American International University – Bangladesh (AIUB)

Faculty of Engineering

Department of CSE, EEE, and CoE

EEE4103 MICROPROCESSOR AND EMBEDDED SYSTEM

COURSE PROJECT PROPOSAL FORM

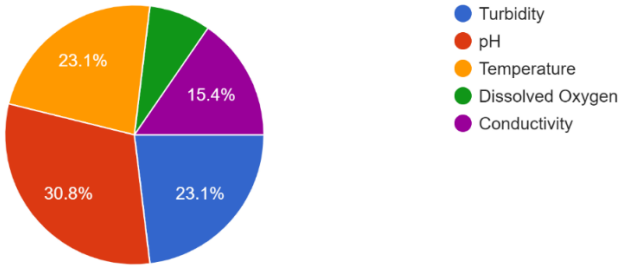
SEMESTER: SPRING 2023-2024

PROJECT TITLE: IoT Base Real-Time Water Monitoring System

SURVEY:

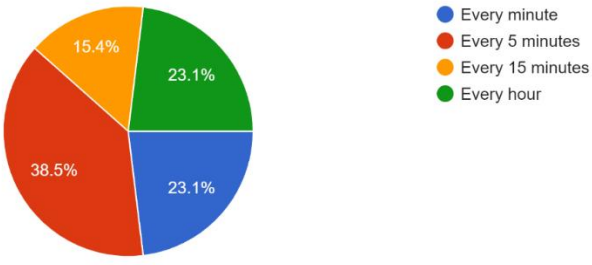
Which water quality parameters do you believe are most important to monitor in real-time?

13 responses



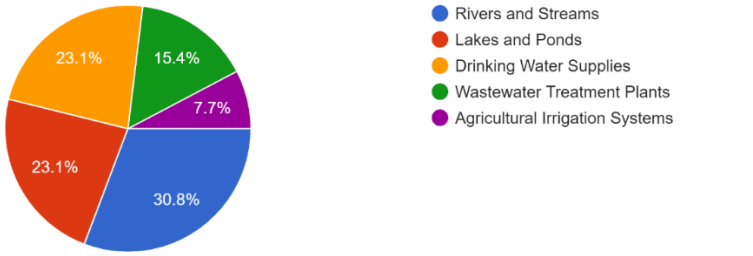
How frequently do you think real-time water quality data should be updated?

13 responses



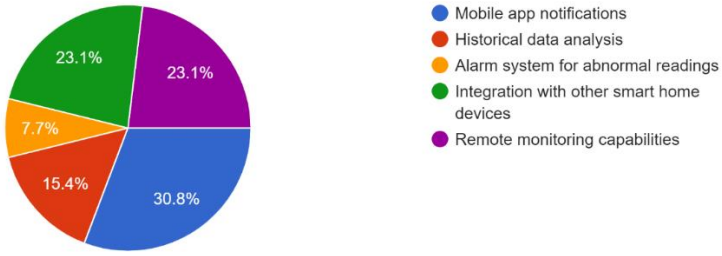
What type of water sources do you think would benefit most from a real-time monitoring system?

13 responses



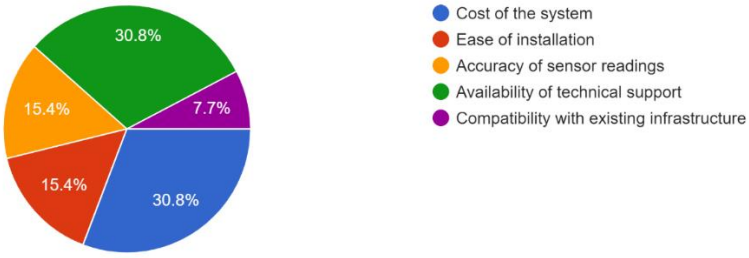
What features would you expect from a real-time water monitoring system?

13 responses



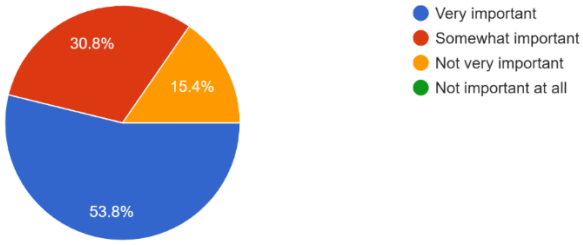
Which factors do you think would influence the adoption of a real-time water monitoring system?

