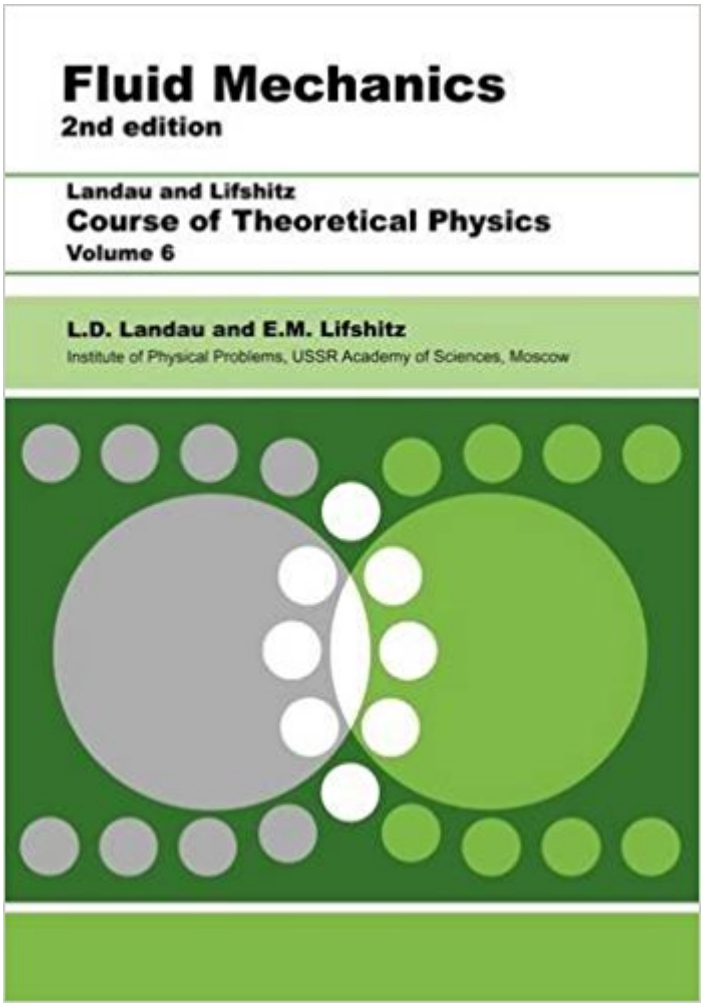
# Fluid Mechanics, Second Edition: Volume 6 (Course Of Theoretical Physics S)



## Synopsis

This is the most comprehensive introductory graduate or advanced undergraduate text in fluid mechanics available. It builds up from the fundamentals, often in a general way, to widespread applications, to technology and geophysics. New to this second edition are discussions on the universal dimensions similarity scaling for the laminar boundary layer equations and on the generalized vector field derivatives. In addition, new material on the generalized streamfunction treatment shows how streamfunction may be used in three-dimensional flows. Finally, a new Computational Fluid Dynamics chapter enables compulations of some simple flows and provides entry to more advanced literature. * Basic introduction to the subject of fluid mechanics, intended for undergraduate and beginning graduate students of science and engineering. * Includes topics of special interest for geophysicists and to engineers. * New and generalized treatment of similar laminar boundary layers, streamfunctions for three-dimensional flows, vector field derivatives, and gas dynamics. Also a new generalized treatment of boundary conditions in fluid mechanics, and expanded treatment of viscous flows.

## Book Information

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## Customer Reviews

This is a classic text on fluid mechanics, and an essential for any serious researcher in the field. This book starts by deriving the basic equations of fluid dynamics (a few simple equations - easy, huh?), then each subsequent chapter discusses narrower topics such as viscosity, turbulence,

supersonic flow, etc. As a text for a student, this book has some serious limitations in my view. I would not recommend this book to someone approaching the material for the first time, or to teach oneself, it is really best as a research resource for a professional or graduate student. One thing that I didn't like about this book (and this is a complaint about the LL series in general) is that it is very difficult to separate which topics are general and which are very specific. The reader needs to know a bit about hydrodynamics before approaching this book in my opinion. For example, LL discuss the Rankine-Hugoniot equations for flow across a shock (a general result fundamental to hydrodynamics), then in the next section they discuss the supersonic corrugation instability, a subject that is really of interest to a small number of researchers and advanced graduate student in specific fields. Overall, not a great learning text, but an irreplacable reference on hydrodynamics. If you are looking for an introductory text, start with Batchelor.

