ramp 1.7 Types of Signals: sinusoidal, triangular and saw tooth, square
Unit– II **Diodes and Applications**	2a. Describe the working and applications of P-N junction diode. 2b. Describe the working and applications of Zener diode.	2.1 P-N junction diode 2.2 Bridge Rectifier 2.3 'T' and 'π'' Filter circuits 2.4 Zener diode, Zener diode as voltage regulator
Unit– III **Transistors**	3a. Differentiate between PNP and NPN transistor and their applications 3b. Distinguish between FET, MOS and CMOS and their applications	3.1 PNP and NPN transistor (working principle) 3.2 Transistor as switch 3.3 FET, working of PMOS and NMOS 3.4 Working of CMOS Logic Family
Unit– IV **Oscillators**	4a. Describe the working principle of oscillators	4.1 Types of feedback(Positive and Negative) 4.2 Principle of oscillation. 4.3 Oscillators: Hartley and Colpitts
Unit-V **Cables, Connectors and Measuring Instruments**	5a. Differentiate the different types of cables. 5b. Distinguish the different types of connectors 5c. Use different measuring instruments	5.1 Analog and Digital display. 5.2 Cables: coaxial cable, twisted pair cable and fiber optic cable 5.3 Connectors: coaxial cable connectors, RJ-45, RS-232, HDMI connectors 5.4 Multimeters: Analog and digital multimeter 5.5 CRO: front panel controls and application

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
I	Electronic Components and Signals	07	05	04	05	14
II	Diodes and Applications	10	04	04	10	18
III	Transistors	09	01	04	09	14
IV	Oscillators	07	04	04	02	10
V	Cable, Connectors and Measuring Instruments	09	02	02	10	14
	Total	**42**	**16**	**18**	**36**	**70**

Legends:
R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as only general guideline for students and teachers. The actual distribution of marks in the question paper may vary from above table.

6. SUGGESTED LIST OF EXERCISES/PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the above mentioned expected competency.

S. No.	Unit No.	Practical Exercise	Approx Hours Required
1	All	Perform Basic operations on MultiSIM/ Electronic Workbench	04
2	I, V	Measure voltage and current of a given circuit using analog and digital multimeters.	02
3	II	Test performance of P-N junction diode.	02
4	V	Operate all controls of CRO front panel.	02
5	I,V	Measure voltage and frequency of any given signal using oscilloscope.	02
6	II	Test performance of bridge rectifier.	02
7	I	Measure parameters of various signals	02
8	III	Test performance of transistor as a switch	02
9	IV	Test the performance of the T-filter	02
10	IV	Test the performance of the π-filter	02
11	V	Test various cables for different applications	04
12	V	Identify various connectors & Draw their diagram	02
		Total	**28**

7. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed individual or group-based student activities like:

- Course/topic based seminars,
- Teacher guided self learning activities,
- Course /library/internet/lab based mini-projects etc.

8. SUGGESTED LEARNING RESOURCES

A. List of Books

S.No.	Title of Books	Author	Publication
1	Principle of Electronics	V.K.Mehta	S.Chand & Co., latest edition
2	Electronics Principles	Albert Paul Malvino	McGraw Hill, latest edition
3	Electronics Devices and Circuit Theory	Robert L. Boylestad	Pearson, latest edition
4	Electronic Instrumentation	H.S.Kalsi	McGraw Hill, latest edition
5	Cables and Connectors	John Kadick	AVO International, latest edition

B. List of Major Equipment/ Cables and Connectors

i. Analog multimeter, digital multimeter
ii. CRO
iii. Function generator
iv. Different Types of Cables, Connectors

C. List of Software/Learning Websites

i. Electronic workbench
ii. MultiSIM

9. COURSE CURRICULUM DEVELOPMENT COMMITTEE.

Faculty Members from Polytechnics

- **Prof. M.P.Parmar**, Incharge Head and Senior Lecturer, Information Technology Department, Government Polytechnic, Ahmedabad
- **Prof. Nandu Fatak**, Lecturer, Information Technology Dept. Government Polytechnic, Ahmedabad

Coordinator & Faculty Members From NITTTR, Bhopal

- **Prof. (Mrs.) Susan S. Mathew**, Associate Professor, Dept. of Electrical and Electronics Engg.
- **Dr.(Mrs.) Anjali Potnis**, Assistant Professor, Dept. of Electrical and Electronics Engg.