13 responses



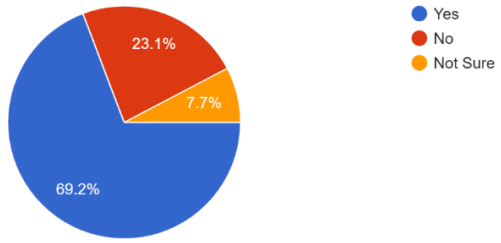
In your opinion, how important is it to have user-friendly data visualization interfaces for a real-time water monitoring system?

13 responses



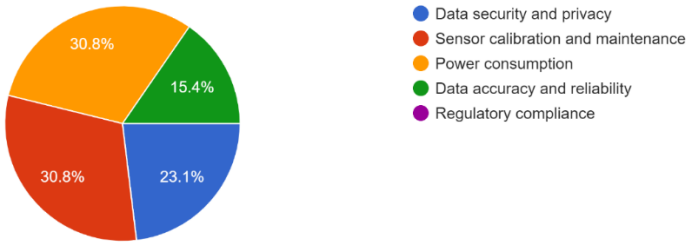
Would you be more likely to use a real-time water monitoring system if it could integrate with other smart home devices?

13 responses



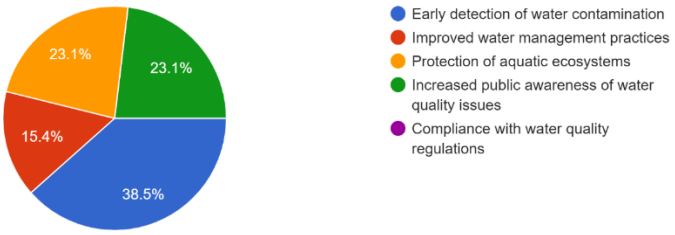
What are your primary concerns regarding the implementation of a real-time water monitoring system?

13 responses



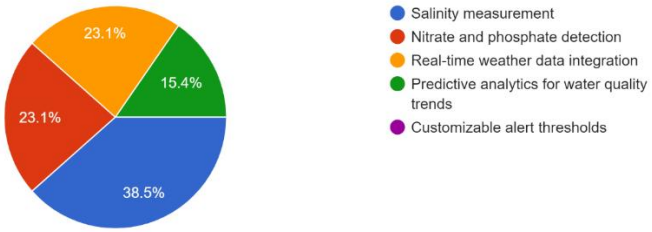
How do you think a real-time water monitoring system could benefit your community or organization?

13 responses



Which additional features would you like to see in a real-time water monitoring system?

13 responses



AIMS AND OBJECTIVES OF THE PROJECT:

Design and develop a real-time water monitoring system using Arduino:

This objective focuses on the creation of the hardware and software components of the system using Arduino and other essential components like sensors.

Implement sensors for measuring key water quality parameters:

This objective emphasizes the selection and integration of specific sensors relevant to water quality assessment, such as turbidity sensors, pH sensors, and temperature sensors.

Collect and analyze real-time water quality data:

This objective highlights the system's ability to gather continuous data from the sensors and process it for meaningful insights into water quality. This potentially involves establishing data logging capabilities and visualization techniques.

LITERATURE REVIEW:

Malche and their colleagues [1] proposed a system designed for acquiring real-time data pertaining to water source water levels from anywhere, accessible through any Internet- connected device. This system serves the purpose of monitoring and evaluating water usage and environmental parameters, encompassing location information, water quality, temperature, and various other variables. Moreover, it facilitates remote data collection, analysis, and the real- time prediction of data related to the utilization of a specific water source and other factors, all specific to a designated location.

Gama-Moreno and their team [2] introduced The InteRface for Monitoring Water Tanks (IRMA) as a system designed to enable users to oversee and maintain their water tank facilities while tracking irrigation practices. IRMA's construction involves a combination of electronic and software components. Key attributes of IRMA include the capacity to initiate and terminate watering operations remotely, accessible through smartphones or mobile devices equipped with SMS functionality. Additionally, it provides online control and monitoring of watering facilities through various mobile devices.

Olambimpe (2010) [3] conducted a study focusing on the development and assembly of an automatic water pump control system, accompanied by a water level indicator. The design encompasses automatic control through digital circuitry for pump activation and deactivation. Additionally, it includes a visual indicator to apprise users of the water level in the overhead tank. Notably, the design incorporates an alert system, via an alarming circuit, to signal the user in cases of water absence in the underground tank.

