

Fluid Mechanics And Hydraulic Machines Rk Rajput

A Textbook of Fluid Mechanics and Hydraulic MachinesLaxmi PublicationsHydraulics, Fluid Mechanics and Hydraulic MachinesS. Chand Publishing

Hydraulic Machines (Fluid Machinery) has been designed as a textbook for engineering students specializing in mechanical, civil, electrical, hydraulics, chemical and power engineering. The highlights of the book are simple language supported by analytical and graphical illustrations. A large number of theory questions and numerical problems with solution hints have been annexed at the end of every chapter. A large number of objective questions have been included to help the students opting for competitive examinations. Five case studies based on research have been included which can be advantageously used by practising engineers pursuing research design and consultancy careers. Complete design of hydraulic machines has been demonstrated with the help of suitable examples. The book has been divided into six parts containing 13 chapters.

This textbook offers a unique introduction to hydraulics and fluid mechanics through more than 100 exercises, with guided solutions, which students will find valuable in preparation for their preliminary or qualifying exams and for testing their grasp of the subject. In some exercises two different solution methods are proposed, to highlight the fact that the level of complexity of the calculations is often linked to the choice of method, though in most cases only the simplest method is presented. The exercises are organized by subject, covering forces on planes and curved surfaces; floating bodies; exercises that require the application of linear and angular momentum balancing in inertial and non-inertial references; pipeline systems, with particular applications to industrial plants; hydraulic systems with machines (pumps and turbines); transient phenomena in pipelines; and uniform and gradually varied flows in open channels. The book also features appendices that contain selected data and formulas of practical interest. Instructors of courses that address one or all of the above topics will find the exercises of great help in preparing their courses, while researchers will find the book useful as an accessible summary of the topics covered.

This textbook attempts to cover all the topics concerning fluid Mechanics, Hydraulics and Hydraulic Machines, keeping in view the requirements of undergraduate engineering students of all branches. Beginning with fundamentals, advanced topics are discussed towards the end of each chapter. This book written in SI System of units should be a single guiding reference material for most university examinations, AMIE and other competitive examinations. While dealing with various aspects, emphasis is on showing a physical picture of the situation with the help of diagrams.

Fluid Mechanics And Hydraulic Machines is designed for the course on fluid mechanics and hydraulic machines offered to the undergraduate students of mechanical and civil engineering. Written in a lucid style, the book lays emphasis on explaining the logic and physics of critical problems to develop analytical skills in the reader.

In the book a large number of problems from the Examination paper of London University, Institution of Mechanical Engineers (London) Institution of Engineers (India) Union Public Service Commission (India) and Various Indian Universities have been included.**CONTENTS** : Part- I : Properties of Fluids * Pressure Measurement * Hydrostatic Forces on Surfaces * Buoyancy and Floating * Fluid Masses in Relative Equilibrium * Kinematics of Fluid Flow * Dynamics of Fluid Flow * Flow Measurement * Flow Through Orifices and Mouth Pieces * Flow over Notches and Weirs *

Fundamentals of Flow Through Pipes * Fundamentals of Flow through Open Channels * Flow of Compressible Fluids
Part-II : Advance Topics In Fluid Mechanics And Hydraulics : Dimensional Analysis * Hydraulic Similitude * Laminar Flow
* Turbulent Flow Through Pipes * Boundary Layer Theory * Flow Around Immersed Bodies * Uniform Flow in Open
Channels * Non Uniform Flow in Open Channels Part- III : Hydarulics Machines : Impacts of Free Jets * Hydraulic
Turbines * Governing and Performance of Hydraulic Turbines * Reciprocating Pumps * Centrifugal Pumps *
Miscellaneous Hydraulic Devices and Machines Part-IV : Iscellaneous Topics : Fluvial Hydraulics * Elementary
Hydrodynamics * Water Power Engineering * Laboratory Experiments Part-V : Appendices : Appendix A : Miscellaneous
Objective Type Questions * Appendix B : Cavitation * Appendix C : Geometrical Properties of Plane Areas * Appendix D :
secondary Flow * Appendix E : Use Vector Notaions * Appendix F : Computer Programes * Reference * Index.

