

Sinhgad Technical Education Society's  
**Smt. Kashibai Navale College of Engineering**

**Department of Electronics & Telecommunication Engineering**



**Sinhgad Institutes**

**Second Year**

**Project Based Learning (PBL)**

# **LOG BOOK**

**ACADEMIC YEAR: 2024 – 25**

**Semester: IV**

<b>Division:</b> SE-III
<b>Batch:</b> S9
<b>Group:</b> 04
<b>Project Title:</b> RFID & RF Based E-Voting System



Sinhgad Institutes

## Smt. Kashibai Navale College of Engineering

Sr. No. 44/1, Vadgnon (Bk), Off Sinhgad Road, Pune – 411 041.

Department of E&TC Engineering

# Certificate

This is to certify that, following students,

1. Tejas Bhalchandra Kole	Roll No.: E2301
2. Harsh Rakesh Kolhe	Roll No.: E2302
3. Tejas Atul Kotgire	Roll No.: E2304
4. Shraddha Vijay Kshirsagar	Roll No.: E2306
5.	Roll No.:
6.	Roll No.:

has completed all the Term Work in the subject **Project Based Learning (PBL)** satisfactorily in the department of E&TC Engineering as prescribed by Savitribai Phule Pune University, in the academic year 2024 – 2025.

Faculty-In-Charge

Mr. V. P. Niwane/  
Mrs. T. A. Mate  
Coordinator

Dr. P. S. Raskar  
Program Coordinator  
(HOD)

Date: 16 / 04 / 2025

### **Rules & Regulations:**

- 1) Handle the workbook very carefully.
- 2) All students must enter the correct information in the logbook.
- 3) All entries in the PBL log book must be verified by the concerned supervisor/mentor/guide.
- 4) Activities planned should be completed as per the instructions and schedule given by supervisor/mentor/guide.
- 5) Assessment of TW for Project Based Learning (PBL) is out of 50 Marks which are based on attendance, regularity of completion of activities on given time and students involvement. Also based on idea inception, outcomes of PBL, problem solving skills, solution provided, final product, documentation, demonstration, contest participation, and awareness.
- 6) Students need to submit a final report of 20 to 25 pages in the prescribed format given at the end of this workbook.

### **Course Objectives:**

- To emphasize project based learning activities that are long-term, interdisciplinary and student-centric.
- To inculcate independent and group learning by solving real world problem with the help of available resources.
- To be able to develop application based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
- To get practical experience in all steps in the life cycle of the development of electronic systems: specification, design, implementation, and testing.
- To be able to select and utilize appropriate hardware and software tools to design and analyze the proposed system.
- To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism.

### **Course Outcomes:**

- 1) CO1: Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
- 2) CO2: Contribute to society through proposed solution by strictly following professional ethics and safety measures.
- 3) CO3: Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
- 4) CO4: Analyze the results and arrive at valid conclusion.
- 5) CO5: Use of technology in proposed work and demonstrate learning in oral and written form.
- 6) CO6: Develop ability to work as an individual and as a team member

**Group Information:**

Division: SE-III Batch: 59 Group: 04

Roll No.	PRN No.	Name of Student	Mobile No.
E2301	72314248D	Tejas Bhalchandra Kole	7499461788
E2302	72314249B	Harsh Rakesh Kolhe	9623465615
E2304	72314254J	Tejas Atul Kotgire	9156845506
E2306	72314261M	Shraddha Vijay Kshirsagar	9403845159

Name of Faculty: Ms. Archana Deokate

E-mail: \_\_\_\_\_

Mobile No.: 9561616532

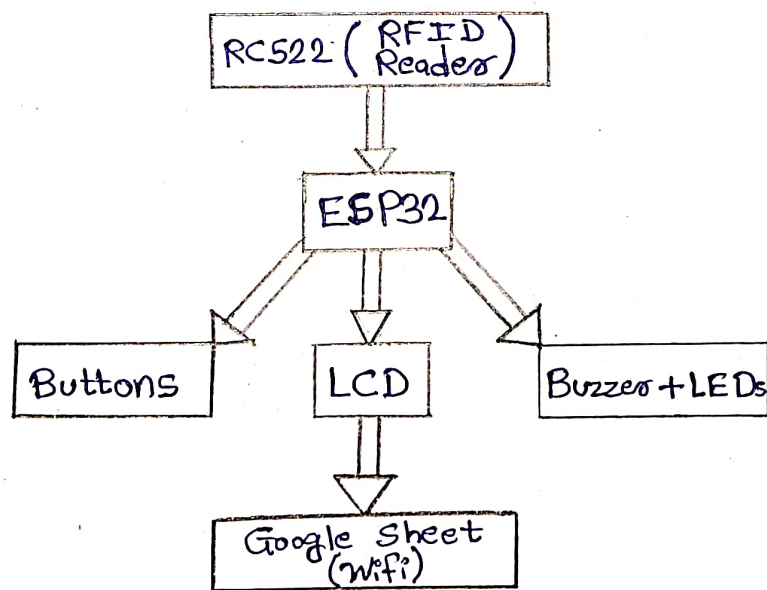


## Project Title: RFID & RF Based E-Voting System

**Aim:** To develop a secure RFID and RF Based Voting System using ESP32 and google sheets for real time vote logging and transparent result display.