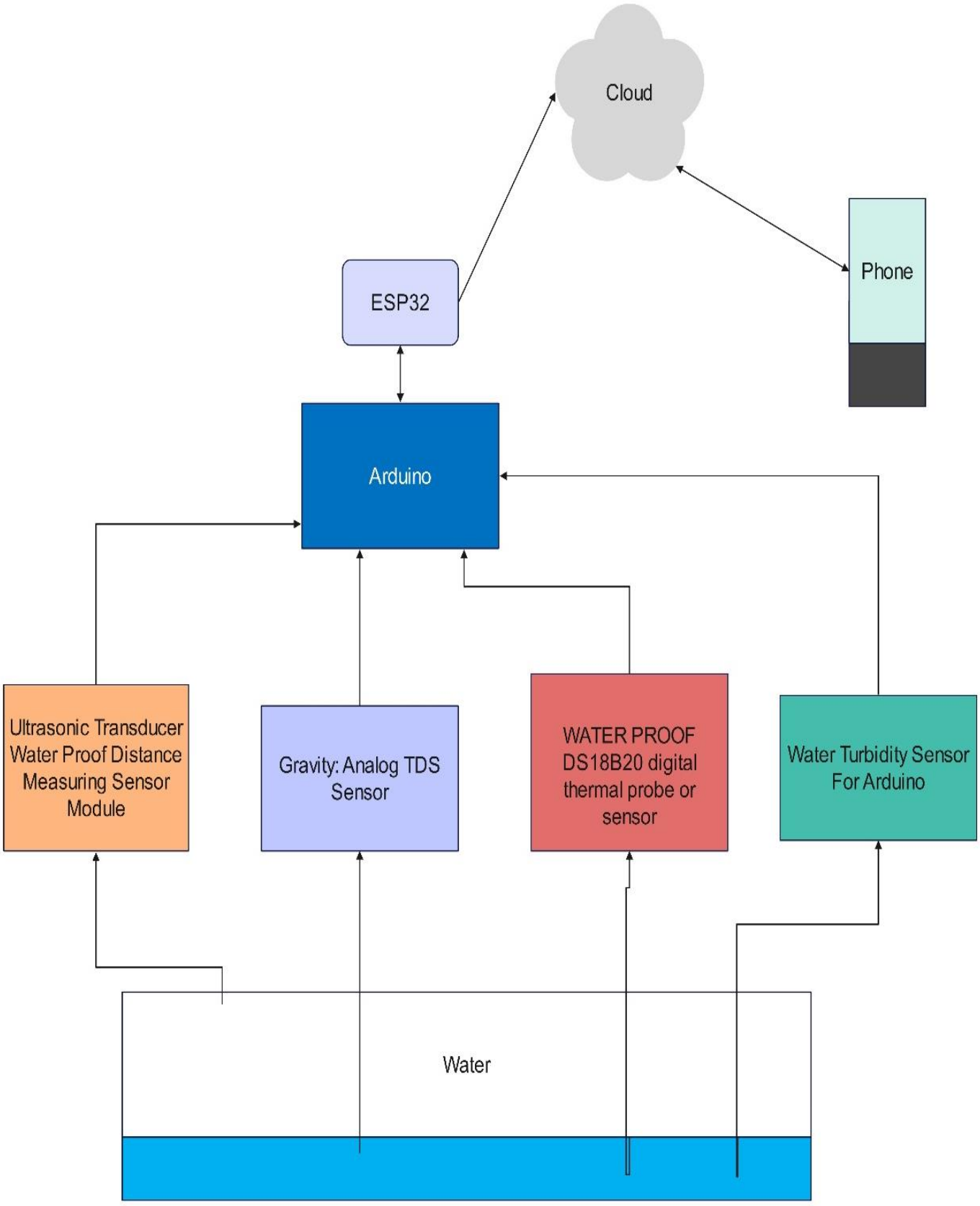
Ingleshwar and their collaborators (2018) introduced a system that leverages IoT technology and an Android application for tank water monitoring. This system employs the ESP 8266 microcontroller, connecting to the Firebase cloud to retrieve maximum and minimum water levels. Users are granted control when the water level falls within the midpoint between these thresholds. This innovative system addresses the limitations of traditional tanks by enabling both water level monitoring and control, marking a significant advancement in water management technology.

