

Engineering Hydrology By Wilson Em

A special workshop on scale problems in hydrology was held at Princeton University, Princeton, New Jersey, during October 31-November 3, 1984. This workshop was the second in a series on this general topic. The proceedings of the first workshop, held in Caracas, Venezuela, in January 1982, appeared in the Journal of Hydrology (Volume 65:1/3, 1983). This book contains the papers presented at the second workshop. The scale problems in hydrology and other geophysical sciences stem from the recognition that the mathematical relationships describing a physical phenomenon are mostly scale dependent in the sense that different relationships manifest at different space-time scales. The broad scientific problem then is to identify and formulate suitable relationships at the scales of practical interest, test them experimentally and seek consistent analytical connections between these relationships and those known at other scales. For example, the current hydrologic theories of evaporation, infiltration, subsurface water transport and water sediment transport overland and in channels etc. derive mostly from laboratory experiments and therefore generally apply at "small" space-time scales. A rigorous extrapolation of these theories to large spatial and temporal basin scales, as mandated by practical considerations, appears very difficult. Consequently, analytical formulations of suitable hydrologic theories at basin wide space-time scales and their experimental verification is currently being perceived to be an exciting and challenging area of scientific research in hydrology. In order to successfully meet these challenges in the future, this series of workshops was initiated.

The third edition of this best-selling textbook combines thorough coverage of fundamental theory with a wide ranging treatment of contemporary applications. The chapters on sediment transport, river engineering, wave theory and coastal engineering have been extensively updated, and there is a new chapter on computational modelling. The authors illustrate applications of computer and physical simulation techniques in modern design. The book is an invaluable resource for students and practitioners of civil, environmental, and public health engineering and associated disciplines. It is comprehensive, fully illustrated and contains many worked examples, taking a holistic view of the water cycles, many aspects of which are critical for future sustainable development.

The book provides a comprehensive account of an important sector of engineering—the hydro-power—that is renewable and potentially sustainable. It covers the entire scope of the subject in a lucid manner starting from the fundamentals of hydrology, to various hydraulic and civil structures to electrical and mechanical equipment as required for hydro-power projects. Many new issues and challenges voiced in the energy sector in general and water power in particular during the last decade have been addressed in the book. Recent innovations and developments in some areas like wave power, and new technologies in hydraulic structures, like the P-K weirs, fuse gates, stepped spillways, CFRD, RCC, etc., find place suitably in the book. The book is meant for undergraduate and postgraduate students of civil and electrical engineering and for the professionals interested in the subject. NEW IN THE SECOND EDITION ? Thoroughly rewritten text; takes account of the new and growing technology, including • New types of dams, sedimentation of reservoirs, rehabilitation of dams • Spillway design floods, new types of spillways • Mathematical models for rainfall-runoff analysis, including contribution of snowfall • Structural components of tidal plants, and new types of turbines • Wave power exploitation ? Detailed study on Sardar Sarovar and Tehri projects ? Fully updated with the latest data, up to 2013 ? Two new chapters on 'small-scale hydro, and 'environmental impact of hydro and multi-purpose projects'

Every engineering structure, whether it's a building, bridge or road, is affected by the ground on which it is built. Geology is of fundamental importance when deciding on the location and design of all engineering works, and it is essential that engineers have a basic knowledge of the subject. Engineering Geology introduces the fundamentals of the discipline and ensures that engineers have a clear understanding of the processes at work, and how they will impact on what is to be built. Core areas such as stratigraphy, rock types, structures and geological processes are explained, and put in context. The basics of soil mechanics and the links between groundwater conditions and underlying geology are introduced. As well as the theoretical knowledge necessary, Professor Bell introduces the techniques that engineers will need to learn about and understand the geological conditions in which they intend to build. Site investigation techniques are detailed, and the risks and risk avoidance methods for dealing with different conditions are explained. * Accessible introduction to geology for engineers * Key points illustrated with diagrams and photographs * Teaches the impact of geology on the planning and design of structures

^iEco-Hydrology is the first book to offer an overview of the complex relationships between plants and water across a wide range of terrestrial and aquatic environments. Leading ecologists and hydrologists present reviews of the eco-hydrology of drylands, wetlands, temperate and tropical rain forests, streams, and rivers and lakes. Contents include: * background information on the water relations of plants, from individual cells to strands of plants * the role of mathematical models in eco-hydrology * explanations of how plants affect patterns and rates of water movement and storage in a range of terrestrial and aquatic ecosystems.

