



# Chandigarh College of Engineering & Technology

Government Institute under UT Administration, Affiliated to Panjab University

CHANDIGARH COLLEGE OF ENGINEERING AND TECHNOLOGY, SECTOR 26, CHANDIGARH		
Experiment No-6		Rev = 1
Subject: Fluid Mechanics Lab.	Subject Code: MEC-456	Semester: 4

**Experiment:** To determine the friction coefficients for pipes of different diameters.

**Equipment required:** Darcy's apparatus

**Description of equipment's to be used:**

1. Darcy's apparatus consists of two pipes with different pipes
2. One common inlet valve is provided in the main supply line for the whole apparatus.
3. A measuring tank.

**Theory:**

While the nature of flow depends upon the Reynolds Number, the frictional resistance offered to the flow of fluids depends essentially on the roughness of the surface of the conduit carrying the flow. In laminar flow this frictional resistance is mostly due to viscous resistance of fluid to flow. In turbulent flow it is due to resistance offered by viscosity of fluid and surface roughness of the conduct this frictional resistance causes loss of head which is given by Darcy and Weisbach equation:

$$h_f = \frac{4fLV^2}{2gD}$$

Where  $f$  is called Darcy's friction factor and given by  $f = 64/Re$  for laminar flow and depends upon relative roughness of pipe in case of turbulent flow.

$L$  = Pipe length

$V$  = Velocity

$D$  = Diameter of pipe

# Mechanical Fm Lab Manual

**A. B. Shinde**



## **Mechanical Fm Lab Manual:**

**Fluid Mechanics with Laboratory Manual** Mr. Sanjeev Pandey, 2024-08-16 Combines theoretical concepts of fluid mechanics with practical laboratory experiments including measurement techniques fluid flow analysis and equipment operation

*Fluid Mechanics with Laboratory Manual* Bireswar Majumdar, 2016-02-29 Primarily intended for the undergraduate students of mechanical engineering civil engineering chemical engineering and other branches of applied science this book now in its second edition presents a comprehensive coverage of the basic laws of fluid mechanics The text discusses the solutions of fluid flow problems that are modelled by various governing differential equations Emphasis is placed on formulating and solving typical problems of engineering practice

**Fluid Mechanics and Machinery : Laboratory Manual** A. B. Shinde, *Fluid Mechanics Experiments* Robabeh Jazaei, 2022-05-31 Fluid mechanics is one of the most challenging undergraduate courses for engineering students The fluid mechanics lab facilitates students learning in a hands on environment The primary objective of this book is to provide a graphical lab manual for the fluid mechanics laboratory The manual is divided into six chapters to cover the main topics of undergraduate level fluid mechanics Chapter 1 begins with an overview of laboratory objectives and the introduction of technical laboratory report content In Chapter 1 error analysis is discussed by providing examples In Chapter 2 fluid properties including viscosity density temperature specific weight and specific gravity are discussed Chapter 3 revolves around the fluid statics include pressure measurement using piezometers and manometers Additionally hydrostatic pressure on the submerged plane and curved surfaces as well as buoyancy and Archimedes Principle are examined in Chapter 3 In Chapter 4 several core concepts of fluid dynamics are discussed This chapter begins with defining a control system based on which momentum analysis of the flow system is explained The rest of the chapter is allotted to the force acting on a control system the linear momentum equation and the energy equation Chapter 4 also covers the hydraulic grade line and energy grade line experiment The effect of orifice and changing cross sectional area by using Bernoulli's equation is presented in Chapter 4 The application of the siphon is extended from Chapter 4 by applying Bernoulli's equation The last two chapters cover various topics in both internal and external flows which are of great importance in engineering design Chapter 5 deals with internal flow including Reynolds number flow classification flow rate measurement and velocity profile The last experiment in Chapter 5 is devoted to a deep understanding of internal flow concepts in a piping system In this experiment students learn how to measure minor and major head losses as well as the impact of piping materials on the hydrodynamics behavior of the flow Finally open channels weirs specific energy and flow classification hydraulic jump and sluice gate experiments are covered in Chapter 6

