



**Gyanmanjari**  
Innovative University

Course Syllabus  
Gyanmanjari Institute of Technology  
Semester-3

**Subject:** Basic Electronics-BETEE13304

**Type of course:** Major

**Prerequisite:** Basic Understanding of Electronics

**Rationale:**

This course has been designed to impart in-depth knowledge of Electronics. The students learn basic concepts of electronic components and their applications. In this course students learn about processes like rectification, amplification and construction of instrument used for measuring Electronics Parameter. Field of basic electronics lies in its fundamental importance in various areas including engineering, technology, and everyday life.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			ESE		MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

*Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*



**Course Content:**

Unit No	Course content	Hrs	% Weight age
1	<b>Semiconductor Diodes</b> <ul style="list-style-type: none"> <li>• Semiconductor materials- intrinsic and extrinsic types. Depletion layer, barrier potential, Knee Voltage.</li> <li>• An Introduction to PN Junction, Biasing of diode: Forward and Reverse, VI characteristics of PN junction diode, ideal diode. Static and Dynamic Resistance of a Diode, Application of Diode.</li> <li>• Zener diode, LED, Photodiode, Varactor diode, Tunnel diodes, Schottky diode.</li> </ul>	15	25%
2	<b>Applications of Diode</b> <ul style="list-style-type: none"> <li>• Rectifiers: Half wave, center-tapped Full wave, Bridge Rectifier, Performance Indices: RMS value, Ripple Factor, Efficiency.</li> <li>• Diode circuits: Clipper &amp; Clamper circuits (Biased &amp; Unbiased). Applications of Clipper and Clamper</li> <li>• Peak Detector.</li> <li>• Reverse Polarity Protection Circuit.</li> </ul>	12	20%
3	<b>Bipolar junction transistors and Amplifier</b> <ul style="list-style-type: none"> <li>• Bipolar Junction Transistors: Transistor Construction, Symbols of NPN &amp; PNP transistor, Unbiased Transistor, Operation of NPN &amp; PNP Transistor.</li> <li>• Transistor configuration: Common base, Common Emitter and Common Collector. Input and output characteristics of all configurations.</li> <li>• Transistors Biasing: DC operating point, Various Biasing Circuit.</li> </ul>	15	25%
4	<b>Field Effect Transistor and Metal Oxide Silicon Field Effect Transistors</b> <ul style="list-style-type: none"> <li>• FET: Introduction, operation, JFET parameters, JFET characteristics, JFET amplifiers.</li> <li>• MOS FET: Introduction, operation, MOSFET Parameters</li> </ul>	9	15%
5.	<b>Electronic Instrumentation and Measurement</b> <ul style="list-style-type: none"> <li>• Introduction.</li> <li>• Digital Voltmeter: comparison of Digital and Analog Voltmeter. Working and Block Diagram of Digital Voltmeter. Types of DVM.</li> <li>• Digital Multimeter: Block Diagram and Working</li> <li>• Cathode Ray Oscilloscope: CRT, Block diagram, Working and Application</li> <li>• Digital Storage Oscilloscope: Block Diagram, Working modes</li> </ul>	9	15%

**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1	<b>Judge and Draw</b> Clue will be given to the students, students need to Judge and draw the circuit. Activity is to be done in a group of 3 or 4 .Upload it in GMIU Web Portal	10
2	<b>Component Identification</b> Identify the component and name it. Give two Characteristics of that component and upload it in GMIU Web Portal	10
3	<b>Micro project</b> Students will make project(prototype) using Electronics Component in a group of 2 or 3 .Upload Report in GMIU Web Portal	10
Total		30

**Suggested Specification table with Marks (Theory):60**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weight age	20%	40%	30%	10%	0	0

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

**Course Outcome:**

After learning the course the students should be able to:	
CO1	Familiarize with the basic terminology/definitions of Electronics Engineering
CO2	Analyze and find application of Diodes.
CO3	Summarize the operation of BJT, FET and MOSFET
CO4	Understand measuring instruments and their construction



**List of Practicals:**

Sr. No	Descriptions	Unit No	Hrs
1	Measurement of different signal parameters.	1	2
2	Identify components using Lissajous Pattern.	1	2
3	To study V-I Characteristics of PN Junction diodes.	1	2
4	To study V-I Characteristics of Zener Diode with Graph.	1	2
5	To understand the Characteristics of LED.	1	2
6	To study Half wave Rectifier.	2	2
7	Convert AC signal into DC using Full Wave Rectifier and Calculate Ripple Factor.	2	2
8	Convert AC signal into DC using Bridge Rectifier	2	2
9	To study Characteristics of BJT in Common Base Configuration	3	2
10	To draw the input and output Characteristics of BJT in Common Emitter Configuration	3	2
11	To study Characteristics of BJT in Common Collector Configuration	3	2
12	Test the performance of JFET	4	2
13	To study construction of CRT	5	2
14	Project	1,2,3,4,5	4
	<b>TOTAL</b>		30

**Instructional Method:**

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.



Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment  
Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

**Reference Books:**

- [1] David A. Bell, "Electronic Devices and Circuits", Oxford University Press
- [2] R.L Boylestad and L. Nashelsky, "Electronic Devices & Circuit Theory", Pearson Education
- [3].N N. Bhargava, D C Kulshreshtha, S C Gupta. "Basic Electronics and Linear Circuits"  
McGraw Hill India
- [4] D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education (India) Private Limited

