

ELECTRIC CIRCUIT ANALYSIS- 1



Project Report: Sleep Detector Using IR Sensor and Buzzer

Names	Muneeb Ahmad
Registration Numbers	FA21-BEE-145
Class	BEE-2C
Instructor's Name	Dr. Amir Rasheed Chaudhery

Lab Assessment

Pre-Lab	In-Lab	Post Lab			Total
		Data Presentation	Data Analysis	Writing Style	

Sleep Detector Using IR Sensor and Buzzer

1. Objective

To design and demonstrate a simple electronic circuit capable of detecting when a person nods off or moves away by monitoring infrared light reflection, and to alert them through a buzzer alarm.

2. Introduction

Drowsiness and accidental sleep during activities such as studying or monitoring can lead to decreased alertness and performance. This project focuses on building a straightforward sleep detector using an IR sensor and a buzzer. The system detects the proximity of a person's face. As long as the face is within range, the IR light reflects back to the sensor and keeps the buzzer silent. If the person nods off or moves out of range, the reduced reflection triggers the buzzer to alert them.

3. Components Required

S.No	Component	Quantity
1	IR Sensor Module (3-pin)	1
2	Buzzer	1
3	Connecting Wires	As Needed
4	Power Source (5V or 9V Battery)	1

4. Working Principle

The IR sensor module emits continuous infrared light. When a person's face is positioned close to the sensor, the infrared light reflects back and is detected by the sensor's photodiode. This keeps the output in a stable state that keeps the buzzer turned off. If the person moves away (as happens during nodding off), the reflected light diminishes, causing the sensor's output to change and activate the buzzer, thus alerting the person.

5. Circuit Description

The circuit is straightforward. The IR sensor's VCC and GND pins are connected to the power source. The OUT pin of the sensor is directly connected to the positive terminal of the buzzer, while the negative terminal of the buzzer is connected to ground. When the sensor does not detect sufficient reflected IR light, the OUT pin state changes, powering the buzzer.

6. Circuit Diagram

IR Sensor Module
+5V -----> VCC
GND -----> GND
OUT -----> + Buzzer
- Buzzer --> GND

7. Advantages

Simple and low-cost implementation.
Does not require microcontrollers or programming.
Can be easily adjusted for different sensitivity levels.
Suitable for basic safety and alert systems.

8. Applications

- As a student desk alarm to avoid sleeping during study sessions.
- A prototype for a driver drowsiness warning system.
- Presence detection for other simple alert circuits.

9. Conclusion

This project successfully demonstrates a basic sleep detection mechanism using an IR sensor and a buzzer. It highlights how simple electronics can be utilized to enhance alertness and prevent unintended drowsiness in small setups without the need for complex micro-controller programming.