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# A General Relativity Workbook Pomona College

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Introduction to General Relativity  
An Introduction to General Relativity  
Zur Theorie sozialer Systeme  
Six Ideas that Shaped Physics  
Six Ideas that Shaped Physics  
Die Gemeinwirtschaft  
A General Relativity Coursebook  
Introduction to General Relativity  
Six Ideas that Shaped Physics  
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Relativity: The General Theory  
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Introduction to General Relativity  
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Six Ideas that Shaped Physics  
A General Relativity Workbook  
General Relativity  
The Mathematical Theory of Special and General Relativity  
Special and General Relativity  
General Relativity  
Welt teilen  
A Student's Guide to General Relativity  
Core Principles of Special and General Relativity  
General Relativity  
Introduction to General Relativity  
Introduction to 2-Spinors in General Relativity  
Problem Book in Relativity and Gravitation  
An Introduction To Relativity ( South Asian Edition )  
Mathematics of Relativity  
Six Ideas that Shaped Physics  
Problem Book in Relativity and Gravitation  
General relativity for mathematicians  
The General Theory of Relativity  
General Relativity and Gravitational Waves  
A First Course in General Relativity  
Relativity in Curved Spacetime  
Relativity

## Six Ideas that Shaped Physics

*A General Relativity Workbook Pomona College*

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### **BENITEZ ZION**

Introduction to General Relativity Princeton University Press  
A General Relativity Workbook is a textbook intended to support a one-semester undergraduate course on general relativity.

Through its unique workbook-based design, it enables students to develop a solid mastery of both the physics and the supporting tensor calculus by guiding them to work through the implications. The mathematics is introduced gradually and in a completely physical context. Each chapter, which is designed to correspond to one class session, involves a short overview of the concepts without obscuring derivations or details, followed by a series of boxes that guide students through the process of working things out. This active-learning approach enables students to develop a more secure mastery of the material than more traditional approaches. More than 350 homework problems support further learning.

**An Introduction to General Relativity** Morgan & Claypool Publishers

A working knowledge of Einstein's theory of general relativity is an essential tool for every physicist today. This self-contained book is an introductory text on the subject aimed at first-year graduate students, or advanced undergraduates, in physics that assumes only a basic understanding of classical Lagrangian mechanics. The mechanics problem of a point mass constrained to move without friction on a two-dimensional surface of arbitrary shape serves as a paradigm for the development of the mathematics and physics of general relativity. After reviewing special relativity, the basic principles of general relativity are presented, and the most important applications are discussed. The final special topics section guides the reader through a few important areas of current research. This book will allow the reader to approach the more advanced texts and monographs, as well as the continual influx of fascinating new experimental results, with a deeper understanding and sense of appreciation. *Zur Theorie sozialer Systeme* Walter de Gruyter GmbH & Co KG  
"This volume is one of six that together comprise the text

materials for Six Ideas That Shaped Physics, a unique approach to the two- or three-semester calculus-based introductory physics course. I have designed this curriculum (for which these volumes only serve as the text component) to support an introductory physics course that combines three elements: Inclusion of 20th-century physics topics, A thoroughly 21st-century perspective on even classical topics, and Support for a student-centered and active-learning-based classroom"--

**Six Ideas that Shaped Physics** McGraw-Hill Companies  
Relativity theory has become one of the icons of Twentieth Century science. It's reckoned to be a difficult subject, taught as a layered series of increasingly difficult mathematics and increasingly abstract concepts. We're told that relativity theory is supposed to be this complicated and counter-intuitive. But how much of this historical complexity is really necessary? Can we bypass the interpretations and paradoxes and pseudoparadoxes of Einstein's special theory and jump directly to a deeper and more intuitive description of reality? What if curvature is a fundamental part of physics, and a final theory of relativity shouldn't reduce to Einstein's "flat" 1905 theory //on principle//? "Relativity..." takes us on a whistlestop tour of Twentieth Century physics - from black holes, quantum mechanics, wormholes and the Big Bang to the workings of the human mind, and asks: what would physics look like without special relativity? 394 printed pages, 234x156 mm, ~200 figures and illustrations, includes bibliography and index [www.relativitybook.com](http://www.relativitybook.com)

**Six Ideas that Shaped Physics** CRC Press

This book is based on a set of 18 class-tested lectures delivered to fourth-year physics undergraduates at Griffith University in Brisbane, and the book presents new discoveries by the Nobel-prize winning LIGO collaboration. The author begins with a review of special relativity and tensors and then develops the basic elements of general relativity (a beautiful theory that unifies special relativity and gravitation via geometry) with applications to the gravitational deflection of light, global positioning systems, black holes, gravitational waves, and cosmology. The book provides readers with a solid understanding of the underlying physical concepts; an ability to appreciate and in many cases derive important applications of the theory; and a solid grounding

for those wishing to pursue their studies further. General Relativity: An Introduction to Black Holes, Gravitational Waves, and Cosmology also connects general relativity with broader topics. There is no doubt that general relativity is an active and exciting field of physics, and this book successfully transmits that excitement to readers.

