



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-3

Subject: Analog and Digital Electronics - DETEE13206

Type of course: Minor

Prerequisite: Basic knowledge of Analog and Digital Electronics

Rationale:

This course has been designed to impart in-depth knowledge of Analog and Digital Electronics. The students learn basic concepts related to electronics components and their applications. In this course students learn about processes like rectification, amplification, number system, Boolean algebra and Combinational Circuit. Field of Analog and Digital 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.	Electronic Device <ul style="list-style-type: none"> ❖ Basic Concept Of Electronics and its application ❖ Types of Electron Emission & its types. <ul style="list-style-type: none"> ➤ Thermionic Emission ➤ Field emission ➤ Secondary emission ➤ Photo-electric emission 	12	20%



	<ul style="list-style-type: none"> ❖ Classification of material. ➤ Definition Of Energy Band, Valence band, Conduction band, Forbidden energy gap ➤ Energy band diagram of Insulators ,Conductors ,Semiconductors ❖ Intrinsic & Extrinsic Semiconductor. ❖ PN junction diode, Zener diode and Light Emitting Diode (LED) • Integrated circuits (I.C) & its advantages 		
2.	<p>Electronic Circuit</p> <ul style="list-style-type: none"> ❖ Introduction to Rectifier ❖ Principles of working of different types of Rectifiers with their merits and demerits ➤ Half wave rectifier ➤ Full wave rectifier ❖ Functions of filters and classification of simple Filter circuit ➤ Capacitor, ➤ Choke input ➤ Capacitor Input Filter ❖ Working of D.C power supply system (unregulated) with help of block diagrams only ❖ Transistor, Different types of Transistor Configuration and state output ➤ Configuration and state output and input current gain relationship in CE,CB and CC configuration ❖ Need of biasing and explain different types of biasing with circuit diagram ➤ Emitter bias method ➤ Biasing with collector-feedback resistor method 	12	20%
3.	<p>Number system And logic Gate</p> <ul style="list-style-type: none"> ❖ Introduction of Digital Systems ❖ Numbers Systems Binary, Decimal , Octal, Hexadecimal ❖ Base Conversion ❖ Binary logic ❖ Logic Gates ➤ AND , OR, NOT, EX-OR, NOR, NAND, EX- NOR ❖ Universal Gates ➤ NAND Gate ➤ NOR Gate ❖ Postulates ❖ Laws ❖ Boolean algebra ❖ Basic theorems of Boolean algebra ❖ De-Morgan's Theorems Boolean functions 	12	20%



4.	<p>Boolean Function Implementation and Basic Combinational Logic</p> <ul style="list-style-type: none"> ❖ Need for simplification ❖ K – Map method ➤ 2 – Variable K – map ➤ 3 – Variable K – map ➤ 4 – variable K – map ❖ K – Map using Don’t care condition ❖ Introduction to combinational circuits ❖ Arithmetic and Logical Combinational Circuits ➤ Half Adder ➤ Full Adder ➤ Full Subtractor ❖ Data transmission combinational circuits ➤ Encoder ➤ 4 – 2 Encoder ➤ Decoder ➤ 2 – 4 Decoder ➤ Multiplexer ➤ 4 – 1 multiplexer ➤ De- multiplexer 1 – 4 De -multiplexer 	12	20%
5.	<p>Sequential Circuits</p> <ul style="list-style-type: none"> ❖ Introduction to Sequential circuit ❖ Flip Flop ➤ SR Flip Flop ➤ JK Flip Flop ➤ D Flip Flop ➤ T Flip Flop 	12	20%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	<p>Coding of Semiconductor Type Designation Code Students need to identify code given by faculty and generate new code for semiconductor and upload report in GMIU web portal (No. of student per team - 03)</p>	10
2	<p>Solve and Simulate Students need to prepare log book based on problems assigned by faculty Upload a solution of the problem in GMIU web portal(No. of student per team – 02 or 03)</p>	10
3	<p>Learn with Fun Students need to prepare micro project in group of three or four and upload video of working model on GMIU web portal.</p>	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)
Weightage	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	Analyze the features of electronic device.
CO2	Design and development of electronic circuit using different configuration.
CO3	Perform conversion of given number between various types of number and apply Boolean algebra for circuit optimization.
CO4	Understand and apply various types of combinational circuits

List of Practical:

Sr. No	Descriptions	Unit No	Hrs
1.	Familiarization with operation and use of the Various Electronics Instruments. by way of taking readings of relevant quantities.	1	2
2.	Plotting of V-I characteristics of a PN junction diode.	1	2
3.	Plotting of V-I characteristics of a Zener diode.	2	2
4.	To Perform Half wave Rectifier and Calculate Ripple Factor.	2	2
5.	To Perform Full Wave Rectifier and Calculate Ripple Factor.	2	2
6.	To draw the input and output Characteristics of BJT in Common Emitter Configuration.	2	2
7.	To Perform basic logic gates & Verification of truth table.	3	2
8.	To Study Universal Building Block Implementation of various Logic gates using only NAND gates & verification of truth table.	3	2
9.	To Study Universal Building Block Implementation of various Logic gates using only NOR gate & verification of truth table.	3	2
10.	To design & Implement Half Adder circuits.	4	2
11.	To design & Implement Full Adder circuits.	4	2
12.	To design & Implement Half Subtractor circuits.	4	2
13.	To design & Implement Full Subtractor circuits.	4	2
14.	To realize Encoder Combinational Circuits.	4	2
15.	To realize Decoder Combinational Circuits.	4	2
TOTAL			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] Basic Electronics Solid State :B L Threja
- [2] Basic Electronics Engineering: Satya Sai Srikant, Prakash Kumar Chaturvedi
- [3] Electronics Fundametal and Application :D. Chattopadhyay, P. C. Rakshit
- [4] Basic Electronics Engineering: Sean Westcott, Jean Riescher Westcott
- [5] Basic electronic devices and circuits: Mahesh H patel.
- [6] Digital Logic and Computer Design: Mano M Morris, Pearson Publication
- [7] Modern Digital Electronics: Jain R P, Tata McGraw-Hill

