

Books On Fluvial Hydraulics And River Engineering

Comprehensive text on the fundamentals of modeling flow and sediment transport in rivers treating both physical principles and numerical methods for various degrees of complexity. Includes 1-D, 2-D (both depth- and width-averaged) and 3-D models, as well as the integration and coupling of these models. Contains a broad selection
This book, first published in 1979, collects together a key set of papers from the 10th Binghamton Geomorphology Symposium. They analyse fluvial theory, channel processes, stream adjustments, paleo-adjustments and channel adjustments.
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Written by an expert with thirty years experience in the field, this is a concise review of the hydrodynamic concepts and calculation procedures, upon which fluvial hydraulics is built. The first part is devoted to steady uniform and non-uniform as well as unsteady flow in open channels. The second part deals with transport phenomena, including sediment transport and local scour, turbidity currents and mixing processes in open channels. The volume is divided into nine chapters of unequal length which are

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autonomous and self-contained. The subject matter presented in each chapter is usually followed by a number of solved exercises, accompanied by a detailed discussion of the solution procedure. Unsolved problems are given at the end of each chapter. The book is written in a user-friendly style and has a double vocation. It will readily serve as a textbook for undergraduate and/or graduate students as well as a handbook for the professionals dealing with problems in environmental, water resources, civil, hydraulic and agricultural engineering, and in geomorphology and geology.

This volume presents a description of the river (a natural watercourse, usually freshwater, flowing towards an ocean, a lake, a sea, or another river), including its shape, size, organization, and action, along with a consistent theory that explains much of the observed character of channels.

Ecohydraulics: An Integrated Approach provides a research level text which highlights recent developments of this emerging and expanding field. With a focus on interdisciplinary research the text examines:- the evolution and scope of ecohydraulics interactions between hydraulics, hydrology, fluvial geomorphology and aquatic ecology the application of habitat modelling in ecohydraulic studies state of the art methodological developments and approaches detailed case studies including fish passage design and the management of environmental flow regimes research needs and the future of ecohydraulics research The contributions offer broad geographic coverage to encapsulate the wide range of approaches, case studies and methods used

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to conduct ecohydraulics research. The book considers a range of spatial and temporal scales of relevance and aquatic organisms ranging from algae and macrophytes to macroinvertebrates and fish. River management and restoration are also considered in detail, making this volume of direct relevance to those concerned with cutting edge research and its application for water resource management. Aimed at academics and postgraduate researchers in departments of physical geography, earth sciences, environmental science, environmental management, civil engineering, biology, zoology, botany and ecology; *Ecohydraulics: An Integrated Approach* will be of direct relevance to academics, researchers and professionals working in environmental research organisations, national agencies and consultancies.

Developments in Geographic Information Technology have raised the expectations of users. A static map is no longer enough; there is now demand for a dynamic representation. Time is of great importance when operating on real world geographical phenomena, especially when these are dynamic. Researchers in the field of Temporal Geographical Information Systems (TGIS) have been developing methods of incorporating time into geographical information systems. Spatio-temporal analysis embodies spatial modelling, spatio-temporal modelling and spatial reasoning and data mining. *Advances in Spatio-Temporal Analysis* contributes to the field of spatio-temporal analysis, presenting innovative ideas and examples that reflect current progress and achievements.

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Published by the American Geophysical Union as part of the Geophysical Monograph Series, Volume 194. *Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches, Analyses, and Tools* brings together leading contributors in stream restoration science to provide comprehensive consideration of process-based approaches, tools, and applications of techniques useful for the implementation of sustainable restoration strategies. Stream restoration is a catchall term for modifications to streams and adjacent riparian zones undertaken to improve geomorphic and/or ecologic function, structure, and integrity of river corridors, and it has become a multibillion dollar industry. A vigorous debate currently exists in research and professional communities regarding the approaches, applications, and tools most effective in designing, implementing, and assessing stream restoration strategies given a multitude of goals, objectives, stakeholders, and boundary conditions. More importantly, stream restoration as a research-oriented academic discipline is, at present, lagging stream restoration as a rapidly evolving, practitioner-centric endeavor. The volume addresses these main areas: concepts in stream restoration, river mechanics and the use of hydraulic structures, modeling in restoration design, ecology, ecologic indices, and habitat, geomorphic approaches to stream and watershed management, and sediment considerations in stream restoration. *Stream Restoration in Dynamic Fluvial Systems* will appeal to scholars, professionals, and government agency and institute researchers involved in examining river flow processes, river

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channel changes and improvements, watershed processes, and landscape systematics.