*Die Gemeinwirtschaft* Springer-Verlag

Based on the ideas of Einstein and Minkowski, this concise treatment is derived from the author's many years of teaching the mathematics of relativity at the University of Michigan. Geared toward advanced undergraduates and graduate students of physics, the text covers old physics, new geometry, special relativity, curved space, and general relativity. Beginning with a discussion of the inverse square law in terms of simple calculus, the treatment gradually introduces increasingly complicated situations and more sophisticated mathematical tools. Changes in fundamental concepts, which characterize relativity theory, and the refinements of mathematical technique are incorporated as necessary. The presentation thus offers an easier approach without sacrifice of rigor. Dover (2014) republication of the edition published by John Wiley & Sons, New York, 1950. See every Dover book in print at [www.doverpublications.com](http://www.doverpublications.com)

**A General Relativity Coursebook** World Scientific Publishing Company

A Broad Perspective on the Theory of General Relativity and Its Observable Implications  
General Relativity: Basics and Beyond familiarizes students and beginning researchers with the basic features of the theory of general relativity as well as some of its more advanced aspects. Employing the pedagogical style of a textbook, it includes essential id

Introduction to General Relativity University of Chicago Press

"Wald's book is clearly the first textbook on general relativity with a totally modern point of view; and it succeeds very well where others are only partially successful. The book includes full discussions of many problems of current interest which are not treated in any extant book, and all these matters are considered with perception and understanding."—S. Chandrasekhar "A tour de force: lucid, straightforward, mathematically rigorous, exacting in the analysis of the theory in its physical aspect."—L. P.

Hughston, Times Higher Education Supplement "Truly excellent. . . A sophisticated text of manageable size that will probably be read by every student of relativity, astrophysics, and field theory for years to come."—James W. York, Physics Today

**Six Ideas that Shaped Physics** CreateSpace

A gentle introduction to general relativity, striking a balance between ease of use and precision, for all undergraduates in physics.

**General Relativity** Myprint

Student-friendly, well illustrated textbook for advanced undergraduate and beginning graduate students in physics and mathematics.

Relativity: The General Theory Cambridge University Press

This book provides an accessible, yet thorough, introduction to special and general relativity, crafted and class-tested over many years of teaching. Suitable for advanced undergraduate and graduate students, this book provides clear descriptions of how to approach the mathematics and physics involved. It is also contains the latest exciting developments in the field, including dark energy, gravitational waves, and frame dragging. The table of contents has been carefully developed in consultation with a large number of instructors teaching courses worldwide, to ensure its wide applicability to modules on relativity and gravitation.

Features: A clear, accessible writing style, presenting a sophisticated approach to the subject, that remains suitable for advanced undergraduate students and above Class-tested over many years To be accompanied by a partner volume on 'Advanced Topics' for students to further extend their learning

Six Ideas that Shaped Physics CRC Press

"This volume is one of six that together comprise the text materials for Six Ideas That Shaped Physics, a unique approach to the two- or three-semester calculusbased introductory physics course. I have designed this curriculum (for which these volumes only serve as the text component) to support an introductory course that combines three elements: Inclusion of 20th-century physics topics, A thoroughly 21st-century perspective on even classical topics, and Support for a student-centered and active-learning-based classroom"--

*Introduction to General Relativity* John Wiley & Sons

General relativity is now an essential part of undergraduate and graduate courses in physics, astrophysics and applied

mathematics. This simple, user-friendly introduction to relativity is ideal for a first course in the subject. Beginning with a comprehensive but simple review of special relativity, the book creates a framework from which to launch the ideas of general relativity. After describing the basic theory, it moves on to describe important applications to astrophysics, black hole physics, and cosmology. Several worked examples, and numerous figures and images, help students appreciate the underlying concepts. There are also 180 exercises which test and develop students' understanding of the subject. The textbook presents all the necessary information and discussion for an elementary approach to relativity. Password-protected solutions to the exercises are available to instructors at [www.cambridge.org/9780521735612](http://www.cambridge.org/9780521735612).

**Spacetime and Geometry** Iop Concise Physics

This book presents the basic theory of relativity in a rational and simplest possible manner, with the emphasis on the Principle of Simplicity in developing the theory. The presentation is in the style of a discussion and is generally devoid of unproven and speculative assertions. In rare cases where speculative ideas are mentioned, they are clearly stated to be such. Test results verifying all of the theoretical results are given and discussed. This work is intended to serve as a resource and reference book for educational purposes. In Parts I and II the principal results of special and general relativity are derived rigorously, discussing the contributions of Einstein, as well as Lorentz, Poincare, Minkowski, Hilbert, Eddington and others, with historical notes touching upon the various aspects of relativity. Multiple derivations are given particularly of the mass-energy relation, the gravitational field equation, and the relativistic orbit of planets. The Schwarzschild metric and its consequences leading to the formation of black holes are treated in detail. The historical problems of physical dilation of time and Einstein's clock paradox are treated in an entirely new manner based upon general relativity. The author has also presented Einstein's gravitational radiation theory, and its application by Peters and Mathews to radiation from orbiting bodies, followed by the study of radiation from a certain binary pulsar by Weisberg and Taylor. These difficult topics are treated without taking shortcuts as is commonly done in textbooks, but in a manner that senior students can understand. A fresh look is taken of Weyl's

