

Access Free
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Hartle

Gravity

Solutions

Manual

More emphasis is placed on an intuitive grasp of the subject and calculational facility than on rigorous exposition

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*in this introduction
to general relativity
for mathematics
undergraduates or
graduate
physicists.*

*A working
knowledge of
Einstein's theory of
general relativity is
an essential tool
for every physicist
today. This self-
contained book is*

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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

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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

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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

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*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.
The important
changes quantum*

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mechanics has undergone in recent years are reflected in this approach for students. A strong narrative and over 300 worked problems lead the student from experiment, through general principles of the theory, to modern

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applications.

*Stepping through
results allows*

*students to gain a
thorough*

understanding.

*Starting with basic
quantum*

mechanics, the

book moves on to

more advanced

theory, followed by

applications,

perturbation

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methods and special fields, and ending with developments in the field. Historical, mathematical and philosophical boxes guide the student through the theory. Unique to this textbook are chapters on measurement and quantum optics,

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*both at the
forefront of current
research.*

*Advanced
undergraduate and
graduate students
will benefit from
this perspective on
the fundamental
physical paradigm
and its
applications. Online
resources including
solutions to*

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*selected problems,
and 200 figures,
with colour
versions of some
figures, are
available at www.cambridge.org/Auletta.*

*The masses of
neutron stars are
limited by an
instability to
gravitational
collapse and an*

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instability driven by gravitational waves limits their spin. Their oscillations are relevant to x-ray observations of accreting binaries and to gravitational wave observations of neutron stars formed during the coalescence of double neutron-star systems. This

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*volume includes
more than forty
years of research
to provide
graduate students
and researchers in
astrophysics,
gravitational
physics and
astronomy with the
first self-contained
treatment of the
structure, stability
and oscillations of*

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rotating neutron stars. This monograph treats the equations of stellar equilibrium; key approximations, including slow rotation and perturbations of spherical and rotating stars; stability theory and its applications,

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from convective stability to the r-mode instability; and numerical methods for computing equilibrium configurations and the nonlinear evolution of their oscillations. The presentation of fundamental equations, results

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*and applications is
accessible to
readers who do not
need the detailed
derivations.*

*Introducing
Einstein's Relativity
Gravity*

*A Relativist's
Toolkit*

*The Armed Forces
Officer*

*Mathematical
Physics*

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"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

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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

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*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
Discusses the Allied
invasion of*

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Normandy, with extensive details about the planning stage, called Operation Overlord, as well as the fighting on Utah and Omaha Beaches.

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

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and mathematics.

This book offers an essential bridge between college-level introductions and advanced graduate-level books on special relativity. It begins at an elementary level, presenting and discussing the basic concepts normally covered in college-level works, including

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the Lorentz

transformation.

Subsequent chapters

introduce the four-

dimensional

worldview implied by

the Lorentz

transformations,

mixing time and

space coordinates,

before continuing on

to the formalism of

tensors, a topic

usually avoided in

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lower-level courses.

The book's second half addresses a number of essential points, including the concept of causality; the equivalence between mass and energy, including applications; relativistic optics; and measurements and matter in Minkowski space-time. The

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closing chapters focus on the energy-momentum tensor of a continuous distribution of mass-energy and its covariant conservation; angular momentum; a discussion of the scalar field of perfect fluids and the Maxwell field; and general coordinates. Every chapter is

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supplemented by a section with numerous exercises, allowing readers to practice the theory. These exercises constitute an essential part of the textbook, and the solutions to approximately half of them are provided in the appendix.

*An Introduction to
General Relativity*

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*The Theoretical
Minimum
Black Holes,
Gravitational Waves,
and Cosmology
Understanding and
Using English
Grammar
An Introduction to
Einstein's General
Relativity*

**Hundreds of well-
illustrated articles**

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explore the most important fields of science. Based on content from the McGraw-Hill Concise Encyclopedia of Science & Technology, Fifth Edition, the most widely used and respected science reference of its

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**kind in print, the
new Concise
Encyclopedia
Series delivers: *
Detailed, well-
illustrated
explanations, not
just definitions *
Hundreds of
concise yet
authoritative
articles in each
volume * An easy-**

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**to-understand
presentation,
accessible and
interesting to non-
specialists * A
portable,
convenient format
* Bibliographies,
appendices, and
other information
to supplement the
articles
Einstein's general**

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**theory of relativity
is widely
considered to be
one of the most
elegant and
successful
scientific theories
ever developed,
and it is
increasingly being
taught in a
simplified form at
advanced**

