

# ASPECTS OF WASTE WATER & THEIR MANAGEMENT

N. Naga Mallikarjun, Asso. Professor. S. Syed, Asst. Professor



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With the same attention to pedagogical approach and balance between theory and practice as the current series, this volume is based on a consolidated, integrated, and updated version of a set of six volumes written by the authors in Brazil, addressing the issues presented above. Since these volumes have achieved such widespread acclaim in Brazil that they are now obligatory reading in universities, consulting businesses, and government organizations dealing with water and the environment, the authors felt it was time to publish an English edition.

The books in this set were produced with the goal of presenting a coherent technical foundation based on the most up-to-date findings and methods from across the world. Despite the authors' varied backgrounds and areas of expertise, it is abundantly obvious that the Brazilian experience contributes much. Brazil's vastness is quite staggering.

variances in climate, population, economy, and culture; they represent the actual conditions faced by many countries. Notably, Brazil has been a frontrunner in the post-treatment of anaerobic effluents and the use of anaerobic technology to domestic sewage treatment. Thanks to years of intensive, applied, cooperative research by the Brazilian Research Programme on Basic Sanitation (PROSAB), anaerobic treatment and aerobic/anaerobic post-treatment have been consolidated and are now widely applied in full-scale plants across Brazil. This book is a collection of PROSAB's previous work and is a valuable source of current knowledge applicable to regions with a warm climate.

These two authors have written the first five books. Vanete Thomaz Soccol, Eduardo Sabino Pegorini, Hilton Fel'cio dos Santos, Marcelo Antonio Teixeira Pinto, Maur'cio Ludovice, Ricardo Franci Gonc alves, Sandra Ma'rcia Cesa'rio Pereira da Silva, and Vanete Thomaz Soccol.

This international version was inspired by the original Brazilian volumes, and many colleagues, students, and specialists provided feedback and encouragement. It would be impossible to thank each and every person who has contributed to our success by name.

Both authors would like to express gratitude to their fellow researchers and students at the Department of Sanitary and Environmental Engineering at Brazil's Federal University of Minas Gerais for their contributions to this study. This international version got institutional and financial support from the appropriate division, reflecting the university's dedication to educate a global audience.

Finally, the authors would like to thank IWA Publishing for their support and patience over the lengthy process of writing this series.

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Dr. Y. Nagaraja



**ELECTRICAL MOTORS &  
DRIVES: A TEXTBOOK**

# Elaborating on Analog Electronics

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**Electronic**

# **ELABORATING ON ANALOG ELECTRONICS**

R. L. B. R. Prasad Reddy, Asst. Professor

G. Lakshmi Bharath, Asst. Professor

# **ELECTRICAL MOTORS AND DRIVES: A TEXTBOOK**

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# Engineering Strategies for the Cloud Computing Model



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# Engineering Strategies for the Cloud Computing

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## Preface

### Overview

Few professions are as well-established as software engineering when it comes to building complicated software systems. The steps of a software development life cycle (SDLC), which is employed, include requirement collecting, design creation, and code authoring. For such projects, there are several well-established frameworks and methodologies available, such as object-oriented, component-based, service-oriented, and agile methods. However, as cloud computing becomes more popular, it becomes necessary to adapt tried-and-true software development techniques in order to fully use cloud-based resources.

Because of the numerous benefits that the cloud computing paradigm provides, including lower capital costs and the ability to access cloud-based services on-demand and in real-time, businesses are attracted to it. Businesses may now self-provision software development platforms, including the required infrastructure, which has significantly decreased the time it takes to build and distribute apps. The features that cloud-enabled software must exhibit must be hardwired into the systems itself due to the dynamic, virtualized, distributed, and multi-tenant nature of the cloud. This is especially true if the software will be available to many users or utilized in the cloud. It is vital in this situation to understand that cloud SDLC is a quicker process and that software development must be more incremental and iterative. Additionally, the application's architecture must have elements that enable it to use the cloud's infrastructure services for networking, storage, and other functions. It's essential that the chosen frameworks function well with quick deployment cycles. Any effective technique must be able to satisfy the following requirements: performance, availability, security, privacy, dependability, and, most critically, scalability and multi-tenancy. All of this suggests that in order to make sure that software systems are appropriate for usage in cloud environments, software architects must undergo a mindset shift and embrace new methodologies of design and deployment.

Software Engineering Frameworks for the Cloud Computing Paradigm aims to offer an overview of the state of the art in this field and to promote discussion and education on the proper software engineering approaches and frameworks. 26 academics and business experts from all across the world have presented their results, case studies, and suggestions for creating engineering software that is cloud-ready.

## **Objectives**

This book's goal is to provide an overview of recent advances in software engineering that are applicable to the cloud computing environment. This book's primary goals are as follows:

- Documenting the cutting edge of software engineering practices for building cloud-friendly apps

Presenting appropriate theoretical frameworks, methods, and future areas of study

- Offering recommendations for cloud-based application architecture to both novices and experts

Learning more about software engineering and how it relates to the new paradigm of cloud computing

## **Organisation**

Software Engineering Frameworks for Cloud Computing Paradigm has 15 chapters. These are divided into four sections:

- Software Engineering and the Impact of the Cloud Paradigm, Part I. The concept of cloud computing as it relates to the field of software engineering is the main topic of this section. There are three chapters that examine the effects of the Semantic Web, talk about change brought on by the cloud, and identify problems and difficulties specific to the creation of cloud-based software.