This book presents practical hydraulic and river engineering research along with fluvial geomorphological concepts, and links the theoretical and practical knowledge of people working every day with rivers, streams, and hydraulic structures to fluvial geomorphology. Besides providing a guide for professionals, this book also provides material for students to acquire the knowledge and skills to rehabilitate rivers, streams, and waterways.

River Processes deals primarily with flow and sediment dynamics in alluvial channels. It emphasises water flows (basic principles and characterisation), fluvial sediment, processes of erosion and sediment transport, bedforms that result from flow-bed sediment interactions in sand and gravel, flow and sedimentary processes in curved, braided and confluent channels, as well as aquatic habits. River Processes provides a comprehensive synthesis of current knowledge about physical processes in alluvial channels, with an emphasis on the recent work on flow-bed-sediment transport interactions. It is intended primarily for undergraduate students interested in fluvial studies as part of physical geography, earth sciences, environmental sciences and ecology courses. The textbook is fully illustrated throughout with line drawings and photographs.

This book presents key principles of the hydraulics of river basins, with a unique focus

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on the interplay between stream flows and sediment transport. Addressing a number of basic topics related to the hydraulics of natural waterways, it above all emphasizes applicative aspects in order to provide the reader with a solid grasp of river engineering. The first chapter explores many of the fixed base hydraulic topics that are normally neglected in traditional texts, namely the effects on motion produced by the vegetation and macroroughnesses that characterize many mountain streams. The remaining chapters are devoted entirely to hydraulics with mobile riverbeds and put particular emphasis on inhomogeneous river channels. The book's approach goes beyond classical treatments, so as to not only introduce readers to the fundamentals of mobile riverbeds, but also enable today's river engineers to successfully design and maintain natural riverbeds.

Fluvial Hydraulics Deals With The Hydraulics Of Rivers Flowing Through Credible Material And Transporting Some Of The Material With Them. It Encompasses Mechanics Of Sediment Transportation, Channel Hydraulics, And Channel Formation, Geometry, And Changes In Alluvial Rivers. Even Though The Earlier Civilizations Faced Problems Relating To Alluvial Rivers, The Science Of Fluvial Hydraulics Started Taking Shape Only About 300 Years Back; The Significant Contributions To This Subject Have Been Made Only During The Past Two Centuries. This Book Briefly Outlines The Developments In Fluvial Hydraulics And Gives To The Men Of The Past And Present, Who Have Contributed To The Development Of The Subject, Their Just

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Due. The Major Emphasis In The Book Being On Hydraulic Aspects, The Peripheral Topics, Such As Erosion And Drainage Patterns, Are Only Briefly Mentioned. It Is Hoped That This Book Will Stimulate Others To Collect Additional Information On The Subject Which Can Form The Basis For A More Exhaustive Record Of The History Of Fluvial Hydraulics.

Fluvial Geomorphology studies the biophysical processes acting in rivers, and the sediment patterns and landforms resulting from them. It is a discipline of synthesis, with roots in geology, geography, and river engineering, and with strong interactions with allied fields such as ecology, engineering and landscape architecture. This book comprehensively reviews tools used in fluvial geomorphology, at a level suitable to guide the selection of research methods for a given question. Presenting an integrated approach to the interdisciplinary nature of the subject, it provides guidance for researchers and professionals on the tools available to answer questions on river restoration and management. Thoroughly updated since the first edition in 2003 by experts in their subfields, the book presents state-of-the-art tools that have revolutionized fluvial geomorphology in recent decades, such as physical and numerical modelling, remote sensing and GIS, new field techniques, advances in dating, tracking and sourcing, statistical approaches as well as more traditional methods such as the systems framework, stratigraphic analysis, form and flow characterisation and historical analysis. This book: Covers five main types of geomorphological questions and their associated tools: historical framework; spatial framework; chemical, physical and biological methods; analysis of processes and forms; and future understanding framework. Provides guidance on advantages

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and limitations of different tools for different applications, data sources, equipment and supplies needed, and case studies illustrating their application in an integrated perspective. It is an essential resource for researchers and professional geomorphologists, hydrologists, geologists, engineers, planners, and ecologists concerned with river management, conservation and restoration. It is a useful supplementary textbook for upper level undergraduate and graduate courses in Geography, Geology, Environmental Science, Civil and Environmental Engineering, and interdisciplinary courses in river management and restoration.