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undergraduate level within both physics and mathematics departments. Due to the increasing interest in gravitational physics, in both the academic and the public sphere, driven largely by widely-publicised

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**developments
such as the recent
observations of
gravitational
waves, general
relativity is also
one of the most
popular scientific
topics pursued
through self-study.
Modern General
Relativity
introduces the**

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**reader to the
general theory of
relativity using an
example-based
approach, before
describing some
of its most
important
applications in
cosmology and
astrophysics, such
as gamma-ray
bursts, neutron**

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**stars, black holes,
and gravitational
waves. With
hundreds of
worked examples,
explanatory boxes,
and end-of-
chapter problems,
this textbook
provides a solid
foundation for
understanding one
of the towering**

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**achievements of
twentieth-century
physics.**

**The third volume
in the bestselling
physics series
cracks open
Einstein's special
relativity and field
theory Physicist
Leonard Susskind
and data engineer
Art Friedman are**

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**back. This time,
they introduce
readers to
Einstein's special
relativity and
Maxwell's classical
field theory. Using
their typical brand
of real math,
enlightening
drawings, and
humor, Susskind
and Friedman walk**

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us through the complexities of waves, forces, and particles by exploring special relativity and electromagnetism. It's a must-read for both devotees of the series and any armchair physicist who wants to improve their

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**knowledge of
physics' deepest
truths.**

**Spacetime physics
-- Physics in flat
spacetime -- The
mathematics of
curved spacetime
-- Einstein's
geometric theory
of gravity --
Relativistic stars --
The universe --**

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**Gravitational
collapse and black
holes --**

**Gravitational
waves --**

**Experimental tests
of general
relativity --**

Frontiers

**Special Relativity
and Classical Field
Theory**

Introduction to

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**General Relativity
Einstein Gravity in
a Nutshell
Spacetime and
Geometry**

*This unique book
offers a
concise,
introductory
overview of
general
relativity and*

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*black holes,
motivating
students to
become active
participants in
carrying out
their own
investigations.
To this end, the
book uses
calculus and
algebra, rather
than tensors, to
make general*

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*relativity
accessible to
sophomores and
juniors. Five
chapters
introduce basic
concepts, and
seven projects
require the
reader to apply
these basic
concepts to real
astronomical
applications.*

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*In 1950, when he
commissioned the
first edition of
The Armed Forces
Officer,
Secretary of
Defense George
C. Marshall told
its author,
S.L.A. Marshall,
that "American
military
officers, of
whatever*

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service, should share common ground ethically and morally." In this new edition, the authors methodically explore that common ground, reflecting on the basics of the Profession of Arms, and the

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*officer's
special place
and distinctive
obligations
within that
profession and
especially to
the
Constitution.
A pithy yet deep
introduction to
Einstein's
general theory
of relativity Of*

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Solutions Manual

*the four
fundamental
forces of
nature, gravity
might be the
least understood
and yet the one
with which we
are most
intimate. On
Gravity combines
depth with
accessibility to
take us on a*

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Solutions Manual

*compelling tour
of Einstein's
general theory
of relativity.
A. Zee begins
with the
discovery of
gravity waves,
then explains
how gravity can
be understood in
comparison to
other classical
field theories,*

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Solutions Manual

*presents the
idea of curved
spacetime, and
explores black
holes and
Hawking
radiation. Zee
travels as far
as the theory
reaches, leaving
us with
tantalizing
hints of the
unknown, from*

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Solutions Manual

the intransigence of quantum gravity to the mysteries of dark matter. Infused with Zee's signature warmth and fresh style, On Gravity opens a unique pathway to comprehending relativity, gravity,

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*spacetime, and
the workings of
the universe.*

*A unique
graduate
textbook that
develops
powerful
approximation
methods and
their
applications to
real-life
astrophysical*

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systems.

*A General
Relativity
Workbook
Modern General
Relativity
Advanced
Mechanics and
General
Relativity
Quantum
Mechanics
Gravitation*

Examines such

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phenomena as black holes, wormholes, singularities, gravitational waves, and time machines, exploring the fundamental principles that control the universe. Introduces the superstring theory that attempts to unite

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general relativity and
quantum mechanics
Einstein's theories of
special relativity and
general relativity
form a core part of
today's
undergraduate (or
Masters-level)
physics curriculum.
This is a
supplementary

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problem book or student's manual, consisting of 150 problems in each of special and general relativity. The problems, which have been developed, tested and refined by the authors over the past two decades, are a

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mixture of short-form and multi-part extended problems, with hints provided where appropriate. Complete solutions are elaborated for every problem, in a different section of the book; some solutions include brief discussions on

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their physical or
historical
significance.