This introduction to hydrology is essentially practical, emphasising the application of hydrological knowledge to the solution of engineering problems.

The book presents the processes governing the dynamics of landscapes, soils and sediments, water and energy under different climatic regions using studies conducted in varied climatic zones including arid, semi-arid, humid and wet regions. The spatiotemporal availability of the processes and fluxes and their linkage to the environment, land, soil and water management are presented at various scales. Spatial scales including laboratory, field, watershed, river basin and regions are represented. The effect of tillage operations and land management on soil physical characteristics and soil moisture is discussed. The book has 35 chapters in seven sections: 1) Landscape and Land Cover Dynamics, 2) Rainfall-Runoff Processes, 3) Floods and Hydrological Processes 4) Groundwater Flow and Aquifer Management, 5) Sediment Dynamics and Soil Management, 6) Climate change impact on vegetation, sediment and water dynamics, and 7) Water and Watershed Management.

The purpose of this book is to disseminate contemporary knowledge and practical experiences concerning problems and solutions related to urban hydrology and drainage. Although the main focus is on developing countries, the book draws from experiences in many other parts of the world. Based upon numerous practical examples and case studies, the book provides information to assist in the management, planning and engineering design processes. Urban Stormwater Management in Developing Countries covers a wide range of methods and approaches to improve the understanding and ability of local stakeholders to solve stormwater problems within the framework of integrated urban water management. As well as structural interventions, the book describes various non-structural approaches for flood mitigation and pollution control. This book encourages the reader to adopt an integrated approach towards stormwater management and considers the importance of institutional arrangements, participation of local stakeholders in planning, as well as aspects of financing and cost recovery.

This comprehensive and topical book: Addresses the broad range of issues related to urban stormwater management with a specific focus on developing countries. Covers the main aspects of planning, design, operation and maintenance of urban drainage systems as well as socio-economic and institutional issues related to urban stormwater management. Presents structural and non-structural approaches for flood mitigation and pollution control within an integrated water resource management framework. Provides extensive examples and case studies of "best practice". Contents Urbanisation and urban hydrology Impacts of flooding on society Integrated framework for stormwater management Institutional structures and policies Planning for urban stormwater management Approaches to urban drainage system design Ecological approaches to urban drainage system design Applications of computer models Operational performance and maintenance Flood mitigation and response strategies Participation and partnerships Economics and financing Full Contents List (27KB)

A study of water supply technology for students and practising engineers. This updated fifth edition covers important topics such as demand

management, risk management and environmental impact assessment. European, UK and US standards, reputations and practice are covered throughout.

An established and popular text written for students of civil engineering and practising engineers. Plenty of practical examples are provided, as well as problems for the reader to attempt.

One approach to the introduction of computational material to the classroom is to supplement a textbook with modern computer codes. Unfortunately most codes are expensive, designed for commercial use, without source code and may require special software. Visual Hydrology provides a cheaper and simpler alternative, supplying computational exercises that can be fully assimilated by students, and allowing them to activate, understand and reproduce modern computer code. Visual Hydrology aims to: explain the structure of modern object-oriented computer code provide the source code for worked examples numerically check the worked examples used in text show how worked examples can be used with alternative data describe and reference the underlying theory provide additional exercises with each worked example use Microsoft Excel software alone Requiring only a basic knowledge of Microsoft Excel, this Primer teaches the use of modern and readily-available computer code for engineering computation. Visual Hydrology demonstrates codes for common and practical examples used in hydrological engineering, and will be a valuable resource to students, research workers and consulting engineers in the water-related sector. Examples of source code to accompany this publication can be downloaded by clicking here.