- Part II: Cloud Platform Software Development Life Cycle. This book has five chapters that cover different phases of the software development life cycle, with a focus on the engineering and testing needs for cloud-based applications. The chapters also go into software design and development with virtualization and a distributed multi-tenant environment in mind.

- Software Design Strategies for Cloud Adoption, in Part III. This section has five chapters that concentrate on feature-driven and cloud-aided software creation and provide adoption and migration techniques for the cloud. Architectural patterns for migration of legacy systems and application development in a hybrid cloud environment are also covered.



- Section IV: Online Software's Efficiency The two chapters here examine the effectiveness and speed of cloud-based software. Effective techniques for cloud-based software engineering are discussed in one chapter, and a methodology for determining the interrelationships among various app performance parameters is presented in the other.

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A futuristic robotic hand is shown holding a pen, pointing at a digital interface. The interface displays several data visualization elements: a circular gauge at the top right, a line graph on the left, and a bar chart on the right. The background is dark with a grid pattern and some glowing points. The overall aesthetic is high-tech and scientific.

# RESEARCH METHODOLOGY

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# RESEARCH METHODOLOGY

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Syllabus

Credit Based Semester and Grading System w.e.f. the Academic year  
2013-14M.Com.(SemesterIII)

## RESEARCHMETHODOLOGYINCOMMERCE

### CourseObjectives

1. To understand research and research process
2. To acquaint students with identifying problems for research and develop research strategies
3. To familiarize students with the techniques of data collection, analysis of data and interpretation

### ModuleI– IntroductiontoResearch

(15Lectures)

Nature of Scientific Inquiry, Scientific Methods, Induction and Deduction. Hypothesis and Theory and their Interpretation. Nature and Scope of Social Research, Need for Multi-disciplinary and Inter-disciplinary Research

### ModuleII– Defining Research Problems and Research Design

(10Lectures)

Planning of Research. Selection of a Problem for  
Research. Sample Size Research Design. Important Aspects of Research Design

### Module III– Methods and Techniques of Data Collection

(15Lectures)

Methods of Data Collection. Sources of Data Collection – Use of Secondary Data and Methods of Collecting Primary Data. Observation and Interviews. Questionnaires and Schedules

## Question Paper Pattern

### III-Semester End Examination

Marks:60

Duration:2hours

**Note: 1.All Questions are Compulsory with internal choice**

**2. Figure to the right indicate marks**

Q.1 Answer Any One from the Following (Out of Two)	Module-I	(20marks)
Q.2 Answer Any One from the Following (Out of Two)	Module-II	(20marks)
Q.3 Answer Any One from the Following (Out of Two)	Module- III	(20marks)

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## Chapter 24

# The Categorization of Development Boards to Implement the Embedded Systems and Internet of Things With Cloud Database for Volcano Monitoring Drones


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### ABSTRACT

*Instead of sending human beings into volcanoes, drone-bot is used to measure the live lava temperature, and it alerts the ground station to protect people near the surroundings. The thermocouple is used as a temperature sensor. It can measure a wide range of higher temperatures, and it can be interfaced with the TTGo T-Call development board to process and send the temperature data to the ground station through GSM as short message service (SMS). Also the ESP-32 CAM is interfaced with that development board to capture the snapshot of the mountain if the temperature is high and the same snap is shared to the ground station through Wi-Fi. The GPS module is also interfaced with the development board to know the location of the volcano.*

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## **INTRODUCTION**

The Embedded system can be implemented by using the set of sensors and bunch of actuators connected with the Microcontroller or a Development Board with microcontroller like Arduino, ESP8266, ESP32, TTGo-T-Call and Raspberry Pi, etc., and the development board is programmed by using some programming languages like C Programming, C++ Programming, Python Programming, Micro Python programming, etc., to perform specific task. If the embedded system is connected with internet, to monitor and control the actuators based on the sensor data from the remote location with high data security, then it is called Internet of Things. There are many stages in Internet of Things which are to be discussed in this chapter.

### **Embedded systems**

The bunch of sensors and actuators connected with a microcontroller or a development board which can be operated and controlled through a software or firmware to perform the specific task is called an embedded system (Ma & Jiao, 2020). The basic structure of an Embedded system is shown in figure 1. There are variety of microcontrollers available to implement an embedded system (Martínez-Rodríguez, Valle, Brox, & Sánchez-Solano, 2020). They are 8051 microcontroller and its variants, PIC microcontroller and its variants and ARM microcontroller and its variants (Arredondo-Velázquez, Diaz-Carmona, Barranco-Gutiérrez, & Torres-Huitzil, 2020). These are the standard microcontrollers widely used in the industries to perform the particular tasks (Kwak & Lee, 2020). The assembly language programming and Embedded 'C' programming is used for programming these microcontrollers (Zhang, Seo, Donyanavard, Dutt, & Kurdahi, 2021). These microcontrollers never produce noises when handling the inputs and outputs because of its reliability (Muthukumaran V et al., 2018).

The high reliability microcontrollers are always used in the industries for good efficiency. These microcontrollers can be used with the development boards to implement the tasks easily. The other development boards are Arduino and its models which uses AVR family microcontrollers, ESP8266, Node MCU, ESP 12, ESP 32, TTGo-T-Call and its models, and Raspberry Pi and its different versions. These development boards can be programmed by using Embedded 'C++' through Arduino Integrated Development Environment (IDE), Micro python IDE, and Thonny python IDE. The Raspberry pi is the only development board which is having the operating system to perform the tasks (Muthukumaran V et al., 2021).



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