Designed as a
companion text to
complement a main
relativity textbook, it
does not assume
access to any
specific textbook.
This is a helpful
resource for

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advanced students,
for self-study, a
source of problems
for university
teaching assistants,
or as inspiration for
instructors and
examiners
constructing
problems for their
lectures, homework
or exams.

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Algebra doesn't have to consist of solving hundreds of apparently meaningless problems! These worksheets, while they include abstract problems to help the student practice the skills, also include real-life problems

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that allow the student
to remember the
purpose of what
they're learning, give
them a chance to
explore God's
handiwork, and
equip them to apply
math outside of a
textbook. Easy-to-use
daily
schedule Carefully

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graduated problems
to help students learn
the material Built-in
review of
concepts Problems
that let the students
apply algebra to real-
life
settings Perforated
pages to tear out and
hand
students Chapter

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quizzes and quarter
tests, along with a
final exam

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Concise

Encyclopedia of

Engineering

The Quest of the

Valiant Swabian

Special Relativity

Einstein and the

Quantum

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A Student's Manual
for A First Course in
General Relativity

*This textbook
develops general
relativity and its
associated
mathematics from a
minimum of
prerequisites, leading
to a physical
understanding of the*

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theory in some depth.

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*widely used and
respected science
reference of its kind
in print, each of these
subject-specific quick-
reference guides
features: * Detailed,
well-illustrated
explanations, not just
definitions *
Hundreds of concise
yet authoritative*

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*articles in each
volume * An easy-to-
understand
presentation,
accessible and
interesting to non-
specialists * A
portable, convenient
format **

*Bibliographies,
appendices, and other
information*

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*supplement the
articles*

*This best-selling title
provides in one
handy volume the
essential
mathematical tools
and techniques used
to solve problems in
physics. It is a vital
addition to the
bookshelf of any*

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*serious student of
physics or research
professional in the
field. The authors
have put considerable
effort into revamping
this new edition.*

*Updates the leading
graduate-level text in
mathematical physics*

Provides

comprehensive

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*coverage of the
mathematics
necessary for
advanced study in
physics and
engineering Focuses
on problem-solving
skills and offers a
vast array of
exercises Clearly
illustrates and proves
mathematical*

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*relations New in the
Sixth Edition:*

*Updated content
throughout, based on
users' feedback More
advanced sections,
including differential
forms and the elegant
forms of Maxwell's
equations A new
chapter on
probability and*

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statistics More

elementary sections

have been deleted

Features more than

seven thousand

entries covering

topics, terms, and

concepts in math,

science, and

technology.

Exploring Black

Holes

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*Newtonian, Post-
Newtonian,
Relativistic
Einstein's Outrageous
Legacy
Foundations and
Frontiers
General Relativity*

*This 2004 textbook
fills a gap in the
literature on general
relativity by*

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*providing the
advanced student
with practical tools
for the computation
of many physically
interesting
quantities. The
context is provided
by the mathematical
theory of black
holes, one of the
most elegant,*

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*successful, and
relevant applications
of general relativity.
Among the topics
discussed are
congruencies of
timelike and null
geodesics, the
embedding of
spacelike, timelike
and null
hypersurfaces in*

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*spacetime, and the
Lagrangian and
Hamiltonian
formulations of
general relativity.
Although the book is
self-contained, it is
not meant to serve as
an introduction to
general relativity.
Instead, it is meant
to help the reader*

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acquire advanced skills and become a competent researcher in relativity and gravitational physics. The primary readership consists of graduate students in gravitational physics. It will also be a useful reference

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*for more seasoned
researchers working
in this field.*

*What sets this
volume apart from
other mathematics
texts is its emphasis
on mathematical
tools commonly used
by scientists and
engineers to solve
real-world problems.*

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Using a unique approach, it covers intermediate and advanced material in a manner appropriate for undergraduate students. Based on author Bruce Kusse's course at the Department of Applied and

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Engineering Physics

at Cornell

University,

Mathematical

Physics begins with

essentials such as

vector and tensor

algebra, curvilinear

coordinate systems,

complex variables,

Fourier series,

Fourier and Laplace

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*transforms,
differential and
integral equations,
and solutions to
Laplace's equations.
The book moves on
to explain complex
topics that often fall
through the cracks
in undergraduate
programs, including
the Dirac delta-*