Beginning with the basics of water resources and hydrologic cycle, the book contains detailed discussions on simulation and synthetic methods in hydrology, rainfall-runoff analysis, flood frequency analysis, fundamentals of groundwater flow, and well hydraulics. Special emphasis is laid on groundwater budgeting and numerical methods to deal with situations where analytical solutions are not possible. The book has a balanced coverage of conventional techniques of hydrology along with the latest topics, which makes it equally useful to practising engineers.

Hydrogeology: Principles and Practice provides a comprehensive introduction to the study of hydrogeology and the significance of groundwater in the terrestrial aquatic environment. Earlier chapters explain the fundamental physical and chemical principles of hydrogeology, and later chapters feature groundwater investigation techniques and contaminant hydrogeology. A unique feature of the book is a chapter on the application of environmental isotopes and noble gases in the interpretation of aquifer evolution. The last chapter discusses groundwater resources and environmental management, and examines the role of groundwater in integrated river basin management, including the possible impacts of climate change. Throughout the text, boxes are used to explain special topics and to illustrate international case studies. The appendices provide useful reference material and include review questions and exercises to develop the reader's knowledge and problem-solving skills in hydrogeology. This accessible textbook is essential reading for undergraduate and graduate students in earth and environmental sciences taking a course in hydrogeology or groundwater science. An Instructor manual CD-ROM for this title is available. Please contact our Higher Education team at HigherEducation@wiley.com for more information. Streamlined to facilitate student understanding, this second edition, containing the latest techniques and methodologies and some new problems, continues to provide a comprehensive treatment of hydrology of watersheds, soil erosion problems, design and installation of soil conservation practices and structures, hydrologic and sediment yield models, watershed management and water harvesting. It also deals with the special requirements of management of agricultural and forested watersheds. This book is designed for undergraduate students of agricultural engineering for courses in hydrology, and soil and water conservation engineering. It will also be of considerable value to students of agriculture, soil science, forestry, and civil engineering. KEY FEATURES Emphasises fundamentals using numerous illustrations to help students visualise different phenomena Offers lucid presentation of field practices Presents the analysis and design of basic hydraulic structures Devotes an entire chapter to watershed management Provides numerous solved design problems and exercise problems to develop a clear understanding of the theory Gives theoretical questions, and objective type questions with answers to test the students' understanding.

Engineering Hydrology Macmillan International Higher Education

Fully renewed and extended, this edition is a valuable source of information for anyone involved in drainage engineering and management. It provides new theories, technologies, knowledge and experiences in combination with traditional land development practices in the humid temperature zone. Aspects covered include: management and maintenance; Global Hydrology illustrates in detail the growing importance of understanding hydrological processes and pathways as a means of effective and safe management of water resources. It describes current management practices and past environmental impact. It analyses the options for improving water supply and protecting the environment, emphasizing the need for international collaboration in a changing societal and environmental context

The fourth edition of this bestselling textbook has been fully revised in order to present the most up-to-date and comprehensive guide to completing a hydrogeological study. Beautifully presented with full colour photos and diagrams throughout, Field Hydrogeology retains its practical pocket size for easy use in the field. This new edition includes all the recent developments in the environmental regulations, with particular focus on the use of innovative technology. New topics include geothermal energy, soakaways, marrying manual water level readings with logger records, prediction of long-term drawdown and lateral extent of impacts, and flow measurement in locations with small head gradients. With case studies and text boxes to aid comprehension, and a particular emphasis on practical application, this is an essential tool for students taking Hydrogeology and/or field course modules in Geology, Earth Sciences, Hydrogeology and Engineering courses.

