



# BML MUNJAL UNIVERSITY™

FROM HERE TO THE WORLD

## SMART BIO-SAND FILTRATION SYSTEM WITH REAL-TIME WATER QUALITY MONITORING

Manya Awasthi (240932), Riddhi Sharma (240604), Kinshuk Mishra (240881), Paras Singh (240947),  
Vasu Chawla (240683), Kanishka Roy (240896)

Mentor: Dr. Hirdesh Kumar Pharasi

### OBJECTIVE

The objective of this project is to develop a sustainable, low-cost bio-sand filtration system using eco-friendly materials, integrated with real-time pH, temperature, turbidity, and TDS sensors for safe drinking water. It also aims to ensure easy deployment and maintenance in water-stressed and underdeveloped rural areas, providing an accessible solution for clean water.

### WORKING

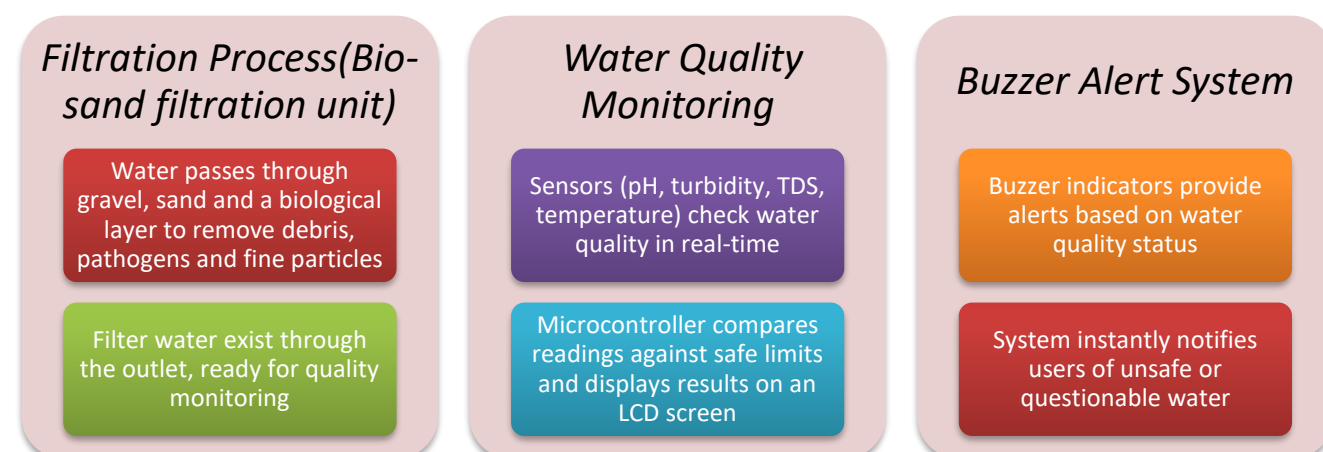
**Filtration Process:** Contaminated water flows through layers of gravel, sand, and a biological layer that remove particles, pathogens, and impurities.

**Biological Purification:** A bio-layer forms on the sand, where microorganisms break down pathogens and organic matter, enhancing purification.

**Real-Time Monitoring:** Sensors measure pH, temperature, turbidity, and TDS of the filtered water in real time.

**LED Alert System:** Buzzer provide instant, user-friendly water quality alerts based on sensor readings, without the need for external devices.

### PROTOTYPE



### RESULT AND OBSERVATION

#### Effective Filtration:

The system efficiently removes impurities, reduces turbidity, and enhances water quality using a multi-layer filtration process.

#### Real-Time Monitoring:

Continuous monitoring of pH, turbidity, temperature, and TDS with live data displayed for user tracking.

#### Cost-Effective and Low Maintenance:

Durable, sustainable materials ensure low maintenance and affordability.

#### User Alerts:

Buzzer notifies users when water quality falls below safe levels, ensuring safe consumption.

### CONCLUSION

The Smart Bio-Sand Filtration System with Real-Time Water Quality Monitoring offers a reliable, cost-effective solution for safe drinking water in rural and flood-prone areas. Continuous monitoring and real-time alerts ensure informed decisions, while its low-maintenance design ensures accessibility in challenging environments.

### FUTURE OUTLOOK

Our future outlook includes integrating a mobile app for real-time monitoring and adding a buzzer system that triggers automatic filtration kit ejection when water quality is unsafe, enhancing user experience and ensuring quick action for water safety.

