

<b>INSTITUTE</b>	<b>DIPLOMA STUDIES</b>
<b>PROGRAM</b>	<b>DIPLOMA ENGINEERING (COMPUTER ENGINEERING)</b>
<b>SEMESTER</b>	<b>2</b>
<b>COURSE TITLE</b>	<b>BASIC ELECTRONICS</b>
<b>COURSE CODE</b>	<b>09EE2103</b>
<b>COURSE CREDITS</b>	<b>3</b>

**Objective:**

- 1 This subject provides an opportunity for the students to get familiarized with all basic electronics components and study the characteristics of diode, transistors etc. Also student will get the ability to do simulation of corresponding circuits. The lab is designed for second semester students.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Develop the conceptual knowledge about the semiconductor and learn fundamentals of terminal characteristics of PN junction diode and design
- 2 Identify limitation of diode and learning fundamentals of transistor structure, types and behavioral characteristics and comparison of various transistor configurations.
- 3 Exploring the DC load line, biasing methods, and applications of transistor.
- 4 To build basic circuits using liner IC's.
- 5 To troubleshoot electronic circuits.

**Pre-requisite of course:**Basic knowledge of physics

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
2	0	2	50	30	20	25	25

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Diode characteristics and its applications</b> Types of semiconductors., P-N junction diode formation and characteristics., Applications - Diode as rectifier, half wave, full wave and bridge rectifier, clipping and clamping circuit., Need of filters., Need of filters., Zener diode & it's application, Photo diode, LDR, Photovoltaic Cell, Light Emitting Diode, Varactor Diode, Digital display	11

Contents : Unit	Topics	Contact Hours
2	<b>Transistor characteristics and applications</b> PNP and NPN transistors, conduction through transistor leakage current, relationship between $\alpha$ and $\beta$ ., Transistor configuration & characteristics for CB, CE, CC. Load line and biasing methods of transistor., Common emitter amplifier. Common collector amplifier. Multistage amplifier, Construction of JFET, Characteristics of JFET	8
3	<b>Integrated circuits, Cables and Connectors</b> Need of IC's. Block diagram of operation amplifier. Characteristics and specification of op amp , Applications of op amp, Block diagram of IC555, Working of IC555, Applications of IC 555, Mono stable, bi stable, astable Multivibrator and timer circuit, Cables: coaxial cable, twisted pair cable and fiber optic cable, Connectors: coaxial cable connectors, RJ-45, RS-232, HDMI connectors.	9
<b>Total Hours</b>		<b>28</b>

#### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	<b>To use oscilloscope for measuring pick voltage, frequency and observing AC electrical quantities.</b> To use oscilloscope for measuring pick voltage, frequency and observing AC electrical quantities	2
2	<b>To use function generator for producing square and sine wave.</b> To use function generator for producing square and sine wave.	2
3	<b>To Plot the V-I characteristics of PN junction diode under forward and reverse bias conditions and find the cut- in voltage, and Dynamic resistance of PN junction diode in forward bias using simulation.</b> To Plot the V-I characteristics of PN junction diode under forward and reverse bias conditions and find the cut- in voltage, and Dynamic resistance of PN junction diode in forward bias using simulation.	2
4	<b>To Obtain the forward bias and reverse bias characteristics of a Zener diode and find out the Zener break down voltage from characteristics using simulation.</b> To Obtain the forward bias and reverse bias characteristics of a Zener diode and find out the Zener break down voltage from characteristics using simulation.	2
5	<b>To prepare Half-wave rectifier and observe the output.</b> To prepare Half-wave rectifier and observe the output.	2
6	<b>To prepare full wave rectifier and observe the output.</b> To prepare Half-wave rectifier and observe the output.	2

**Suggested List of Experiments:**

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
7	<b>To design and implement clipper circuits and draw its output voltage wave form.</b> To design and implement clipper circuits and draw its output voltage wave form.	2
8	<b>To Plot the input and output VI-characteristics of NPN BJT in common emitter configuration using simulation.</b> To Plot the input and output VI-characteristics of NPN BJT in common emitter configuration using simulation.	2
9	<b>To Configure and test NPN BJT as a switch.</b> To Configure and test NPN BJT as a switch.	2
10	<b>To prepare fixed bias NPN BJT amplifier and observe its output waveform using simulation.</b> To Configure and test NPN BJT as a switch.	2
11	<b>To build and analyze timer circuit using 555 timer using simulation.</b> To build and analyze timer circuit using 555 timer using simulation.	2
12	<b>To operate IC555 in Bistable stable mode and observe output.</b> To operate IC555 in Bistable stable mode and observe output.	2
13	<b>To operate IC555 in mono stable mode and observe output.</b> To operate IC555 in mono stable mode and observe output.	2
14	<b>Diode characteristics and its applications</b> Types of semiconductors, P-N junction diode formation and characteristics., Applications - Diode as rectifier, half wave, full wave and bridge rectifier, clipping and clamping circuit., Need of filters., C, L, LC, p filters., Zener diode & its application., Photo diode, LDR, Photovoltaic Cell, Light Emitting Diode, Varactor Diode, Digital display	0
15	<b>Transistor characteristics and applications</b> PNP and NPN transistors, conduction through transistor leakage current, relationship between $\alpha$ and $\beta$ ., Transistor configuration & characteristics for CB, CE, CC. Load line and biasing methods of transistor., Common emitter amplifier. Common collector amplifier. Multistage amplifier, Construction of JFET, Characteristics of JFET	0
16	<b>Integrated circuits, Cables and Connectors</b> Need of IC's. Block diagram of operation amplifier. Characteristics and specification of op amp , Applications of op amp, Block diagram of IC555, Working of IC555, Applications of IC 555, Mono stable, bi stable, astable Multivibrator and timer circuit, Cables: coaxial cable, twisted pair cable and fiber optic cable, Connectors: coaxial cable connectors, RJ-45, RS-232, HDMI connectors.	0
<b>Total Hours</b>		<b>26</b>

**Textbook :**

- 1 Principle of Electronics, V.K.Mehta , S.Chand , .

**References:**

- 1 Principle of Electronics, Principle of Electronics, V.K.Mehta, S.Chand & Co, NA
- 2 Electronics Principles, Electronics Principles, Albert Paul Malvino, McGraw Hill, NA
- 3 Electronics Devices and Circuit Theory, Electronics Devices and Circuit Theory, Robert L. Boylestad, Pearson, NA
- 4 Cables and Connectors, Cables and Connectors, John Kadick, AVO International, NA

**Suggested Theory Distribution:**

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
35.00	35.00	20.00	10.00		

**Supplementary Resources:**

- 1 . [https://onlinecourses.nptel.ac.in/noc17\\_ee02/preview](https://onlinecourses.nptel.ac.in/noc17_ee02/preview)
- 2 <https://electronicsforu.com/>