Wadekar and their collaborators (Reference [5]) have proposed an IoT solution for monitoring and managing water consumption. The system utilizes sensors within the water tank to continuously update water level data, which is then stored in the cloud. Users can access this information via an Android application, providing insights into water levels. Furthermore, the system automates the operation of the water pump, activating it when the tank's water level is insufficient and deactivating it once the tank is nearing full capacity.

A proposed IoT solution aids in the monitoring and control of water tank levels. In a study by Kumar and colleagues [6], they introduced a simulation model that utilizes the Blynk tool for remote water tank level monitoring and control. This model involves a virtual water tank in Proteus, which employs logic gates to indicate the water level. The data is transmitted to an Arduino and transferred to the Blynk cloud, offering users the capability to manage and oversee water levels via their mobile devices. The primary focus of their research paper is centered on the conservation of water, energy, and time.

Omolola (2010) [7] conducted a study involving the design and construction of a water level detector with pump control, utilizing a microcontroller. This project incorporated a digital water level detector with pump control, along with an instrument to display the water level in a tank. The system employed a seven-segment display to indicate the water level. Similar to the work of Olabimpe (2010), the system featured an alarm that emitted a continuous sound for 10 seconds when the tank reached 100% capacity.

EXPERIMENTAL BLOCK DIAGRAM:



POSSIBLE OUTCOMES OF THE PROJECT:

Improved Water Quality Monitoring and Management:

Early detection of water quality changes: The real-time monitoring system can identify potential issues like pollution or contamination quickly, allowing for prompt intervention and corrective measures.
Increased awareness and public engagement: The project can raise public awareness about water quality issues and foster a sense of responsibility for water conservation and protection within the community.

Contribution to Sustainable Development Goals (SDGs):
Goal 3: Good Health and Well-being: Improved water quality can lead to better health outcomes within the community by reducing the risk of waterborne diseases.

Goal 6: Clean Water and Sanitation: The project directly contributes to this goal by providing tools for improved water quality monitoring and management, leading to cleaner water sources and better sanitation practices.
Goal 12: Responsible Consumption and Production: By promoting awareness and responsible water use practices, the project can contribute to sustainable consumption and production patterns.
Goal 13: Climate Action: By promoting responsible water management and preventing pollution, the project can indirectly contribute to climate change mitigation and adaptation efforts.
Goal 14: Life Below Water: Protecting water quality is crucial for maintaining healthy aquatic ecosystems and preserving biodiversity. This project can contribute to achieving this goal by ensuring cleaner water resources for aquatic life.

PROJECT TIMELINE (GANTT CHART):

Task	Weak 1	Weak 2	Weak 3	Weak 9	Weak 10	Weak 11	Weak 13
Project planning	x						
Component sourcing		x					
Prototype build				x			
Testing and debugging					x		
Final integration					x		
Documentation							x

REFERENCES:

[1] Malche, Timothy, and Priti Maheshwary. "Internet of things (IoT) based water level monitoring system for smart village." In Proceedings of International Conference on Communication and Networks: ComNet 2016, pp. 305-312. Springer Singapore, 2017.

[2] Gama-Moreno, L. A., A. Corralejo, A. Ramirez-Molina, J. A.Torres-Rangel, C. Martinez-Hernandez, and M. A. Juarez."A design of a water tanks monitoring system based on mobile devices." In 2016 International Conference on Mechatronics, Electronics and Automotive Engineering (ICMEAE), pp. 133-138. IEEE, 2016.

[3] Olabimpe, A. I. (2010). Design and Construction of Water Pump Control with Level Indicator Project.

[4] Shah, Priyen P., Anjali A. Patil, and Subodh S. Ingleshwar. "IoT based smart water tank with Android application." In 2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC), pp. 600 - 603. IEEE, 2017

[5] Wadekar, Sayali, Vinayak Vakare, Ramratan Prajapati, Shivam Yadav, and Vijaypal Yadav. "Smart water management using IOT." In 2016 5th International Conference on Wireless Networks and Embedded Systems (WECON), pp. 1-4. IEEE, 2016.

[6] Kumar, GV Nagesh, C. Bhavana Reddy, K. Vijay Kumar, D. Prasanna Kumari, P. Sunil, and G. Lokesh Pavan Krishna. "Real Time Monitoring and Controlling of Water Levels in Tank with Improved Blynk Features." In 2021 International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), pp. 366-370. IEEE, 2021.