*Fluid Mechanics Laboratory Manual* John B. Herbich, 1960

**Laboratory Manual for Fluid Mechanics** Gordon G. Smith, Bobby Earl Price, 1963

Fluid Mechanics and Hydraulic Machines (A Lab Manual) T.S. Desmukh, 2001

Lab. Manual of Fluid Mechanics & Machines Gupta, Chandra, 2006-02-01

*Catalog of Course of Instruction at the United States Naval Academy*

United States Naval Academy,1953      *Course of Instruction at the United States Naval Academy* United States Naval Academy,1953      Fluid Mechanics and Heat Transfer William Roy Penney,Edgar C. Clausen,2018-01-31 This practical book provides instruction on how to conduct several hands on experiments for laboratory demonstration in the teaching of heat transfer and fluid dynamics It is an ideal resource for chemical engineering mechanical engineering and engineering technology professors and instructors starting a new laboratory or in need of cost effective and easy to replicate demonstrations The book details the equipment required to perform each experiment much of which is made up of materials readily available is most laboratories along with the required experimental protocol and safety precautions Background theory is presented for each experiment as well as sample data collected by students and a complete analysis and treatment of the data using correlations from the literature      **FLUID MECHANICS** RAJU, K. SRINIVASA,KUMAR, D. NAGESH,2020-07-01 Fluid Mechanics has transformed from fundamental subject to application oriented subject Over the years numerous experts introduced number of books on the theme Majority of them are rather theoretical with numerical problems and derivations However due to increase in computational facilities and availability of MATLAB and equivalent software tools the subject is also transforming into computational perspective We firmly believe that this new dimension will greatly benefit present generation students The present book is an effort to tackle the subject in MATLAB environment and consists of 16 chapters The book can support undergraduate students in fluid mechanics and can also be referred to as a text reference book **KEY FEATURES** Explanation of Fluid Mechanics in MATLAB in structured and lucid manner 161 Example Problems supported by corresponding MATLAB codes compatible with 2016a version 162 Exercise Problems for reinforced learning 12 MP4 Videos for the demonstration of MATLAB codes for effective understanding while enhancing thinking ability of readers A Question Bank containing 261 Representative Questions and 120 Numerical Problems **TARGET AUDIENCE** Students of B E B Tech and AMIE Civil Mechanical and Chemical Engineering Useful to students preparing for GATE and UPSC examinations      **Fluid Mechanics and Fluid Power** T. Prabu,P. Viswanathan,Amit Agrawal,Jyotirmay Banerjee,2021-08-03 div style This book comprises select proceedings of the 46th National Conference on Fluid Mechanics and Fluid Power FMFP 2019 The contents of this book focus on aerodynamics and flow control computational fluid dynamics fluid structure interaction noise and aero acoustics unsteady and pulsating flows vortex dynamics nuclear thermal hydraulics heat transfer in nanofluids etc This book serves as a useful reference beneficial to researchers academicians and students interested in the broad field of mechanics      Laboratory Experiments and Demonstrations in Fluid Mechanics and Heat Transfer Fred Landis,1964      **Fluid Mechanics Laboratory Manual for Civil Engineering Students** G. Padmanabhan,2007-12-28      Projects in Higher Education National Science Foundation (U.S.),1976      Technical Information Pilot ,1951      **Free Night School of Engineering** Cooper Union for the Advancement of Science and Art. School of Engineering,1928      **FLUID MECHANICS AND HYDRAULIC MACHINES** GOYAL, MANISH

KUMAR,2015-08-31 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 : A CONCISE INTRODUCTION PANI, BIDYA**

SAGAR,2016-04-13 This is a comprehensive and accessible text that discusses all the aspects of fluid mechanics in concise manner and easy to understand language The contents of the book have been designed to match with the exact needs of the students The book has attempted to provide linkages between the different fundamental concepts of fluid mechanics It gives a holistic knowledge of the logic behind each of them through illustrations and simple worked out examples These features will help to approach any problem in a systematic way based on the theory learnt After the end of each chapter students will have a chance to review a summary of the presented features Chapter end problems have been carefully selected to supplement the theoretical knowledge The book contains a list of important references at the end of each chapter to serve as a guide to those students and teachers who wish to delve deeper into the subject matter

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