The state-of-the-art in fluvial hydrodynamics can be examined only through a careful exploration of the theoretical development and applied engineering technology. The book is primarily focused, since most up-to-date research findings in the field are presented, on the research aspects that involve a comprehensive knowledge of sediment dynamics in turbulent flows. It begins with the fundamentals of hydrodynamics and particle motion followed by turbulence characteristics related to sediment motion. Then, the sediment dynamics is analysed from a classical perspective by applying the mean bed shear approach and additionally incorporating a statistical description for the role of turbulence. The work finally examines the local scour problems at hydraulic structures and scale models. It is intended to design as a course textbook in graduate / research level and a guide for the field engineers as well, keeping up with modern technological developments. Therefore, as a simple prerequisite, the background of the readers should have a basic knowledge in hydraulics in undergraduate level and an understanding of fundamentals of calculus.

Rivers are important agents of change that shape the Earth's surface and evolve through time

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in response to fluctuations in climate and other environmental conditions. They are fundamental in landscape development, and essential for water supply, irrigation, and transportation. This book provides a comprehensive overview of the geomorphological processes that shape rivers and that produce change in the form of rivers. It explores how the dynamics of rivers are being affected by anthropogenic change, including climate change, dam construction, and modification of rivers for flood control and land drainage. It discusses how concern about environmental degradation of rivers has led to the emergence of management strategies to restore and naturalize these systems, and how river management techniques work best when coordinated with the natural dynamics of rivers. This textbook provides an excellent resource for students, researchers, and professionals in fluvial geomorphology, hydrology, river science, and environmental policy.

A stream flowing in alluvium deforms its bed surface, forming ripples, dunes, bars, etc., and, in many instances, it deforms its channel entirely, thereby creating meandering or braiding patterns. It could be said that, in general, an alluvial stream and its deformable boundary undergo a variety of fluvial processes leading to the emergence of a multitude of alluvial forms. This book concerns the physics and analytical treatment of various fluvial processes and the associated alluvial bed and plan forms listed above. Following an introductory chapter on the basics of turbulent flow and sediment transport, the book covers the origin, geometric characteristics and effects of bed forms, from small- to meso-scale (ripples, dunes, alternate and multiple bars); the initiation, geometry and mechanics of meandering streams; the computation of flow, bed deformation and the planimetric evolution of meandering streams; and braiding and delta formation. The book also covers the regime concept, the time-

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development of a stream towards its regime state, and the formulation of stable, or equilibrium, morphology. The book distinguishes itself by its comprehensive analysis and discussion of key processes involved in large-scale river morphodynamics. The book was written primarily for researchers and graduate students of hydraulic engineering, water resources and related branches of earth sciences, but it will also prove useful for river engineers and managers. Understanding and being able to predict fluvial processes is one of the biggest challenges for hydraulics and environmental engineers, hydrologists and other scientists interested in preserving and restoring the diverse functions of rivers. The interactions among flow, turbulence, vegetation, macroinvertebrates and other organisms, as well as the transport and retention of particulate matter, have important consequences on the ecological health of rivers. Managing rivers in an ecologically friendly way is a major component of sustainable engineering design, maintenance and restoration of ecological habitats. To address these challenges, a major focus of River Flow 2016 was to highlight the latest advances in experimental, computational and theoretical approaches that can be used to deepen our understanding and capacity to predict flow and the associated fluid-driven ecological processes, anthropogenic influences, sediment transport and morphodynamic processes. River Flow 2016 was organized under the auspices of the Committee for Fluvial Hydraulics of the International Association for Hydro-Environment Engineering and Research (IAHR). Since its first edition in 2002, the River Flow conference series has become the main international event focusing on river hydrodynamics, sediment transport, river engineering and restoration. Some of the highlights of the 8th International Conference on Fluvial Hydraulics were to focus on inter-disciplinary research involving, among others, ecological and biological aspects

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relevant to river flows and processes and to emphasize broader themes dealing with river sustainability. River Flow 2016 (extended abstract book 854 pages + full paper CD-ROM 2436 pages) contains the contributions presented during the regular sessions covering the main conference themes and the special sessions focusing on specific hot topics of river flow research, and will be of interest to academics interested in hydraulics, hydrology and environmental engineering.

The Third Edition Of This Book Recognises Two Important Developments That Have Taken Place In Recent Years.(1) Mathematical Modelling Of Alluvial River Processes, And(2) Environmental Aspects Relating To Sedimentation.Both Of These Factors Have Been Duly Considered In This Edition. With Its Detailed Analysis And Clear Presentation, This Book Would Be Extremely Useful For Practising Civil Engineers. It Would Also Serve As An Authoritative Reference Source For Graduate And Senior Undergraduate Civil Engineering Students.

