

Online Library Error Control
Coding Fundamentals And
Applications Solution Manual

Error Control

Coding

Fundamentals And

Applications

Online Library Error Control

Coding Fundamentals And

Solution Manual

This is the revised edition of Berlekamp's famous book, 'Algebraic Coding Theory', originally published in 1968, wherein he introduced several

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**algorithms which have
subsequently dominated
engineering practice in this
field. One of these is an
algorithm for decoding Reed-
Solomon and Bose-Chaudhuri-
Hocquenghem codes that**

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**subsequently became known
as the Berlekamp-Massey
Algorithm. Another is the
Berlekamp algorithm for
factoring polynomials over
finite fields, whose later
extensions and**

embellishments became widely used in symbolic manipulation systems. Other novel algorithms improved the basic methods for doing various arithmetic operations in finite fields of characteristic

two. Other major research contributions in this book included a new class of Lee metric codes, and precise asymptotic results on the number of information symbols in long binary BCH

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codes. Selected chapters of the book became a standard graduate textbook. Both practicing engineers and scholars will find this book to be of great value.

The purpose of Error-Control

Coding for Data Networks is to provide an accessible and comprehensive overview of the fundamental techniques and practical applications of the error-control coding needed by students and

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engineers. An additional purpose of the book is to acquaint the reader with the analytical techniques used to design an error-control coding system for many new applications in data networks.

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Error~control coding is a field in which elegant theory was motivated by practical problems so that it often leads to important useful advances. Claude Shannon in 1948 proved the existence of error-

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control codes that, under suitable conditions and at rates less than channel capacity, would transmit error-free information for all practical applications. The first practical binary codes were

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**introduced by Richard
Hamming and Marcel Golay
from which the drama and
excitement have infused
researchers and engineers in
digital communication and
error-control coding for more**

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than fifty years. Nowadays, error-control codes are being used in almost all modern digital electronic systems and data networks. Not only is coding equipment being implemented to increase the

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**energy and bandwidth
efficiency of communication
systems, but coding also
provides innovative solutions
to many related data-
networking problems.
After a dozen years of**

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incremental changes, C# has become one of the most versatile programming languages available. With this comprehensive guide, you'll learn just how powerful the combination of C# 5.0 and

.NET 4.5 can be. Author Ian Griffiths guides you through C# 5.0 fundamentals and teaches you techniques for building web and desktop applications, including Windows 8-style apps.

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**Completely rewritten for
experienced programmers,
this book provides many code
examples to help you work
with the nuts and bolts of C#
code, such as generics,
dynamic typing, and the new**

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asynchronous programming features. You'll also get up to speed on XAML, ASP.NET, LINQ, and other .NET tools. Discover how C# supports fundamental coding features such as classes, other custom

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types, collections, and error handling Understand the differences between dynamic and static typing in C# Query and process diverse data sources such as in-memory object models, databases, and

**XML documents with LINQ Use
.NET's multithreading features
to exploit your computer's
parallel processing
capabilities Learn how the new
asynchronous language
features can help improve**

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**application responsiveness
and scalability Use XAML to
create Windows 8-style,
phone, and classic desktop
applications**

**This is a concise presentation
of the concepts underlying the**

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**design of digital
communication systems,
without the detail that can
overwhelm students. Many
examples, from the basic to
the cutting-edge, show how
the theory is used in the**

design of modern systems and the relevance of this theory will motivate students. The theory is supported by practical algorithms so that the student can perform computations and simulations.

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**Leading edge topics in coding
and wireless communication
make this an ideal text for
students taking just one
course on the subject.
Fundamentals of Digital
Communications has**

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**coverage of turbo and LDPC
codes in sufficient detail and
clarity to enable hands-on
implementation and
performance evaluation, as
well as 'just enough'
information theory to enable**

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**computation of performance
benchmarks to compare them
against. Other unique features
include space-time
communication and geometric
insights into noncoherent
communication and**

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equalization.

**A Practical Guide to Error-
Control Coding Using
MATLAB**

**Error Control Coding
Theory and Applications
Programming C# 5.0**

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VLSI Architectures for Modern Error-Correcting Codes Fundamentals and Applications

Channel coding lies at the heart of digital communication and data storage, and this detailed

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introduction describes the core theory as well as decoding algorithms, implementation details, and performance analyses. In this book, Professors Ryan and Lin provide clear information on modern channel codes, including

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turbo and low-density parity-check (LDPC) codes. They also present detailed coverage of BCH codes, Reed-Solomon codes, convolutional codes, finite geometry codes, and product codes, providing a one-stop resource for both classical and

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modern coding techniques.

Assuming no prior knowledge in the field of channel coding, the opening chapters begin with basic theory to introduce newcomers to the subject. Later chapters then extend to advanced topics such as

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code ensemble performance
analyses and algebraic code design.
250 varied and stimulating end-of-
chapter problems are also included
to test and enhance learning,
making this an essential resource
for students and practitioners alike.