[7] Omolola, R. A. (2010). Design and Construction of a Water Detector with pump Control. Project, Department of Electrical and Computer Engineering, Federal University of Technology, Minna.

[8] L. Zhenhua, "Supervision and Management Information System for Rural Drinking Water Project Construction", *2013 Third International Conference on Intelligent System Design and Engineering Applications*, pp. 1372-1375, 2013.

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[11] H. Lim, W. Kim and J. Jung, "Integrated Water Cycle Management System for Smart Cities", *2018 2nd International Conference on Green Energy and Applications (ICGEA)*, pp. 55-58, 2018.

[12] Verma, P. (2019). The Vitality of Price Comparison and Product Display for Assortment Satisfaction: Online Footwear Purchase. *International Journal of E-Business Research*

COURSE TEACHER'S NAME **COURSE TEACHER'S SIGNATURE**

DATE

GROUP MEMBERS

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REMARKS (for OFFICE use only)	

Course Name:	Microprocessor and Embedded System	**Course Code:**	EEE 4103
Semester:	Spring, 2023-2024	**Sec:**	F
Faculty Member:	Md Sajid Hossain		

Project Title:	IoT Base Real-Time Water Monitoring System.
Project Group No.	06

Sl #	Student ID #	Student Name	Obtained Marks
1.	**22-46588-1**	**AZMINUR RAHMAN**	
2.	**22-46444-1**	**TRIDIB SARKAR**	
3.	**19-40315-1**	**S.M. FAYSAL MAHMUD**	
4.	**19-41203-2**	**MD. IMTIAZ HOSSAIN**	
5.	**21-45397-3**	**SOWRABH CHANDRA DAS**	
6.	**21-45408-3**	**KAWSHIK HALDER**	
7.	**21-45489-3**	**AVISHEK CHANDA PRATYAY**	

Assessment Materials and Marks Allocation:

COs	Assessment Materials	POIs	Marks
CO3	Course Project Proposal Form	P.c.2.C6	30

Assessment Rubrics:

KPIs	Excellent [2]	Proficient [1.5]	Good [1]	Acceptable [0.5]	Unacceptable [0]	No Response [0]	Secured Marks
Project Title	The title reflects an issue related to complex engineering problems showing targets and methods with possible outcomes.	The title reflects an issue related to complex engineering problems showing targets and methods but some missing issues.	The title reflects an issue related to the course capstone project but there may be some missing issues.	The title reflects an issue related to the course capstone project but is not complete or specific.	The title does not reflect any issues related to the course capstone project.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						**Total Marks (2)**	

KPIs	Excellent [5]	Proficient [4]	Good [3]	Acceptable [2]	Unacceptable [1]	No Response [0]	Secured Marks
Survey	The survey developed as a process for complex engineering problems considering cultural and societal factors has superior variables, targets, measures, and the implementation process is clear and challenging for future project implementation with several possible outcomes having good impacts.	The survey developed as a process for complex engineering problems considering cultural and societal factors has good variables, targets, measures, and the implementation process is clear and challenging for future project implementation with some possible outcomes with little impact.	The survey developed as a process for complex engineering problems considering cultural and societal factors has moderate variables, targets, measures, and the implementation process is clear and challenging for future project implementation with a few possible outcomes with impacts.	The survey developed as a process for complex engineering problems considering cultural and societal factors has good variables, targets, measures, and the implementation process is somewhat clear for future project implementation with very few possible outcomes with little impact.	The survey developed as a process for complex engineering problems considering cultural and societal factors has poor variables, targets, measures, and the implementation process is very unclear for future project implementation with a few possible outcomes but no impacts.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						**Total Marks (5)**	

KPIs	Excellent [3]	Proficient [2.5]	Good [2]	Acceptable [1]	Unacceptable [0.5]	No Response [0]	Secured Marks
Aims and Objectives	Aims and objectives are written to solve complex engineering problems considering cultural and societal factors with specific targets, measurement, and implementation processes that are clear and challenging and have several possible outcomes having very good impacts.	Aims and objectives are written to solve complex engineering problems considering cultural and societal factors with general targets, measurement, and implementation processes that are not clear and challenging and have some possible outcomes having good impacts.	Aims and objectives are written to solve complex engineering problems considering a few cultural and societal factors with narrow targets; measurement, and implementation processes are clear and challenging and have a few possible outcomes having some impacts.	Aims and objectives are written to solve complex engineering problems considering cultural or societal factors with a very target; measurement and implementation processes are not clear or challenging and have little possible outcome having no impact.	Aims and objectives are written to solve complex engineering problems but do not consider cultural and societal factors with any targets; measurement, and implementation processes are not clear and challenging and no possible outcomes have no impacts.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						**Total Marks (3)**	