River Confluences and the Fluvial Network brings together state of the art thinking on confluence dynamics tributary impacts and the links between processes at these scales and river network functions. The book is unique in focus, content, scope and in bringing together engineering, ecological and geomorphological approaches to the three key areas of river system science. Taking a global approach this multi-authored text features a team of carefully selected, internationally renowned, experts who have all contributed significantly

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to recent ground breaking advancements in the field. Each chapter includes a comprehensive review of work to date highlighting recent discoveries and the main thrust of knowledge, previously unpublished research and case studies, challenges and questions, detailed references as well as a forward looking assessment of the state of the science.

This text looks at sediment transport, two-phase flow and loose boundary hydraulics which are some of the names used to identify problems of interaction between fluid flow (water or air) and its boundaries that may be non-cohesive (alluvial) or cohesive.

A pioneering study that encompasses both field and laboratory research, this text explores the landscapes of mountains, rivers, and seacoasts. Topics include weathering, climate, and erosion. New Foreword. 1964 edition.

In this volume, the fundamental principles and applications of river engineering are presented and the close interrelation between river engineering and fluvial processes is stressed. The author integrates river engineering principles with river hydraulics and fluvial geomorphology, providing engineers interested in water supply, channel design, bridge design, flood control, river regulation, irrigation, navigation improvement, and environmental science with a comprehensive, system perspective. Specific topics covered include river flow,

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river channel formation, the physical characteristics of rivers, responses of rivers to natural and man-made changes, and analytical methods of design and evaluation.

"Bridging the gap between qualitative and quantitative descriptions of natural rivers, Fluvial Hydraulics provides a sound understanding of water and sediment flows in natural rivers. This understanding is essential for modeling and predicting hydrologic and geomorphologic processes, erosion, sediment transport, water supply and quality, habitat management, flood hazards, and river restoration. The book will be especially valuable in providing a firm scientific basis for the growing field of river restoration. It bridges the gap between the highly quantitative mechanics-based civil-engineering approach to stream hydraulics and the more qualitative treatments of fluvial geomorphology typical of earth sciences and natural resources curricula. Many concepts are illustrated using measurements of natural river flows." "The book is specifically designed for upper-level students and practitioners who want to gain a better understanding of river behavior. The bases of the equations that are used to describe and predict river flows are systematically presented, including dimensional analysis."--BOOK JACKET.

This text presents an overview of fluvial geomorphology (how water movement effects the surface features of the Earth), and aims to provide river engineers and

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managers with an understanding of natural channel forms and fluvial processes. David Knighton's best-selling book looks at the wide range of forms developed by natural rivers and the processes responsible for that development. The book combines empirical and theoretical approaches, and provides a critical assessment of the many schools of thought which have emerged for dealing with adjustment in the fluvial system. It is fully illustrated throughout by a superb range of figures, photographs and tables. Starting with the network scale, the book examines the interaction of hillslopes, drainage networks and channels, and goes on to considerations of catchment hydrology and catchment denudation. Fluvial processes are analysed in detail, from the mechanics of flow to sediment transport and deposition. Detailing the major components of river channels, the book examines the nature of river adjustment, particularly with respect to equilibrium concepts, and concludes with a look at channel changes through time, affected by flood discharges, climatic change and human activities.

Rivers form one of the lifelines in our society by providing essential services such as availability of fresh water, navigation, energy, ecosystem services, and flood conveyance. Because of this essential role, mankind has interfered continuously in order to benefit most and at the same time avoid adverse consequences such as flood risk and droughts. This has resulted in often highly engineered rivers with a narrow set of functions. In the last decades rivers are increasingly considered in a more holistic

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manner as a system with a multitude of interdependent processes. River research and engineering has therefore added to the river fundamentals also themes like ecohydraulics, consequences of climate change, and urbanisation. River Flow 2020 contains the contributions presented at the 10th conference on Fluvial Hydraulics, River Flow 2020, organised under the auspices of the Committee on Fluvial Hydraulics of the International Association for Hydro-Environment Engineering and Research (IAHR). What should have been a lively physical gathering of researchers, students and practitioners, was converted into an online event as the COVID-19 pandemic hindered international travelling and large gatherings of people. Nevertheless, the fluvial hydraulics community showed their interest and to be very much alive with a high number of participations for such event. Since its first edition in 2002, in Louvain-la-Neuve, this series of conferences has found a large and loyal audience in the river research and engineering community while being also attractive to the new researchers and young professionals. This is highlighted by the large number of contributions applying for the Coleman award for young researchers, and also by the number of applications and attendants to the Master Classes which are aimed at young researchers and students. River Flow 2020 aims to provide an updated overview of the ongoing research in this wide range of topics, and contains five major themes which are focus of research in the fluvial environment: river fundamentals, the digital river, the healthy river, extreme events and rivers under pressure. Other highlights of River Flow

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2020 include the substantial number of interdisciplinary subthemes and sessions of special interest. The contributions will therefore be of interest to academics in hydraulics, hydrology and environmental engineering as well as practitioners that would like to be updated about the newest findings and hot themes in river research and engineering.

