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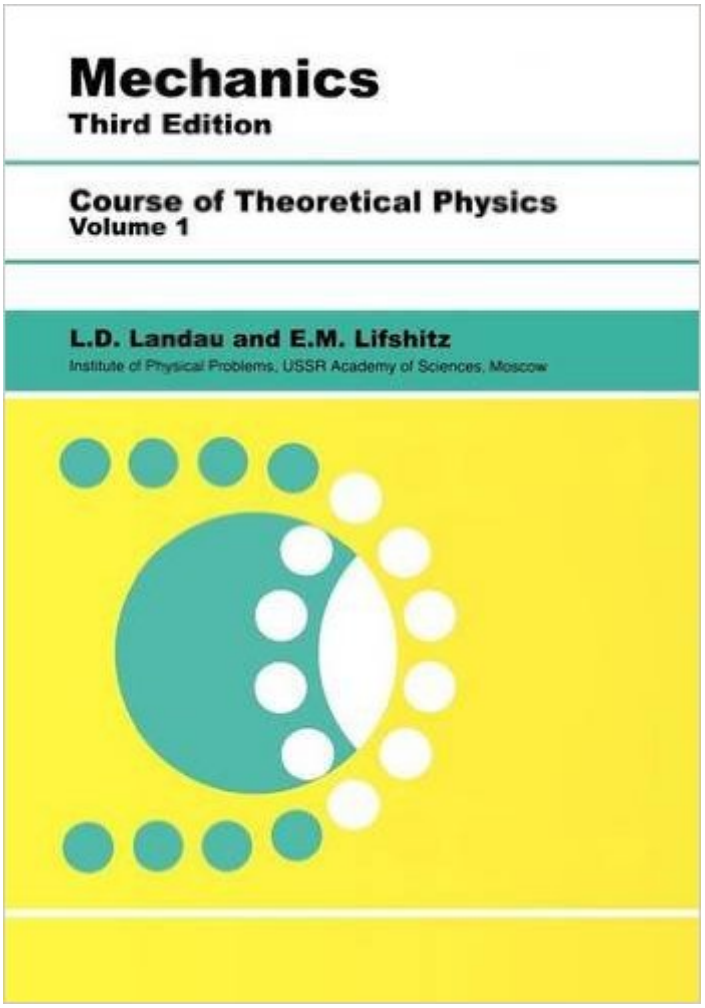

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Synopsis

Devoted to the foundation of mechanics, namely classical Newtonian mechanics, the subject is based mainly on Galileo’s principle of relativity and Hamilton’s principle of least action. The exposition is simple and leads to the most complete direct means of solving problems in mechanics.The final sections on adiabatic invariants have been revised and augmented. In addition a short biography of L D Landau has been inserted.

Book Information

Series: Course of Theoretical Physics S

Paperback: 224 pages

Publisher: Butterworth-Heinemann; 3 edition (January 15, 1976)

Language: English

ISBN-10: 0723628963

ISBN-13: 978-0723628965

ASIN: 0750628960

Product Dimensions: 6.8 x 0.4 x 9.6 inches

Shipping Weight: 12 ounces (View shipping rates and policies)

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Customer Reviews

If physicists could weep, they would weep over this book. The book is devastingly brief whilst deriving, in its few pages, all the great results of classical mechanics. Results that in other books take take up many more pages. I first came across Landau’s mechanics many years ago as a brash undergrad. My prof at the time had given me this book but warned me that it’s the kind of book that ages like wine. I’ve read this book several times since and I have found that indeed, each time is more rewarding than the last.The reason for the brevity is that, as pointed out by previous reviewers, Landau derives mechanics from symmetry. Historically, it was long after the main bulk of mechanics was developed that Emmy Noether proved that symmetries underly every important quantity in physics. So instead of starting from concrete mechanical case-studies and generalising to the formal machinery of the Hamilton equations, Landau starts out from the most generic symmetry and dervies the mechanics. The 2nd laws of mechanics, for example, is derived as a

consequence of the uniqueness of trajectories in the Lagragian. For some, this may seem too "mathematical" but in reality, it is a sign of sophisitication in physics if one can identify the underlying symmetries in a mechanical system. Thus this book represents the height of theoretical sophistication in that symmetries are used to derive so many physical results.The difficulty with this approach, and the reason why this book is not a beginner's book, is that to the follow symmetric arguments, one really has to have already mastered vector calculus. Ideally, you should be able to transform coordinate in your sleep, perform integrals without missing a beat, whether they be line, area, or path, and differentiate functions in many dimensions.

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