Following a concise overview of fluid mechanics informed by numerous engineering applications and examples, this reference presents and analyzes major types of fluid machinery and the major classes of turbines, as well as pump technology. It offers professionals and students in hydraulic engineering with background concepts as well as practical coverage of modern turbine technologies, fully explaining the advantages of both steam and gas turbines. Description, design, and operational information for the Pelton, Francis, Propeller, and Kaplan turbines are provided, as are outlines of various types of power plants. It provides solved examples, chapter problems, and a thorough case study.

The popularity of all the earlier thirteen editions of the book among the students as well as the teachers has made it possible to bring out the fourteenth edition of the book so soon. In this edition the book has been brought out in A-4 size thereby considerably enhancing the general get-up of the book. The book in this fourteenth edition is entirely in SI Units and it has been thoroughly revised in the light of the valuable suggestions received from the learned professors and the students of the various Universities. Accordingly several new articles have been added. The answers of all the illustrative examples and the problems have been checked and corrected. Moreover, several new problems from the latest question papers of the different Universities as well as competitive examinations have been incorporated. Thus, it may be emphatically stated that the book is complete in all respects and it covers the entire syllabus in the subject for degree students in the different branches of engineering for almost all the Universities. Therefore this Single Book fulfills the entire needs of the students intending to appear at the various University Examinations and also for those intending to appear at the various competitive examination such as engineering services and the ICS examinations and for those preparing for AMIE examinations. **OUTSTANDING FEATURES** " Twenty nine chapters covering entire subject matter of Fluid Mechanics, Hydraulics and Hydraulic Machines. " SI Units used for the entire book " More than 200 multiple choice questions with answers " Appendix containing computer programs to solve problems of uniform and critical flows in open

channels. " Ten appendixes dealing with some important topics.

This is an ideal offering for the complete course on Fluid Mechanics and Hydraulic Machines. Written in a simple and lucid style, the book covers the basic principles and its application to the solution of engineering problems. This book is apt for self-study by the students and lays down a strong foundation for problem-solving abilities.

Engineering is applying scientific knowledge to find solutions for problems of practical importance. A basic knowledge of Fluid mechanics and machinery is essential for all the scientists and engineers because they frequently come across a variety of problems involving flow of fluids such as in aerodynamics, Force of fluid on structural surfaces, fluid transport. The experiments described in this lab are part of the curriculum of "Fluid Mechanics and Hydraulic Machines Laboratory" for the degree course in Mechanical, Chemical, and Electrical and Electronics Engineering.

This book has been documented with the aim to include those fundamentals of 'Hydraulic Machines' which are necessary at graduate level engineering courses of any University. Basic hydraulics is extensively used in various applications in industry, construction, mining and marine engineering. The subject is part of graduate level engineering courses in mechanical, civil, mining, and marine engineering studies worldwide. Most of the literature, however, is either written with a commercial objective to promote the sale of the manufacturers or is theoretically too advanced for comprehension by graduate level engineering students. The rapid advancement in design, miniaturization, metallurgy, and hydraulic fluid characteristics has stimulated the demand for an elementary book, explaining fundamentals. Readers are supposed to be familiar with the elementary fluid mechanics, and basics of gears, piston, crank, and different levers. This book includes those fundamentals of fluid transmission of power that are necessary in graduate mechanical engineering, civil engineering, mining engineering, and marine engineering courses of any university.

This treatise on fluid Mechanics ,contains comprehensive treatment of the subject matter in simple,lucid and direct language and envelopes a large number of solved problems properly graded,including typical examples from examination point of view.The book comprise 16 chapters.All chapters of the book are saturated with much needed text supported by simple and self-explanatory figures and a large number of worked examples including Typical Examples(for competitive examinations).At the end of each chapter Highlights,objective Type Questions,Theoretical Questions and Unsolved Examples have been added to make the book a comprehensive and a complete unit in all respects.