KPIs	Excellent [5]	Proficient [4]	Good [3]	Acceptable [2]	Unacceptable [1]	No Response [0]	Secured Marks
Literature Review	Specific formats are maintained to review and cite the literature with recent publications.	Specific formats are maintained to review and cite the literature with recent publications. Identified and analyzed the	Specific formats are maintained to review and cite the literature with recent and past publications. Identified and analyzed the	Specific formats are maintained to review and cite the literature with recent and past publications. Identified but could not analyze all	No specific formats are maintained to review and cite the literature with recent publications. Could not identify and analyze all the problems correctly,	No Response at all/ copied from others/ identical submissions with gross	

	Identified and analyzed the problem correctly.	problem correctly, but all issues were not addressed with relevant or intended work.	problem correctly, but all issues were not addressed with relevant or intended work.	the problems correctly, and all issues were not addressed with relevant or intended work.	and all issues are not addressed with relevant or intended work at all.	errors/ image file printed	
Comments						**Total Marks (5)**	

KPIs	Excellent [4]	Proficient [3]	Good [2]	Acceptable [1]	Unacceptable [0.5]	No Response [0]	Secured Marks
Experimental Block Diagram	The block diagram is drawn to show the connections of all the possible components or sub-systems to show their interdependence with all possible flows of signals from inputs to outputs.	The block diagram is drawn to show the connections of all of the possible components or sub-systems to show their interdependence with a few missing flows of signals from inputs to outputs.	The block diagram is drawn to show the connections of most of the possible components or sub-systems to show their interdependence with a few missing flows of signals from inputs to outputs.	The block diagram is drawn to show the connections of a few possible components or sub-systems to show their interdependence with some missing flow of signals from inputs to outputs.	The block diagram is not drawn to show the connections of all possible components or sub-systems to show their interdependence and flow of signals from inputs to outputs.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						**Total Marks (4)**	

KPIs	Excellent [4]	Proficient [3]	Good [2]	Acceptable [1]	Unacceptable [0.5]	No Response [0]	Secured Marks
Possible Outcomes	Outcomes are written to achieve complex engineering problems' solutions considering cultural and societal factors and showing measurement, and implementation processes to attain the outcomes with all possible impacts.	Outcomes are written to achieve complex engineering problems' solutions considering cultural and societal factors and showing measurement, and implementation processes to attain the outcomes with some impacts.	Outcomes are written to achieve complex engineering problems' solutions considering cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts.	Outcomes are written to achieve complex engineering problems' solutions but do not consider cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts.	Outcomes are not written to achieve complex engineering problems' solutions do not consider cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						**Total Marks (4)**	

KPIs	Excellent [5]	Proficient [4]	Good [3]	Acceptable [2]	Unacceptable [1]	No Response [0]	Secured Marks
Gantt Chart	Specific formats are maintained to draw the Gantt chart and there is the order of workflow with all work to be done.	Specific formats are maintained to draw the Gantt chart and there is the order of workflow with a few works missing.	Specific formats are maintained to draw the Gantt chart and there is the order of workflow with some works missing.	No specific formats are maintained to draw the Gantt chart and there is little order of workflow with some works missing.	No specific formats are maintained to draw the Gantt chart and there is no order of workflow with the most important works missing.	No Response at all/ copied from others/ identical submissions with gross errors/ image file printed	
Comments						**Total Marks (5)**	

KPIs	Excellent [2]	Proficient [1.5]	Good [1]	Acceptable [0.5]	Unacceptable [0]	No Response [0]	Secured Marks
References	Specific formats are maintained to write the references, and all are recently published journal and conference papers having no missing information.	Specific formats are maintained to write the references, and all are journal and conference papers, but some old papers have missing information.	No specific formats are maintained to write the references, and many are internet sources with several missing information and very old references.	No specific formats are maintained to write the references and most of them are internet sources with missing information.	No specific formats are maintained to write the references, and all are internet sources with missing information.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						**Total Marks (2)**	