The natural scarcity of water in arid and semiarid regions, aggravated by man-made factors, makes it difficult to achieve a reliable water resources supply. Communities in these areas pay the price for thousands of years of water manipulation. Presenting important insight into the complexities of arid region hydrology, Engineering Hydrology of Arid Stormwater Hydrology and Drainage

Question: How can I best evaluate the environmental impact and find the risk of water pollution from wastewater disposal? Answer: This book shows you the way! In a unique and comprehensive manner, questions of risk and reliability in water quality are analyzed. And more than that: The author also develops a methodology to evaluate the environmental impact of wastewater disposal on rivers, groundwater and coastal areas. Major topics covered include: fuzzy set theory for engineering risk analysis/ uncertainty analysis of water quantity and quality data/ stochastic and fuzzy simulation of hydrosystems: model selection under uncertainty, water quality control and management in rivers and aquifers, risk in coastal pollution/ decision theory under uncertainty: groundwater pollution, risk management, risk-cost trade-offs In addition, numerous case studies deepen the reader's understanding of the methods and techniques

presented. Jacques Ganoulis from the University of Thessaloniki has written extensively on groundwater hydraulics, surface hydrology and coastal water quality.

Hydrological drought is a textbook for university students, practising hydrologists and researchers. The main scope of this book is to provide the reader with a comprehensive review of processes and estimation methods for streamflow and groundwater drought. It includes a qualitative conceptual understanding of drought features and processes, a detailed presentation of estimation methods and tools, practical examples and key aspects of operational practice. The methods are demonstrated using sample data sets and tools that are provided on the accompanying CD. The drought phenomenon and its diversity across the world are illustrated using a global set of daily streamflow series, whereas regional and local aspects of drought are studied using a combination of hydrological time series and catchment information. The book concludes with human impacts, ecological issues and examples of procedures for designing and operating water resources schemes. The majority of the examples are taken from regions where the rivers run most of the year. The material presented ranges from well established knowledge and analysing methods to recent developments in drought research. Its nature varies accordingly, from a more traditional textbook with its clear overview to that of a research paper, which introduces new approaches and methodologies for drought analysis. Also available in paperback, ISBN 0-444-51767-7.

River stage or flow rates are required for the design and evaluation of hydraulic structures. Most river reaches are ungauged and a methodology is needed to estimate the stages, or rates of flow, at specific locations in streams where no measurements are available. Flood routing techniques are utilised to estimate the stages, or rates of flow, in order to predict flood wave propagation along river reaches. Models can be developed for gauged catchments and their parameters related to physical characteristics such as slope, reach width, reach length so that the approach can be applied to ungauged catchments in the region. The objective of this study is to assess Muskingum-based methods for flow routing in ungauged river reaches, both with and without lateral inflows. Using observed data, the model parameters were calibrated to assess performance of the Muskingum flood routing procedures and the Muskingum-Cunge method was then assessed using catchment derived parameters for use in ungauged river reaches. The Muskingum parameters were derived from empirically estimated variables and variables estimated from assumed river cross-sections within the selected river reaches used. Three sub-catchments in the Thukela catchment in KwaZulu-Natal, South Africa were selected for analyses, with river lengths of 4, 21 and 54 km. The slopes of the river reaches and reach lengths were derived from a digital elevation model. Manning roughness coefficients were estimated from field observations. Flow variables such as velocity, hydraulic radius, wetted perimeters, flow depth and top flow width were determined from empirical equations and cross-sections of the selected rivers. Lateral inflows to long river reaches were estimated from the Saint-Venant equation. Observed events were extracted for each sub-catchment to assess the Muskingum-Cunge parameter estimation method and Three-parameter Muskingum method. The extracted events were further analysed using empirically estimated flow variables. The performances of the methods were evaluated by comparing both graphically and statistically the simulated and observed hydrographs. Sensitivity analyses were undertaken using three selected events and a 50% variation in selected input variables was used to identify sensitive variables. The performance of the calibrated Muskingum-Cunge flood routing method using observed hydrographs displayed acceptable results. Therefore, the Muskingum-Cunge flood routing method was applied in ungauged catchments, with variables estimated empirically. The results obtained shows that the computed outflow hydrographs generated using the Muskingum-Cunge method, with the empirically estimated variables and variables estimated from cross-sections of the selected rivers resulted in reasonably accurate computed outflow hydrographs with respect to peak discharge, timing of peak flow and volume. From this study, it is concluded that the Muskingum-Cunge method can be applied to route floods in ungauged catchments in the Thukela catchment and it is postulated that the method can be used to route floods in other ungauged rivers in South Africa.

