

Department of ELECTRICAL AND ELECTRONICS ENGINEERING

Academic Year 2025 – 2026 (Even Semester)

Degree, Semester & Branch: II Semester B.TECH & AI&DS

Course Code & Title: 24EE204 – Basics of Electrical and Electronics Engineering

Name of the Faculty member: Mrs.R.BRINDHA SHALINI

INNOVATIVE PRACTICE DESCRIPTION

Unit / Topic: Unit IV / Operation of Zener Diode

Course Outcome: CO 4

Activity Chosen: Virtual Lab

Justification:

Virtual laboratories provide an effective and flexible learning environment by allowing students to perform experiments through simulation without the limitations of physical infrastructure. They enhance conceptual understanding by enabling visualization of complex systems, ensure safety while handling high-risk experiments, reduce equipment and maintenance costs, and support self-paced, repetitive learning. Virtual labs also improve analytical and problem-solving skills and help bridge the gap between theoretical knowledge and practical application, making them a valuable supplement to conventional laboratories.

Time Allotted for the Activity: 15 minutes

Details of the Implementation:

The students were asked to do the following steps

1. Set DC voltage to 10V
2. Set the Series Resistance (R_S) to 505 Ω
3. Set Zener voltage (V_Z) to 5V.
4. Vary the Load Resistance (R_L).
5. Voltmeter to be placed parallel to load resistor and ammeter in series with the series resistor.
6. Choose Load Resistance so that Zener diode is 'on' mode.

7. Note the Voltmeter and Ammeter readings for different values of Load Resistance.
8. Note the Load current (I_L), Zener current (I_Z), Output voltage (V_O)
9. Calculate the voltage regulation.

Images / Screenshot of the practice:

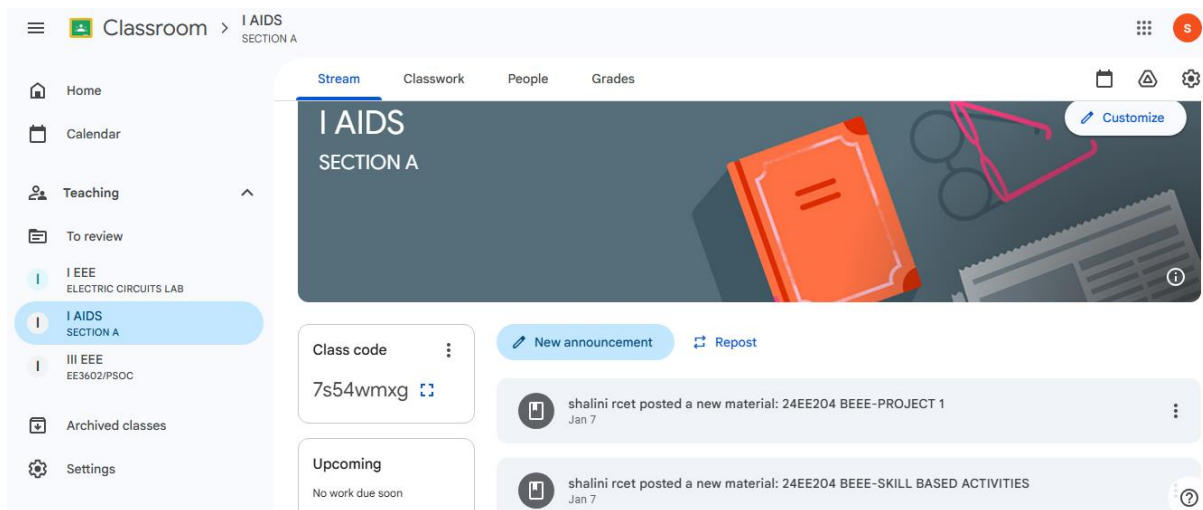


APPLICATIONS:

A Zener diode is widely used in electronic circuits for voltage regulation by maintaining a constant output voltage despite variations in input supply or load conditions. It is also used for over-voltage protection to safeguard sensitive components by limiting excess voltage. Additionally, the Zener diode acts as a reference voltage source in power supplies and control circuits, is employed in wave-shaping applications such as clipping and clamping, and helps in stabilizing biasing conditions in transistor and amplifier circuits.

2. Activity Chosen: GOOGLE CLASS ROOM

<https://classroom.google.com/c/ODM3Mjk3MjU4ODEx?cjc=7s54wmxg>



Google Classroom serves as an effective digital learning platform that streamlines teaching and learning by enabling easy distribution of study materials, **assignments, worksheet problems, skill-based activities, and project work** in a paperless environment. It enhances communication between teachers and students, ensures timely submission and structured feedback, promotes organized and self-paced learning, and supports blended and remote education. By integrating continuous assessment, collaborative activities, and project-based learning, Google Classroom improves student engagement, accountability, skill development, and overall learning effectiveness.

SKILL BASED ACTIVITY

Skill-based activities at the knowledge level are designed to help students recall, recognize, and understand fundamental concepts effectively. Through activities such as identifying components, listing applications, labeling circuit diagrams, solving basic worksheet problems, and answering short conceptual questions, students strengthen their foundational knowledge. These activities encourage active participation, improve subject familiarity, and build confidence, thereby preparing students for higher-order thinking and advanced skill development.

<https://classroom.google.com/c/ODM3Mjk3MjU4ODEx/m/ODM4MzMzMjU4ODEx/details>

WORK SHEET

Unit / Topic: Unit 1: DC CIRCUITS

Course Outcome: CO1

Activity Chosen: PROBLEM SOLVING

Justification:

Worksheet problem activities are used to reinforce theoretical concepts by providing structured, practice-oriented questions that promote active learning. Through these activities, students apply fundamental principles to solve numerical and conceptual problems, improve problem-solving accuracy, and enhance analytical thinking. Regular worksheet practice helps in self-assessment, clarifies doubts, and strengthens understanding, thereby improving academic performance and readiness for examinations.

<https://classroom.google.com/c/ODM3Mjk3MjU4ODEx/m/ODM4MzMzMzI1ODQ4/details>

ANIMATED VIDEOS:

KIRCHOFFS LAW

<https://youtu.be/FHJWkx5yehE?si=pdnzH27-KLHWegVU>

AC CIRCUITS

<https://youtu.be/zO7RZZW0wSQ?si=zDFTsdzVVgPfHu0x>

DC MACHINES

<https://youtu.be/CWulQ1ZSE3c?si=2-erP8QrrrQLdk9C>

PN JUNCTION DIODE

<https://youtu.be/btOIDQeMrMg?si=EGrLhdkEJlvzu1oP>

LED

<https://youtu.be/Z6M3R6RjEas?si=9Uufu8SZleEtVkWW>