With a large number of objective type multiple-choice questions, this book was written in a simple and easy-to-follow language so that even an average student can grasp the subject matter by self-study. --

The favourable and warm reception,which the previous editions and reprints of this popular book has enjoyed all over India and abroad has been a matter of great satisfaction for me.

BASIC Hydraulics aims to help students both to become proficient in the BASIC programming language by actually using the language in an important field of engineering and to use computing as a means of mastering the subject of hydraulics. The book begins with a summary of the technique of computing in BASIC together with comments and listing of the main commands and statements. Subsequent chapters introduce the fundamental concepts and appropriate governing equations. Topics covered include principles of fluid mechanics; flow in pipes, pipe networks and open channels; hydraulic machinery; and seepage and groundwater flow. Each chapter provides a series of worked examples consisting primarily of an introduction in which the general topic or specific problem to be considered is presented. A program capable of solving the problem is then given, together with examples of the output, sometimes for several different sets of conditions. Finally, in a section headed Program Notes the way the program is constructed and operates is explained, and the engineering lessons to be learned from the program output are indicated. Each chapter also concludes with a set of problems for the student to attempt. This book is mainly intended for the first- and second-year undergraduate student of civil engineering who will be concerned with the application of fundamental fluid mechanics theory to civil engineering problems.

This Book Presents A Thorough And Comprehensive Treatment Of Both The Basic As Well As The More Advanced Concepts In Fluid Mechanics. The Entire Range Of Topics Comprising Fluid Mechanics Has Been Systematically Organised And The Various Concepts Are Clearly Explained With The Help Of Several Solved Examples. Apart From The Fundamental Concepts, The Book Also Explains Fluid Dynamics, Flow Measurement, Turbulent And Open Channel Flows And Dimensional And Model Analysis. Boundary Layer Flows And Compressible Fluid Flows Have Been Suitably Highlighted. Turbines, Pumps And Other Hydraulic Systems Including Circuits, Valves, Motors And Ram Have Also Been Explained. The Book Provides 225 Fully Worked Out Examples And More Than 1600 Questions Including Numerical Problems And Objective Questions. The Book Would Serve As An Exhaustive Text For Both Undergraduate And Post- Graduate Students Of Mechanical, Civil And Chemical Engineering. Amie And Competitive Examination Candidates As Well As Practising Engineers Would Also Find This Book Very Useful.

Divided in two parts, "A Textbook of Fluid Mechanics and Hydraulic Machines" is one of the most exhaustive texts on the subject for close to 20 years. For the students of Mechanical Engineering, it can easily be used as a reference text for other courses as well. Important topics ranging from Fluid Dynamics, Laminar Flow and Turbulent Flow to Hydraulic Turbines and Centrifugal pumps are well explained in this book. A total of 23 chapters (combined both units) followed by two special chapters of 'Universities' Questions (Latest) with Solutions' and 'GATE and UPSC Examinations' Questions with Answers/Solutions' after each unit also make it an excellent resource for aspirants of various entrance examinations.

The entire book has been thoroughly revised by adding adequate text and a large number of typical examples selected from various universities and competitive examinations question papers. Besides this, Laboratory Experiments have also been added at the end

of the book to make it still more a comprehensive and complete unit in all respects.

This book caters directly to the requirement with a complete and comprehensive cover of the syllabi of various universities in an extremely student-friendly manner. Each chapter is written in a simple, crisp and logical way, with gradual built up of concepts. The language is lucid and easy to understand yet precisely scientific. Theoretical explanations and mathematical derivations are supported with well-labeled and clear figures along with systematically solved examples to enhance the understanding of the concepts. feature

- Comprehensive coverage of Hydraulic Machines – Turbines, Centrifugal & Reciprocating Pumps and Miscellaneous Hydraulic Machines – Hydraulic Press, Accumulator, Intensifier, Ram, Lift & crane.
- Dedicated discussion on Kinematics & Dynamics of Fluid Flow, Laminar, Turbulent & Compressible Flow
- Pedagogical features include:
 - o Solved Examples: 600
 - o Numerical Problems: 365
 - o Open book problems: 180
 - o Theory Ques: 350
 - o OTQs: 375
 - o Total 1870

