

# Preface

## Overview

Water is vital to life and development in all parts of the world. In third-world countries, where the agricultural sector plays a key role in their economic growth, the management of water resources is an item of high priority in their developmental activities. The basic inputs in the evaluation of water resources are from hydrological parameters and the subject of hydrology forms the core in the evaluation and development of water resources. In the civil engineering curriculum, this subject occupies an important position.

During my long teaching experience, I have felt a strong need for a textbook oriented to the Indian environment and written in a simple and lucid style. The present book is a response to the same. This book is intended to serve as a text for a first course in engineering hydrology at the undergraduate level in the civil engineering discipline. Students specialising in various aspects of water-resources engineering, such as water-power engineering and agricultural engineering will find this book useful. This book also serves as a source of useful information to professional engineers working in the area of water resources evaluation and development.

Engineering hydrology encompasses a wide spectrum of topics and a book like the present one meant for the first course must necessarily maintain a balance in the blend of topics. The subject matter has been developed in a logical and coherent manner and covers the prescribed syllabi of various Indian universities. The mathematical part is kept to the minimum and emphasis is placed on the applicability to field situations relevant to Indian conditions. SI units are used throughout the book.

Further, the book is unique in being India-centric in its use of examples, applications and description of water-resources information and practices and this aspect may be of use to many professionals and NGOs working in the water sector.

## Objective of the Fourth Edition

This book has been receiving very encouraging response from users: students, teachers and professionals alike. In response to a feedback by some users who felt the need for inclusion of a few more topics in the book, a thorough review of the book was undertaken. The fourth edition is the outcome of that exercise.

The main aim of this edition is to make the book meet practically all the needs of a textbook for the first course in Engineering Hydrology at Indian technical universities and engineering institutions. Towards this end, the redundant material of the third edition has been thoroughly pruned and appropriated new material has been added to make the book up to date and useful for a wider range of users.

While the book is designed essentially to meet the requirements of the undergraduate textbook in Engineering Hydrology, it will also be of help and use to students taking competitive examinations conducted by the UPSC, like the Central Engineering Services, Central Civil Services and Indian Forestry Services Examinations.

## New to this Edition

It is believed that the new subject matter that has been added gives an introduction to important emerging areas of study and professional interest and would help users keep themselves well informed.

The significant changes to the present edition are the following:

- Comprehensive coverage and clear explanations of concepts presented to field situations relevant to Indian conditions
- Emphasis on current water-resources scenario in India with authentic and updated statistical data
- Contains latest technologies and applications like GPS, GIS and Remote Sensing in various aspects of applied hydrology
- Addition of new topics:
  - ◆ Global warming and its impact on the water resources of India
  - ◆ Environmental flows
  - ◆ Glacier resources of India
  - ◆ Global freshwater resources
  - ◆ Envelope curves of highest floods in the world
  - ◆ Catchment characteristics
  - ◆ Effect of urbanisation on runoff from a catchment
  - ◆ Sea-water intrusion in coastal aquifers
- Refreshed pedagogy:
  - ◆ Solved Examples: 107
  - ◆ Numerical Problems: 220
  - ◆ Review Questions: 139
  - ◆ Objective Type Questions: 245
  - ◆ Figures: 176
  - ◆ Tables: 105 (updated wherever necessary)

## Chapter Organisation

Designed essentially for a one-semester course, the material in the book is presented in ten chapters. The hydrologic cycle and world water balance are covered in *Chapter 1*. Aspects of precipitation, essentially rainfall, are dealt in sufficient detail in *Chapter 2*. Hydrologic abstractions including evapotranspiration and infiltration are presented in *Chapter 3*. Streamflow-measurement techniques and assessment of surface-flow yield of a catchment form the subject matter of *Chapters 4 and 5*.

The characteristics of flood hydrographs and the unit hydrograph theory together with an introduction to instantaneous unit hydrograph are covered in sufficient detail with numerous worked examples in *Chapter 6*. Floods, a topic of considerable importance, constitute the subject matter of *Chapters 7 and 8*. While in *Chapter 7*, the

flood-peak estimation and frequency studies are described in detail, *Chapter 8* deals with the aspects of flood routing, flood control and forecasting. Basic information on the hydrological aspects of groundwater has been covered in *Chapter 9*. Finally, erosion and reservoir sedimentation are presented in *Chapter 10*.

Numerous worked examples, a set of problems and a set of multiple-choice questions are provided at the end of each chapter to enable students gain good comprehension of the subject. Questions and problems included in the book are largely original and are designed to enhance the capabilities of comprehension, analysis and application of the student.

## Online Learning Centre

The online Learning Centre of this book can be accessed at <http://www.mhhe.com/subramanya/eh4> and contains the following material:

*For Instructors:* Solution Manual and PowerPoint slides

*For Students:* Model Question Papers, List of Abbreviations, Additional References and Web links for further reading

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## **Feedback**

Comments and suggestions for further improvement of the book would be greatly appreciated. I can be contacted at the following e-mail address: ***subramanyak1@gmail.com***.

**K Subramanya**

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