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*function, multivalued
complex functions
using branch cuts,
branch points and
Riemann sheets,
contravariant and
covariant tensors,
and an introduction
to group theory. This
expanded second
edition contains a
new appendix on the*

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calculus of variation

-- a valuable
addition to the
already superb
collection of topics
on offer. This is an
ideal text for upper-
level undergraduates
in physics, applied
physics, physical
chemistry,
biophysics, and all

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areas of

*engineering. It
allows physics
professors to
prepare students for
a wide range of
employment in
science and
engineering and
makes an excellent
reference for
scientists and*

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engineers in

*industry. Worked out
examples appear
throughout the book
and exercises follow
every chapter.*

*Solutions to the odd-
numbered exercises
are available for
lecturers at [www.wil
ey-vch.de/textbooks/](http://www.wiley-vch.de/textbooks/).*

Einstein and the

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Quantum reveals for the first time the full significance of Albert Einstein's contributions to quantum theory. Einstein famously rejected quantum mechanics, observing that God does not play dice. But, in fact, he

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*thought more about
the nature of atoms,
molecules, and the
emission and
absorption of
light--the core of
what we now know
as quantum
theory--than he did
about relativity. A
compelling blend of
physics, biography,*

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and the history of science, Einstein and the Quantum shares the untold story of how Einstein--not Max Planck or Niels Bohr--was the driving force behind early quantum theory. It paints a vivid portrait of the iconic physicist as

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*he grappled with the
apparently
contradictory nature
of the atomic world,
in which its invisible
constituents defy the
categories of
classical physics,
behaving
simultaneously as
both particle and
wave. And it*

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*demonstrates how
Einstein's later work
on the emission and
absorption of light,
and on atomic gases,
led directly to Erwin
Schrödinger's
breakthrough to the
modern form of
quantum mechanics.
The book sheds light
on why Einstein*

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*ultimately renounced
his own brilliant
work on quantum
theory, due to his
deep belief in
science as something
objective and
eternal.*

*An ideal
introduction to
Einstein's general
theory of relativity*

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This unique textbook provides an accessible introduction to Einstein's general theory of relativity, a subject of breathtaking beauty and supreme importance in physics. With his trademark blend of

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wit and incisiveness,

*A. Zee guides
readers from the
fundamentals of
Newtonian
mechanics to the
most exciting
frontiers of research
today, including de
Sitter and anti-de
Sitter spacetimes,
Kaluza-Klein theory,*

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and brane worlds.

*Unlike other books
on Einstein gravity,
this book emphasizes
the action principle
and group theory as
guides in
constructing
physical theories.
Zee treats various
topics in a spiral
style that is easy on*

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beginners, and includes anecdotes from the history of physics that will appeal to students and experts alike. He takes a friendly approach to the required mathematics, yet does not shy away from more advanced

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*mathematical topics
such as differential
forms. The extensive
discussion of black
holes includes
rotating and
extremal black holes
and Hawking
radiation. The ideal
textbook for
undergraduate and
graduate students,*

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*Einstein Gravity in a
Nutshell also
provides an essential
resource for
professional
physicists and is
accessible to anyone
familiar with
classical mechanics
and
electromagnetism. It
features numerous*

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*exercises as well as
detailed appendices
covering a multitude
of topics not readily
found elsewhere.*

*Provides an
accessible
introduction to
Einstein's general
theory of relativity
Guides readers from
Newtonian*

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mechanics to the
frontiers of modern
research Emphasizes
symmetry and the
Einstein-Hilbert
action Covers topics
not found in
standard textbooks
on Einstein gravity
Includes interesting
historical asides
Features numerous

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*exercises and
detailed appendices
Ideal for students,
physicists, and
scientifically minded
lay readers Solutions
manual (available
only to teachers)*

McGraw-Hill

Concise

*Encyclopedia of
Science &*

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Technology

Principles of

*Algebra 2 (Teacher
Guide)*

Applied

Mathematics for

Scientists and

Engineers

Superstrings, Hidden

Dimensions, and the

Quest for the

Ultimate Theory

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*Black Holes and
Time Warps*

GravityAn
Introduction to
Einstein's
General Relativi
tyCambridge
University Press
Covering all
aspects of
gravitation in a
contemporary
style, this

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advanced
textbook is
ideal for
graduate
students and
researchers in
all areas of
theoretical
physics. The
'Foundation'
section develops
the formalism in
six chapters,
and uses it in

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the next four chapters to discuss four key applications - spherical spacetimes, black holes, gravitational waves and cosmology. The six chapters in the 'Frontier' section describe cosmological

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perturbation theory, quantum fields in curved spacetime, and the Hamiltonian structure of general relativity, among several other advanced topics, some of which are covered in-depth for the first

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time in a textbook. The modular structure of the book allows different sections to be combined to suit a variety of courses. Over 200 exercises are included to test and develop the reader's

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understanding.