CHAPTER - 1 Dimensions and Systems of Units CHAPTER - 2 Fluid Flow CHAPTER - 3 Thermal and Hydropower Stations
CHAPTER- 4 Fluid Machinery CHAPTER- 5 Pelton Turbine CHAPTER - 6 Francis Turbine CHAPTER - 7 Propeller and Kaplan Turbines CHAPTER - 8 Turbo Pumps CHAPTER - 9 Positive Displacement Pumps Multiple Choice Questions Answers
References Index

Salient Features: - Comprehensive coverage of Hydraulic Machines in a student-friendly manner - Detailed concept review that aids in thorough and quick revision - Objective questions for competitive examinations as per new pattern - Solutions to numerical objec_ve ques_ons provided on Online Learning Center

This comprehensive book is an earnest endeavour to apprise the readers with a thorough understanding of all important basic concepts and methods of fluid mechanics and hydraulic machines. The text is organised into sixteen chapters, out of which the first twelve chapters are more inclined towards imparting the conceptual aspects of fluids mechanics, while the remaining four chapters accentuate more on the details of hydraulic machines. The book is supplemented with solutions manual for instructors containing detailed solutions of all chapter-end unsolved problems. Primarily intended as a text for the undergraduate students of civil, mechanical, chemical and aeronautical engineering, this book will be of immense use to the postgraduate students of hydraulics engineering, water resources engineering, and fluids engineering. Key features

- The book describes all concepts in easy-to-grasp language with diagrammatic representation and practical examples.
- A variety of worked-out examples are included within the text, illustrating the wide applications of fluid mechanics.
- Every chapter comprises summary that presents the main idea and relevant details of the topics discussed.
- Almost all chapters incorporate objective type questions of previous years' GATE examinations, along with their answers and in-depth explanations.
- Previous years' IES conventional questions are provided at the end of most of the chapters.
- A set of theoretical questions and numerous unsolved numerical problems are provided at the chapter-end to help the students from practice pointof-view.
- Every chapter consists of a section Suggested Reading comprising a list of publications that the students may refer for more detailed information.

Fluid Mechanics and Machinery features exhaustive coverage of the essential concepts of the mechanics of fluids, both static and

dynamic. It also provides an overview of the design and operation of various hydraulic machines such as pumps and turbines. The book also features numerous solved examples in order to help students grasp the fundamentals and apply them to real-life situations. Beginning with discussion of the properties of fluids, Fluid Mechanics and Machinery gives detailed information on topics such as fluid pressure and its measurement, principles of buoyancy and flotation, and fluid statics, kinematics, and dynamics. It then moves on to discuss dimensional analysis and flow of fluids through orifices, mouthpieces, and pipes, and over notches and weirs. More advanced topics such as vortex flow, impact of jets, and flow of compressible fluids are then dealt with in separate chapters. Finally, a thorough overview of the design and operation of various fluid machines such as pumps and turbines explains the practical applications of fluid forces to students.

Written in an innovative style, this book in SI system of units is a complete treatise on fluid mechanics and hydraulic machines. It presents the subject matter in an explicit, lucid and comprehensive manner. Simple mathematical models have been used to describe the intricate physical concepts.

Intended as a textbook for the undergraduate students of civil and mechanical engineering, this book is the outcome of authors' vast experience in this subject area. It presents the basic theories of hydraulics and all types of hydraulic machines that are used in these days in our day-to-day life. Organized in two parts—Hydraulics (Part I) and Hydraulic Machines (Part II), the book is written in an easy-to-follow method in conformity to the syllabi followed in universities. The chapter end exercises of all the chapters are carefully prepared for the students, which enhance their problem-solving skills. This book is also useful for the students of chemical, electrical and aeronautical engineering. Key Features Copious well-illustrated figures Detailed description of various types of pumps and miscellaneous hydraulic machines Numerous solved problems and unsolved problems with answers Deductions and numerical examples in S.I. Units

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