

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

The objective of this course is to impart knowledge of analog electronics, various electronics materials and components. The course describes suitability and characteristics of all basic concepts regarding to electronics which will be useful in advanced courses.

2. LIST OF COMPETENCIES

Apply the concepts of analog electronics to understand working, characteristics, composition and application in the industries and in advanced courses in forthcoming semesters.

3. TEACHING AND EXAMINATION SCHEME

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

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

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I	<p>1a. Introduction to analog electronics.</p> <p>1b. Explain various analog electronics terminology</p>	<p>1.1 Active and passive components.</p> <p>1.2 Voltage and Current Source.</p> <p>1.3 Symbols of various semiconductors.</p> <p>1.4 Important definitions. (i)Amplitude, Frequency, Phase, Wavelength (ii)Signal, waveform, spectrum, Time and frequency domain representation</p> <p>1.5 Signals and their responses. 1.5(i)Unit step, Unit Impulse and Unit Ramp 1.5(ii) Parabolic, Triangular and Saw tooth.</p>
Unit– II	<p>2a...Identify P-N junction diode, its working and applications.</p> <p>2b. Identify Zener diode, its working and applications.</p>	<p>2.1 Working of P-N junction diode</p> <p>2.2 Working of Zener diode</p> <p>2.3 Bridge Rectifier</p> <p>2.4 'T' and $\div \phi$ Filter circuits</p> <p>2.5 Zener diode as voltage regulator</p>
Unit– III	<p>3a. Identify PNP and NPN transistor, its working and applications.</p> <p>3b. Identify FET, its working and applications.</p>	<p>3.1 Working of PNP and NPN transistor</p> <p>3.2 Transistor as switch.</p> <p>3.3 working of PMOS and NMOS</p> <p>3.4 Working of CMOS logic families.</p>
Unit– IV	<p>4a. Apply the principal of oscillator</p> <p>4b. Understand thyristor</p>	<p>4.1 Types of feedback(Positive and Negative)</p> <p>4.2 Principle of oscillation.</p> <p>4.3 Hartley and Colpitts Oscillator</p> <p>4.4 Thyristor: Construction and working</p>
Unit-V	<p>5a. Identify various Cable, Connectors and measuring instruments.</p>	<p>5.1 Analog and Digital display.</p> <p>5.2 Measurement units of various quantities</p> <p>5.3 Cables: coaxial cable, twisted pair cable and fiber optic cable</p> <p>5.4 Connectors: coaxial cable connectors, RJ-45, RS-232, HDMI connectors</p> <p>5.5 Analog multimeter and digital multimeter</p> <p>5.6 CRO: necessary front panel controls and application</p>

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

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks (Duration –Hours)			
			R Level	U Level	A Level	Total
1.	Introduction to analog electronics	07	05	04	05	14
2.	Diodes and its applications	09	04	00	10	14
3.	The Transistors	09	01	04	09	14
4.	Oscillators and other semiconductor devices Oscillator and Thyristor	09	06	04	04	14
5.	Cable, Connectors and measuring instruments	08	00	02	12	14
	Total	42	16	14	40	70

Legends:

R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

6. SUGGESTED LIST OF EXPERIMENTS

The experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency -

S. No.	Unit No.	Experiment
1	1	Understand various analog electronics terminology
2	1	Test response of various signals
3	2	Operate transistor in PNP and NPN mode
4	2	Operate transistor as switch
5	3	Understand working of Zener diode as voltage regulator
6	3	Study operation of CMOS logic family as NAND and NOR logic gate.
7	4	Identify various cables and connectors.
8	4	Understand working of Hartley oscillator.
9	5	Understand working of Colpitts oscillator.
10	5	Identify all controls of CRO front panel.

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like: course/topic based seminars, teacher guided self learning activities, course /library/internet/lab based mini-projects etc. These could be individual or group-based.

8. SUGGESTED LEARNING RESOURCES

A. List of Books

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

B. List of Major Equipment/ Instrument

1. Resistors, capacitors and inductors
2. Digital multimeter
3. CRO
4. Function generator
5. Transistor and FET

C. List of Software/Learning Websites

1. Electronic workbench
2. Model sim

9. Course Curriculum Development Committee.

Faculty members from Polytechnics

1. **Mr. M.P.PARMAR**, Incharge Head and Senior Lecturer, Information Technology Department, Government Polytechnic, Ahmedabad
2. **Mr. Nandu Fatak** , Lecturer, Information Technology Dept. Government Polytechnic Ahmedabad

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