- Objective:**
- To authenticate voters using RFID Cards
  - To allow only one vote per registered card
  - To log votes in real-time on Google Sheets
  - To display message using 16x2 LCD.
  - To give Feedback using LED and Buzzer
  - To view vote summary and winner using admin Card.

### Block Diagram:



## Literature Survey:

The following previous works were studied and referred to the development of the RFID and RF Based E-Voting System:

- 1) 2017 - RFID Based Electronic Voting Machine
  - A system using RFID Cards to authenticate voters and prevent multiple voting attempts. Ensured secure access via VID.
- 2) 2019 - IOT-Enabled E-Voting Using ESP32
  - Proposed real-time vote logging through ESP32 and google sheets for transparency in institutional voting.
- 3) 2020 - Multi-Level Authentication System
  - Introduced the use of both fingerprint and RFID verification for secure and tamper-proof voting.
- 4) 2021 - Secure Voting Using Blockchain
  - Used blockchain ledger technology to store votes submitted via RFID validation for tamper-proof result management.
- 5) 2023 - Real-Time IOT-Based Voting System
  - Focused on user feedback via LCD display and buzzer, and allowed cloud-based result access using Google sheets.

~ These studies helped us identify key challenges and adopt secure and reliable methods for developing voting system.

### Required H/W & S/W:

Hardware : ESP32, RC522, RFID Cards, 16x2 LCD with I2C, 4 push buttons, 4220 resistors, Buzzer, wires, PCB, USB Cable, Laptop,

Software : Arduino IDE, Google Sheets, Google Appscript, etc.

### Applications:

- Can be used in college elections, club voting, etc.
- Secure, paperless and transparent voting.
- Used as small scaled government voting setups.

### References: (Website/Books/Papers):

- 1) Klaus Finkenzeller - RFID Handbook: Fundamental and Applications.
- 2) Espressif Systems - ESP32 Technical Reference Manual
- 3) NXP Semiconductors - MFRC522 RFID Module Datasheet
- 4) Arduino.cc - LiquidCrystal\_I2C Library Documentation
- 5) Google Developers - Apps Script Documentation
- 6) D.L. Chaudhari - Smart Electronic Voting Machine using RFID, IRJET
- 7) IEEE Xplore - Secure RFID Based System Research Papers
- 8) Rajeshwarri Sundarajan - Microcontroller Based Electronic Voting Machine, IJESI, 2013



## Monthly Planning Sheet

Month 1: January 2025

Week	Activity Planned	Activities Completed	Signature of Students	Signature of Faculty
1)	Semester started, orientation about PBL	Understood Project Guidelines from faculty	<u>K. Tejas</u>	
2)	Forming PBL Groups	Group SG-04 Finalized	<u>K. Tejas</u>	
3)	Discussion of General Topics	Discussed IoT-based ideas, shortlisted RFID Topic	<u>K. Tejas</u>	
4)	Initial Literature Review started	Collected 2-3 papers related to RFID Voting	<u>K. Tejas</u>	



## Monthly Planning Sheet

Month 2: February 2025

Week	Activity Planned	Activities Completed	Signature of Students	Signature of Faculty
1)	Finalize Project Title	Chose "RFID and RF Based E-Voting System"	<u>K. Tejas.</u>	
2)	Prepared Block Diagram and Finalize components	Made block diagram, finalized ESP32 + RC522	<u>K. Tejas.</u>	
3)	Purchase Components	Bought ESP32, LCD, buttons, etc	<u>K. Tejas.</u>	
4)	Basic Code Setup and Individual Testing	Tested RFID Scan, LCD, and buttons separately	<u>K. Tejas.</u>	

## Monthly Planning Sheet

Month 3: March 2025

Week	Activity Planned	Activities Completed	Signature of Students	Signature of Faculty
1)	Start Google sheet Integration via Wifi	Connected ESP32 to sheet, logging tested	<u>K. Tejas.</u>	
2)	Implement Voting Logic with Buttons	Voting flow with timeout + LCD message added	<u>K. Tejas.</u>	
3)	Add master card result summary logic	Vote Summary and winner display done	<u>K. Tejas.</u>	
4)	Handle/invalid/duplicate card cases	All edge cases handled, testing started	<u>K. Tejas.</u>	

## Monthly Planning Sheet

Month 4: April 2025

Week	Activity Planned	Activities Completed	Signature of Students	Signature of Faculty
1)	Prepare full report + Add working Images	Project Report completed, images inserted	<u>K. Tejas</u> .	
2)	Complete PPT, logbook, simulations and documents	PPT ready, report saved, as pdf, log book started	<u>K. Tejas</u> .	
3)	Final review, Github upload working video	Uploaded to Github, test video + final testing	<u>K. Tejas</u> .	
4)	Final Printout and Submission	Report printed, logbook filled, Submitted	<u>K. Tejas</u> .	