Rivers are significant geomorphological agents, they show an amazing diversity of form and behaviour and transfer water and sediment from the land surface to the oceans. This book examines how river systems respond to environmental change and why this understanding is needed for successful river management. Highly dynamic in nature, river channels adjust and evolve over timescales that range from hours to tens of thousands of years or more, and are found in a wide range of environments. This book provides a comprehensive overview of recent developments in river channel management, clearly illustrating why an understanding of fluvial geomorphology is vital in channel preservation, environmentally sensitive design and the restoration of degraded river channels. It covers: flow and sediment regimes: flow generation; flow regimes; sediment sources, transfer and yield channel processes: flow characteristics; processes of erosion and sediment transport; interactions between flow and the channel boundary; deposition channel form and behaviour: controls on channel form; channel adjustments; floodplain development; form and behaviour of alluvial and bedrock channels response to change: how channels have responded to past

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environmental change; impacts of human activity; reconstructing past changes river management: the fluvial hydrosystem; environmental degradation; environmentally sensitive engineering techniques; river restoration; the role of the fluvial geomorphologist. Fundamentals of Fluvial Geomorphology is an indispensable text for undergraduate students. It provides straightforward explanations for important concepts and mathematical formulae, backed up with conceptual diagrams and appropriate examples from around the world to show what they actually mean and why they are important. A colour plate section also shows spectacular examples of fluvial diversity. This proceedings volume contains selected papers presented at the 2014 International Conference on Informatics, Networking and Intelligent Computing, held in Shenzhen, China. Contributions cover the latest developments and advances in the field of Informatics, Networking and Intelligent Computing.

Rivers and Floodplains is concerned with the origin, geometry, water flow, sediment transport, erosion and deposition associated with modern alluvial rivers and floodplains, how they vary in time and space, and how this information is used to interpret deposits of ancient rivers and floodplains. There is specific reference to the types and lifestyles of organisms associated with fluvial environments, human interactions with rivers and floodplains, associated environmental and engineering concerns, as well as the economic aspects of fluvial deposits, particularly the modeling of fluvial hydrocarbon reservoirs and aquifers. Methods of studying rivers and floodplains and their deposits

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are also discussed. Although basic principles are emphasized, many examples are detailed. Particular emphasis is placed on how an understanding of the nature of modern rivers and floodplains is required before any problems concerning rivers and floodplains, past or present, can be addressed rationally. Rivers and Floodplains is designed as a core text for senior undergraduate and graduate students studying modern or ancient fluvial environments, particularly in earth sciences, environmental sciences and physical geography, but also in civil and agricultural engineering. College teachers, researchers, and practising professionals will also find the book an invaluable reference. Presents a process-based approach, which is relevant to modern curricula. Discusses methods of studying rivers and floodplains and their deposits. Provides many detailed examples throughout the text. Emphasises the basic principles of this subject. As the first synthesis of this entire field, it will be a must-have for all students studying modern or ancient fluvial environments. Teachers, researchers and practising professionals will find this an invaluable reference tool. Rivers and Floodplains will also be of interest to geologists, geographers and engineers.

After publishing the famous “Fluvial Processes in Geomorphology” in the early 1960s, the work of Luna Leopold, Gordon Wolman, and John Miller became a key for opening the door to understanding rivers and streams. They first illustrated the problem to geomorphologists and geographers. Later, Chang, in his “Fluvial Processes in River Engineering”, provided a basis for engineers, showing this group of professionals how

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to deal with rivers and how to understand them. Since then, more informative studies have been published. Many of the authors started to combine fluvial geomorphology knowledge and river engineering needs, such as “Tools in Fluvial Geomorphology” by G. Mathias Kondolf and Hervé Piégay, or focused more on river engineering tasks, such as “Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches” by Andrew Simon, Sean Bennett, and Janine Castro. Finally, Luna Leopold summarized river and stream morphologies in the beautiful “A view of the river”. It appears that we continue to explore this subject in the right direction. We better understand rivers and streams, and as engineers and fluvial geomorphologists, we can establish tools to help bring rivers alive. However, there is still a hunger for more scientific tools that we could use to further understand rivers and to support the development of healthy streams and rivers with high biodiversity in the present world, which has started to face water scarcity.

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