ABSTRACT

Ground Penetrating Radar (GPR) is a method developed to detect objects buried under the ground by using electromagnetic waves. GPR was studied as a method to map soil thickness and water content, especially in the topsoil. The working principle of GPR is to utilize the reflection of electromagnetic signals that are fired through the transmitting antenna which are then reflected back to the receiving antenna. The reflected signal will then be processed to obtain information about soil moisture.

This research was conducted to determine the water content contained in the soil which will later be useful in various fields, such as environmental, agricultural, civil, mining, and soil surveys. Therefore, a research based on the GPR system was carried out using a Vector Network Analyzer (VNA) to facilitate the identification of water content in the soil. The study was conducted on three different soil samples which were then added with water with a certain concentration to each sample. Each sample is also calculated its water content by gravimetric method as a comparison method.

Based on the research that has been done, it can be concluded that measurements using GPR can detect water content in the soil. However, the results of the comparison between gravimetric measurements and VNA measurements are slightly different. This happens because each type of soil has its own dielectric constant, thus affecting the results of measurements with VNA.

Keyword **:** *Ground Penetrating Radar, Vector Network Analyzer, Gravimetric*