Fast changing legislation and increasing environmental awareness within the non-scientific community demands that the modern approach to the management of rivers and water resources should be based on a sound understanding and application of the scientific and ecological principles that underlie freshwater processes. In two volumes, The Rivers Handbook offers an expert and exhaustive insight into the principles, methods and tools of modern river management - always within an integrated and environmentally acceptable framework. This second volume develops the principles and philosophies expounded in the first volume into the management sphere, organizing the approach around problems, diagnosis and treatment. A fully comprehensive reference to sound methods of modern river management. The ideal information resource for all river managers.

The book, designed for the postgraduate students of Pure and Applied Geology (M.Sc.) and Hydrology and Groundwater (M.Tech) and undergraduate students of Civil Engineering/Irrigational Engineering/Water Resource Engineering, is highly useful to the students for their course study and is also likely to help those appearing in various competitive examinations such as GATE, NET, PSC and UPSC. This book comprises fifteen chapters, of which the first six chapters are devoted to Hydrology, whereas the last nine chapters impart the knowledge of Groundwater. The text explains topics in a simple manner using step-by-step approach throughout and supports learning with illustrations and diagrams. KEY FEATURES 1. Covers a wide range of topics on Hydrology and Groundwater. 2. Provides chapter-end Review Questions, Objective Type Questions and Numerical Problems for practice. 3. Includes Appendices on Unit Conversion Factors; Glossary; and Answers to Objective Type Questions and Numerical Problems, respectively, with a detailed bibliography.

Contractors involved in construction in, or adjacent to, rivers and estuaries are open to a range of construction risks from working in this environment. Not only the primary risk of flooding, but significant risk also stems from scour, poor ground conditions, site drainage, plant operation, site access and tidal impact. The construction works themselves may also have an impact on the river including impact on flood water levels, changes to the local river regime, scour or siltation and effects on navigation and environmental impacts such as pollution. This Manual assists in identifying and managing risks in works design and construction. Guidance is offered on risk assessment and management techniques, along with the identification of typical risk issues likely to be encountered in the river and estuary environment. It is essential reading for clients, project funders, contractors, consulting engineers (both in design and supervision role), insurers and those interested with the risks associated with river and estuary engineering.

Find out more about Hydraulics in Civil and Environmental Engineering Fifth Edition on CRC Press at <http://www.crcpress.com/product/isbn/9780415672450>

Hydrology in Practice is an excellent and very successful introductory text for engineering hydrology students who go on to be practitioners in consultancies, the Environment Agency, and elsewhere. This fourth edition of Hydrology in Practice, while retaining all that is excellent about its predecessor, by Elizabeth M. Shaw, replaces the material on the Flood Studies Report with an equivalent section on the methods of the Flood Estimation Handbook and its revisions. Other completely revised sections on instrumentation and modelling reflect the many changes that have occurred over recent years. The updated text has taken advantage of the extensive practical experience of the staff of JBA Consulting who use the methods described on a day-to-day basis. Topical case studies further enhance the text and the way in which students at undergraduate and MSc level can relate to it. The fourth edition will also have a wider appeal outside the UK by including new material on hydrological processes, which also relate to courses in geography and environmental science departments. In this respect the book draws on the expertise of Keith J. Beven and Nick A. Chappell, who have extensive experience of field hydrological studies in a variety of different environments, and have taught undergraduate hydrology courses for many years. Second- and final-year undergraduate (and MSc) students of hydrology in engineering, environmental science, and geography departments across the globe, as well as professionals in

environmental protection agencies and consultancies, will find this book invaluable. It is likely to be the course text for every undergraduate/MSc hydrology course in the UK and in many cases overseas too.

