

# **DEVELOPMENT OF VIRTUAL pH ANALYZER**

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## **ABSTRACT**

This project presents the development of the virtual pH analyzer that can be used for continuous process applications. The development of virtual pH analyzer was divided into two parts: virtual pH measurement and virtual pH control system. The G-programming language potentialities of LabVIEW™ version 2011 running on a Dell C9-ore 2 Duo 2.0GHz, 3GB RAM computer with Windows 7 Ultimate operating system was utilized for data acquisition and control. The front panel has been designed to mimic the actual pH analyzer and the ON/OFF control strategy is applied for pH control system. Developed virtual instrument shows accuracy, flexibility and power compared to the conventional pH instruments.

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# CHAPTER 1

## INTRODUCTION

### 1.0 BACKGROUND

pH measurements and control play an important role in different industries and plants, such as chemical and biological reaction, waste water treatment, electrochemistry and, production of pharmaceuticals, fermentation, and food production [1,2]. pH measurement is accomplished using pH electrode that works according to the Nernst equation, with regard to this the electrode is connected to device known as pH meter. pH meter is a microprocessor-based electronic instrument with high input impedance that converts the voltage developed on the pH electrode to a pH value [3]. The meter ranges from simple to complex and expensive laboratory instruments with memory storage of only 100 measurements [4]. In general, the pH analyzer is used for the purpose of measuring and controlling pH in industry. pH analyzer is an instrument that measures the pH of the solution and controls the addition of a neutralizing agent (on demand) to maintain the solution at the pH of neutrality, or within certain acceptable limits [2].

Conventional pH measurement and control of any solutions involves the use of several instruments such as pH electrode and pH analyzer connected to a strip chart recorder and some other data acquisition devices. Each of these instruments handles each function and to expand the tasks handled requires buying another instrument and hardware that might be costly. Furthermore; traditional pH analyzer is made up of pre-defined hardware components that execute specific tasks defined by the vendor this hard-coded function makes the traditional pH analyzer more limited in its