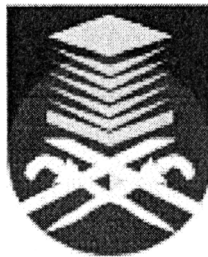


**REFLECTOMETER PROBE SYSTEM FOR  
CONTINUOUS MONITORING OF WATER QUALITY**



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## **ABSTRACT**

Monitoring and assessing the quality of water in streams, reservoirs, lakes, and estuaries are critical for establishing total maximum daily loads to improve water quality. Current techniques for measuring water quality involve in situ measurements and/or the collection of water samples for subsequent laboratory analysis. While these technologies provide accurate measurements for a point in time and space, they are expensive, and do not provide either the continuous, spatial or temporal view of water quality needed for monitoring, assessing, or managing water quality. This paper investigates the effectiveness of microwave reflectometer systems for predicting the Water Quality Index for rivers reservoirs and lakes in Malaysia. Microwave reflectometer shows a potential to determine the salinity and some quality index using the measured reflection and dielectric properties. The microwave reflectometer simplifies and speeds up the computation of the Water Quality Index, as compared to the currently existing method. By optimizing the calculation, a significant saving in terms of money and time can be achieved.

**Keywords:** water quality, microwave, reflectometer, salinity, dielectric.

# CHAPTER 1

## INTRODUCTION

### 1.1 GENERAL

Water (H<sub>2</sub>O) is the most remarkable substance. However, water is often perceived to be pretty ordinary. We wash in water, fish in water, swim in water, drink water and cook with water, although probably not all at the same time. We are about two-thirds water and require water to live. Life as we know it could not have evolved without water and dies without it. Droughts cause famines and floods cause death and disease. Because of its clear importance, water is the most studied material on Earth. It comes as a surprise, therefore, to find that it is so poorly understood, not only by people in general, but also by scientists working with it everyday.

Since water is capable of dissolving or suspending a tremendous variety of materials there is simply no way to get "*pure*" water (H<sub>2</sub>O and nothing but H<sub>2</sub>O) out of your faucet. All water, outside of a research laboratory, will have some other *stuff* in it. Even distilled water you purchase in plastic bottles at the store will eventually have some carbon dioxide (CO<sub>2</sub>) from the air dissolved in it forming a weak acid