This is the first and only book to provide fundamental coverage of computer programs as they are used to evaluate and design environmental control systems. Computer programs are used at every level in every discipline of environmental science, and Modeling Methods for Environmental Engineers covers all of them. In addition, basic concepts related to environmental design and engineering are covered, expanding the usefulness of this book by providing introductory and fundamental materials required by those who wish to understand and employ the powerful computer programs available. An excellent reference for practitioners and students alike, this unique book:

'Engineering geology' is one of those terms that invite definition. The American Geological Institute, for example, has expanded the term to mean 'the application of the geological sciences to engineering practice for the purpose of assuring that the geological factors affecting the location, design, construction, operation and maintenance of engineering works are recognized and adequately provided for'. It has also been defined by W. R. Judd in the McGraw-Hill Encyclopaedia of Science and Technology as 'the application of education and experience in geology and other geosciences to solve geological problems posed by civil engineering structures'. Judd goes on to specify those branches of the geological or geo-sciences as surface (or surficial) geology, structural/fabric geology, geohydrology, geophysics, soil and rock mechanics. Soil mechanics is firmly included as a geological science in spite of the perhaps rather unfortunate trends over the years (now happily being reversed) towards purely mechanistic analyses which may well provide acceptable solutions for only the simplest geology. Many subjects evolve through their subject areas from an interdisciplinary background and it is just such instances that pose the greatest difficulties of definition. Since the form of educational development experienced by the practitioners of the subject ultimately bears quite strongly upon the corporate concept of the term 'engineering geology', it is useful briefly to consider that educational background.

This book provides a review of the principles and methods of drainage with an emphasis on design. The whole field of drainage is covered, and although the book concentrates mainly on the practice in North America, Europe and Britain, the practice in developing countries is also included. The book is directed primarily at the graduate engineer entering professional practice, but will also provide a useful reference for more senior engineers and for those in adjunct professions. Chapter 1 outlines the necessity for drainage on a large or small scale, for rural and urban areas. As the drainage engineer must decide how much unwanted water there will be and when it will occur, the chapter discusses climatic types, prediction of rainfall, evapotranspiration effects, return periods (of design storms and runoff events), river flow and flood prediction, and various sensing systems for providing short term predictions of rainfall, runoff, streamflow and flood warning. Chapter 2 gives a thorough review of the properties of soil in the context of drainage design. The extensive mathematical theories which relate to the crucial area of soil water movement are outlined and due attention is paid to the growing importance of predicting soil water movement in partially saturated soils.

This volume encloses research articles that were presented at the EVOLVE 2014 International Conference in Beijing, China, July 1–4, 2014. The book gathers contributions that emerged from the conference tracks, ranging from probability to set oriented numerics and evolutionary computation; all complemented by the bridging purpose of the conference, e.g. Complex Networks and Landscape Analysis, or by the more application oriented perspective. The novelty of the volume, when considering the EVOLVE series, comes from targeting also the practitioner's view. This is supported by the Machine Learning Applied to Networks and Practical Aspects of Evolutionary Algorithms tracks, providing surveys on new application areas, as in the networking area and useful insights in the development of evolutionary techniques, from a practitioner's perspective. Complementary to these directions, the conference tracks supporting the volume, follow on the individual advancements of the subareas constituting the scope of the conference, through the Computational Game Theory, Local Search and Optimization, Genetic Programming, Evolutionary Multi-objective optimization tracks.

Africa, the cradle of many old civilizations, is the second largest world continent, and the homeland of nearly one-eighth of the world population. Despite Africa's richness in natural resources, the average income per person, after excluding a few countries, is the lowest all over the world, and the percentage of inhabitants infected with contagious diseases is the highest. Development of Africa to help accommodate the ever-increasing population and secure a reasonable living standard to all inhabitants, though an enormous challenge is extremely necessary. Water is the artery of life, without it all living creatures on earth cannot survive. As such, a thorough knowledge of the meteorological and hydrological processes influencing the yield and quality of the water resources, surface and subsurface, and their distribution and variability in time and space is unavoidable for the overall development of any part of the world. It is highly probable that the said knowledge is at present a top priority to Africa, a continent that has been for so long-and probably still-devastated by the endless ambitions of colonial powers not to forget the corruption and destruction practiced by the internal powers, at least in some countries. The present book "Hydrology and Water Resources of Africa" is written with the aim of bringing together in one volume a fair amount of knowledge any professional involved in hydrology and water resources of Africa needs to know.

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