unification of gravitational and electromagnetic field theories, again a difficult topic avoided by textbooks. The final chapter of Part II is on the elements of field cosmology. Aspects involving particle physics are not covered because they cannot be treated even cursorily in a book of this size dealing primarily with fields; only books specializing in cosmology can do justice to that vast subject. Part III is devoted entirely to tensor calculus, and its application to the geometries of Riemann and Weyl; these are the essential tools of Einstein's and Weyl's theories treated in Part II. Finally, four appendices are provided on certain mathematical topics. Thus the book is self-contained. The book contains 11 figures, an extensive bibliography and an index. Note: (1) Mathematical and other errors corrected March 21, 2015. (2) For earlier versions, a PDF of mathematical errata will be emailed upon request for free. (3) Comments of readers are welcome and may be emailed to [ashkatti34@gmail.com](mailto:ashkatti34@gmail.com).

General Relativity and Gravitational Waves World Scientific

"This volume is one of six that together comprise the text materials for Six Ideas That Shaped Physics, a unique approach to the two- or three-semester calculusbased introductory physics course. I have designed this curriculum (for which these volumes only serve as the text component) to support an introductory course that combines three elements: Inclusion of 20th-century physics topics, A thoroughly 21st-century perspective on even classical topics, and Support for a student-centered and active-learning-based classroom"--

**Six Ideas that Shaped Physics** University Science Books

Student-friendly, well illustrated textbook for advanced undergraduate and beginning graduate students in physics and mathematics

*A General Relativity Workbook* Cambridge University Press

Discusses the general theory of relativity, Lie derivatives, rotating black holes, with a focus on basics of cosmology and astrophysics.

**General Relativity** Chocolate Tree Books

This compact guide presents the key features of general relativity, to support and supplement the presentation in mainstream, more comprehensive undergraduate textbooks, or as a re-cap of essentials for graduate students pursuing more advanced studies. It helps students plot a careful path to understanding the core ideas and basics of differential geometry, as applied to general relativity, without overwhelming them.

While the guide doesn't shy away from necessary technicalities, it emphasises the essential simplicity of the main physical arguments. Presuming a familiarity with special relativity (with a brief account in an appendix), it describes how general covariance and the equivalence principle motivate Einstein's theory of gravitation. It then introduces differential geometry and the covariant derivative as the mathematical technology which allows us to understand Einstein's equations of general relativity. The book is supported by numerous worked examples and problems, and important applications of general relativity are described in an appendix.

**The Mathematical Theory of Special and General Relativity**  
Courier Corporation

"This volume is one of six that together comprise the text materials for Six Ideas That Shaped Physics, a unique approach to the two- or three-semester calculus-based introductory physics

course. I have designed this curriculum (for which these volumes only serve as the text component) to support an introductory course that combines three elements: Inclusion of 20th-century physics topics, A thoroughly 21st-century perspective on even classical topics, and Support for a student-centered and active-learning-based classroom"--

Special and General Relativity A General Relativity Workbook  
1. Vorbemerkung Dieser Band vereinigt eine Reihe von grundlegenden Aufsätzen Talcott Parsons' zur Theorie der Sozialsysteme. Diese Aufsätze geben zwar nur einen kleinen Ausschnitt aus dem Gesamtwerk von Parsons wieder. Dabei handelt es sich allerdings um den wichtigsten und grundlegendsten Teil, ohne dessen Kenntnis eine Beurteilung der Theorie Parsons' überhaupt nicht möglich ist. Diesem Band wird in Kürze ein zweiter folgen, der einige Beiträge Parsons zur Theorie der Interaktionsmedien sowie einen Beitrag von Niklas Luhmann zu diesem Thema enthält (1). Die Herausgabe der beiden Bände

zur Theorie der Sozialsysteme und der Theorie der Interaktionsmedien ist ein Versuch, die Auseinandersetzungen mit der gesellschaftlichen Systemtheorie (2) auf der Grundlagen ebene zu ergänzen. Dieses Buch und seine Einleitung wendet sich vor allem an Studenten und andere Leser, die Parsons noch nicht oder nur wenig kennen. Man könnte freilich - iiberspitzt - sagen, daß kaum jemand Parsons wirklich kennt. Einer der Hauptgründe dafür liegt in dem Umfang seiner Arbeiten, ein anderer in der Schwierigkeit jedes Versuchs, Parsons' theoretische Argumente im ersten Anlauf zu begreifen. Daher sind viele Argumente verkürzt oder aufgrund von Rezeptionen aus zweiter oder dritter Hand zur Kenntnis genommen worden. Dabei haben sie sich mit zahlreichen Vorurteilen vermischt (3), so daß vielfach die bestehenden Kenntnisse über Parsons ein Konglomerat aus theoretischen und ideologischen Argumenten darstellen.

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