Landau & Lifshz "Course of Theoretical Physics" is a famous and respected set of books in Physics. Unfortunately, Butterworth-Heinemann, who currently prints those books in English, prints them with very poor quality. The books seem to be "printed" in old copy machines and the paper used is also a cheap one. In many pages, it is really hard to read the text, due to such poor printing.

This is an excellent fluid mechanics text. It is also my first recommendation to those who wish to study acoustics. You ought to start with the initial chapters on fluids; you'll need that material for some of what follows. The 65-page chapter on sound is simply marvellous. And then comes material on a wealth of topics, including shock waves, supersonic flow, detonation waves, relativistic fluid dynamics, and a short but valuable section on superfluid dynamics and the propagation of sound in a superfluid.For physics majors, this is the book to get on fluid mechanics. The explanations are short and clear, and the material is comprehensive. In addition, the exercises are well-chosen, and the solutions are always included.

This is the Volume 6 of the famous Course of Theoretical Physics by L. D. Landau and E. M. Lifshitz. All serious students of theoretical physics must possess the ten volumes of this excellent Course, which cover in detail and rigour practically all the branches of theoretical physics. The Volume 6 treats the theory of the motion of liquids and gases. The book opens with the theory of ideal fluids and drives the attention of the reader to a large amount of topics, which are discussed in greater detail and, moreover, discussing with details topics not usually found in other similar books, such as turbulence, sound, fluid dynamics of combustion, relativistic fluid dynamics and the

dynamics of superfluids. The book is written in a language proper of a theoretical physicist, but owing to its clarity, it can be read without problems for other scientists. A superb book!

The book is often cited by other authors of fluid mechanics and explosion/shock wave work which is why I bought it. It makes a great reference book, yet is probably not the best choice for an introductory course. It is very complete in its development of topics and the problems/examples are all solved in straight forward approaches.

Landau and Lifshitz compose a book on fluid dynamics that includes so many insights into transport theory that it is of interest to even those of us who have given little thought to fluid mechanics. The background provided by the authors is also valuable to researchers involved in solid state diffusion. The authors do an admirable job of introducing the equation of continuity (p.2), the adiabatic motion of an ideal fluid (p.4), energy flux density and associated thermodynamics relations for internal energy (p.10), all within the context of an ideal fluid.Chapter 6 (pp.227-237) is devoted to diffusion, including a particularly lucid discussion of Brownian motion and Einsteinâ ™s relation between the diffusion coefficient and mobility (pp.235-236).In order to understand this book, the reader must already have mastered differential operators and their associated identities.

Written in the language of vectors and tensors (some modern books aren't!), provides a solid basis for applying hydrodynamics in all fields. I like the formulation and calculation of lift and drag on an airfoil/wing, the induced drag due to finite aspect ratio is also calculated. This is one of the texts I recommend when teaching hydrodynamics.

This is another fantastic book from the Landau-Lifshitz series. I studied it in depth and then taught from it. I don't think there is any book of PHYSICAL quantum mechanics comparable to it, not even the classical Sommerfeld's "Mechanics of Defromable Bodies". What I like most in this book is the constant use of thermodynamics, allowing the treatment of much more real (and interesting) systems. For instance, it derives quite early conditions for the establishment of atmospheric thermal inversion, a problem of great practical importance in our days. The introduction of the Reynold's number is also superior to any other I've met. Relativistic fluid mechanics receives also a very good treatment, being an excellent preparation for relativistic cosmology. In this book Landau presents his ideas on turbulence, what is called now the Landau-Kolmogoroff turbulence theory. This is being challenged, after recent progresses on deterministic chaos, by different theories, I! ike that of

Ruelle-Takens. Still, in order to really enjoy the progresses in this field, you should know both, and the perfect source of information for Landau-Kolmogoroff theory is Landau's book.