There are also
over 30
projects, which
help readers
make the
transition from
the book to
their own
original
research.

Best-selling,
accessible
physics-first

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introduction to
GR uses minimal
new mathematics
and begins with
the essential
physical
applications.

Aimed at
advanced
undergraduates
with background
knowledge of
classical
mechanics and

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electricity and magnetism, this textbook presents both the particle dynamics relevant to general relativity, and the field dynamics necessary to understand the theory. Focusing

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on action
extremization,
the book
develops the
structure and
predictions of
general
relativity by
analogy with
familiar
physical
systems. Topics
ranging from
classical field

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theory to minimal surfaces and relativistic strings are covered in a homogeneous manner. Nearly 150 exercises and numerous examples throughout the textbook enable students to test their

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understanding of
the material
covered. A
tensor
manipulation
package to help
students
overcome the
computational
challenge
associated with
general
relativity is
available on a

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site hosted by
the author. A
link to this and
to a solutions
manual can be
found at www.cambridge.org/9780521762458.

Rotating
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Stars
The Elegant
Universe
300 Problems in

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Special and
General
Relativity
Cross Channel
Attack
Brief Answers to
the Big
Questions

*Spacetime and
Geometry is an
introductory textbook
on general relativity,
specifically aimed at
students. Using a*

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lucid style, Carroll first covers the foundations of the theory and mathematical formalism, providing an approachable introduction to what can often be an intimidating subject. Three major applications of general relativity are then discussed: black

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holes, perturbation theory and gravitational waves, and cosmology.

Students will learn the origin of how spacetime curves (the Einstein equation) and how matter moves through it (the geodesic equation). They will learn what black holes really are,

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how gravitational waves are generated and detected, and the modern view of the expansion of the universe. A brief introduction to quantum field theory in curved spacetime is also included. A student familiar with this book will be ready to tackle research-level

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*problems in
gravitational physics.
The Workbook
consists solely of self-
study exercises, with
answers included,
providing students
the opportunity to
explore and practice
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independently. It is
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grammar charts in
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*Book and the
Chartbook.*

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*Grammar is a classic
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to advanced English
language learners.*

*There are many
excellent books on
quantum theory from
which one can learn
to compute energy*

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levels, transition rates, cross sections, etc. The theoretical rules given in these books are routinely used by physicists to compute observable quantities. Their predictions can then be compared with experimental data. There is no fundamental disagreement among

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physicists on how to use the theory for these practical purposes. However, there are profound differences in their opinions on the ontological meaning of quantum theory. The purpose of this book is to clarify the conceptual meaning of quantum theory, and to explain some

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of the mathematical methods which it utilizes. This text is not concerned with specialized topics such as atomic structure, or strong or weak interactions, but with the very foundations of the theory. This is not, however, a book on the philosophy of science. The

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approach is pragmatic and strictly instrumentalist. This attitude will undoubtedly antagonize some readers, but it has its own logic: quantum phenomena do not occur in a Hilbert space, they occur in a laboratory.

An essential resource

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*for learning about
general relativity and
much more, from
four leading experts
Important and useful
to every student of
relativity, this book is
a unique collection of
some 475
problems--with
solutions--in the
fields of special and
general relativity,
gravitation,*

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*relativistic
astrophysics, and
cosmology. The
problems are
expressed in broad
physical terms to
enhance their
pertinence to readers
with diverse
backgrounds. In their
solutions, the authors
have attempted to
convey a mode of
approach to these*

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kinds of problems, revealing procedures that can reduce the labor of calculations while avoiding the pitfall of too much or too powerful formalism. Although well suited for individual use, the volume may also be used with one of the modern textbooks in general relativity.

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*A Brief Tour of a
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Mathematical
Methods For
Physicists
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A First Course in
General Relativity
On Gravity*

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Second edition of a widely-used textbook providing the first step into general relativity for undergraduate students with minimal

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