

**PROTOTYPE SISTEM PERINGATAN DINI BANJIR  
BERDASARKAN TINGKAT KEKERUHAN AIR  
HULU SUNGAI DENGAN *TURBIDITY SENSOR* SEN0189  
DAN *TRANSCIEVER* nRF24L01+**

**SKRIPSI**



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**ABSTRAK**

Telah dilakukan rancang bangun prototipe sistem peringatan dini banjir berdasarkan tingkat kekeruhan air hulu sungai dengan *turbidity sensor* SEN0189 dan *transceiver* nRF24L01+. Alat yang dirancang terbagi menjadi unit *transmitter* dan unit *receiver*. Unit *transmitter* terdiri dari *turbidity sensor* SEN0189, modul Arduino UNO R3 dan *transceiver* nRF24L01+. Unit *receiver* terdiri dari LCD, *transceiver* nRF24L01+, modul Arduino UNO R3 dan *buzzer*. Sensor mengindra tingkat kekeruhan air kemudian nilainya ditransmisikan dari *transmitter* ke *receiver* oleh *transceiver* nRF24L01+. Data kekeruhan air diproses oleh mikrokontroler pada modul Arduino UNO R3 untuk ditampilkan pada LCD dan mengaktifkan peringatan melalui *buzzer*. Jarak maksimum transmisi data sejauh 500 m tanpa penghalang dan 300 m dengan penghalang berupa pepohonan. Hasil pengukuran oleh alat yang dirancang memiliki persentase kesalahan relatif rata-rata sebesar 29,48% terhadap alat standar turbidimeter HACH 2100N. Nilai ambang batas kekeruhan air pada alat yang dirancang dapat diprogram sesuai dengan sungai yang dipantau. Peringatan dini banjir diaktifkan ketika kekeruhan air di atas nilai ambang batas berupa nyala *buzzer* dan tulisan “BRPOTENSI BANJIR” pada LCD. *Buzzer* mati secara otomatis dan LCD menampilkan tulisan “NORMAL” ketika kekeruhan air kurang dari nilai ambang batas. Alat yang dirancang mampu menampilkan nilai kekeruhan air secara *realtime* dan memberi peringatan sesuai dengan tingkat kekeruhan air.

Kata kunci : nRF24L01+, peringatan dini, tingkat kekeruhan air, transmisi data, *turbidity sensor*

# **THE PROTOTYPE OF FLOOD EARLY WARNING SYSTEM BASED ON WATER TURBIDITY LEVEL AT RIVER UPSTREAM USING SEN0189 TURBIDITY SENSOR AND nRF24L01+ TRANSCEIVER**

## **ABSTRACT**

A prototype of flood early warning system based on water turbidity level at river upstream using turbidity sensor SEN0189 and transceiver nRF24L01+ has been designed. The device consist of transmitter unit and receiver unit. Transmitter unit consist of SEN0189 turbidity sensor, Arduino UNO R3 module and nRF24L01+ transceiver. Receiver unit consist of LCD, nRF24L01+ transceiver, Arduino UNO R3 module and buzzer. Sensor senses the water turbidity level then the value is transmitted from transmitter to receiver by nRF24L01+ transceiver. Water turbidity data is processed by microcontroller at Arduino UNO R3 module in order to be displayed on LCD and turn the warning on using buzzer. The maximum data transmission distance is 500 m without barrier and 300 m with trees as barrier. The measurement result shows that device has 29,48% relative error percentage toward to the standard device turbidimeter HACH 2100N. Theshold limit value of this device can be programmed based on the monitored river. The flood early warning is activated when water turbidity above threshold limit value by turning on the buzzer and “BERPOTENSI BANJIR” words are showed on LCD. Buzzer turn off automatically and LCD shows “NORMAL” words when water turbidity less than threshold limit value. The device is able to showing the water turbidity value realtime and give the warning based on the water turbidity level.

Keywords : data transmission, early warning, nRF24L01+, turbidity sensor, water turbidity level