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Error-controlled coding techniques are used to detect and/or correct errors that occur in the message transmission in a digital communications system. Wireless personal channels used by mobile communications systems and

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storage systems for digital multimedia data all require the implementation of error control coding methods. Demonstrating the role of coding in communication and data storage system design, this text illustrates

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the correct use of codes and the selection of the right code parameters. Relevant decoding techniques and their implementation are discussed in detail. Providing communication systems engineers and students

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with guidance in the application of error-control coding, this book emphasizes the fundamental concepts of coding theory while minimising the use of mathematical tools. * Reader-friendly approach to coding in

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communication systems providing
examples of encoding and
decoding, information theory and
criteria for code selection *

Thorough descriptions of relevant
application, including telephony on
satellite links, GSM, UMTS and

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multimedia standards, CD, DVD
and MPEG * Provides coverage of
the fundamentals of coding and the
applications of codes to the design
of real error control systems * End
of chapter problems to test and
develop understanding

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This practical handbook provides communication systems engineers with guidance in the application of error-control coding. It emphasizes the fundamental concepts of coding theory while minimizing the use of mathematical

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tools...demonstrates the role of coding in communication system design...shows the performance gains achievable with coding...illustrates how codes should be used and how to select the right code

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parameters...discusses the decoding techniques that should be considered and how they are implemented...and examines how detailed performance results are obtained.

For introductory graduate courses

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in coding for telecommunications engineering, digital communications. This introductory text on error control coding focuses on key implementation issues and performance analysis with applications valuable to both

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mathematicians and engineers.

Error-Correction Coding and
Decoding

Building Windows 8, Web, and
Desktop Applications for the .NET
4.5 Framework

Coding and Information Theory

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Non-Binary Error Control Coding
for Wireless Communication and
Data Storage
Fundamentals in Information
Theory and Coding
Theory and Applications of Error-
Correcting Codes with an

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**Introduction to Cryptography and
Information Theory**

Completely updated to cover
latest developments, this
text provides a bridge
between introductory
courses in digital

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communications and more advanced courses in information technology. It presents state-of-the-art control techniques.

An accessible textbook that uses step-by-step

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explanations, relatively easy
mathematics and numerous
examples to aid student
understanding.

Error Control

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This practical resource provides you with a comprehensive understanding of error control coding, an essential and widely applied area in modern digital

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communications. The goal of error control coding is to encode information in such a way that even if the channel (or storage medium) introduces errors, the receiver can correct the

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errors and recover the original transmitted information. This book includes the most useful modern and classic codes, including block, Reed Solomon, convolutional,

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turbo, and LDPC codes. You find clear guidance on code construction, decoding algorithms, and error correcting performances. Moreover, this unique book introduces computer

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simulations integrally to help you master key concepts. Including a companion DVD with MATLAB programs and supported with over 540 equations, this hands-on reference provides you with

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an in-depth treatment of a
wide range of practical
implementation issues.
Introduction to the Theory of
Error-correcting Codes
Paving the Way to IMT-
Advanced Standards

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From Theory to Practice
Fundamentals of Error-
Correcting Codes
Algorithms, Architectures
and Applications
Concise Encyclopedia of
Coding Theory

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*One of the most
important key
technologies for digital
communication systems as
well as storage media is
coding theory. It
provides a means to*

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*transmit information
across time and space
over noisy and
unreliable communication
channels. Coding Theory:
Algorithms,
Architectures and*

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*Applications provides a
concise overview of
channel coding theory
and practice, as well as
the accompanying signal
processing
architectures. The book*

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*is unique in presenting
algorithms,
architectures, and
applications of coding
theory in a unified
framework. It covers the
basics of coding theory*

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*before moving on to
discuss algebraic linear
block and cyclic codes,
turbo codes and low
density parity check
codes and space-time
codes. Coding Theory*

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*provides algorithms and
architectures used for
implementing coding and
decoding strategies as
well as coding schemes
used in practice
especially in*

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communication systems.

*Feature of the book
include: Unique
presentation-like style
for summarising main
aspects Practical issues
for implementation of*

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*coding techniques Sound
theoretical approach to
practical, relevant
coding methodologies
Covers standard coding
schemes such as block
and convolutional codes,*

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*coding schemes such as
Turbo and LDPC codes,
and space time codes
currently in research,
all covered in a common
framework with respect
to their applications.*

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*This book is ideal for
postgraduate and
undergraduate students
of communication and
information engineering,
as well as computer
science students. It*

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*will also be of use to
engineers working in the
industry who want to
know more about the
theoretical basics of
coding theory and their
application in currently*

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*relevant communication
systems*

*The first book on
optical OFDM by the
leading pioneers in the
field The only book to
cover error correction*

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*codes for optical OFDM
Gives applications of
OFDM to free-space
communications, optical
access networks, and
metro and log haul
transports show optical*

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*OFDM can be implemented
Contains introductions
to signal processing for
optical engineers and
optical communication
fundamentals for
wireless engineers This*

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*book gives a coherent
and comprehensive
introduction to the
fundamentals of OFDM
signal processing, with
a distinctive focus on
its broad range of*

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*applications. It
evaluates the
architecture, design and
performance of a number
of OFDM variations,
discusses coded OFDM,
and gives a detailed*

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study of error

correction codes for

access networks, 100

Gb/s Ethernet and future

optical networks. The

emerging applications of

optical OFDM, including

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*single-mode fiber
transmission, multimode
fiber transmission, free
space optical systems,
and optical access
networks are examined,
with particular*

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*attention paid to
passive optical
networks, radio-over-
fiber, WiMAX and UWB
communications. Written
by two of the leading
contributors to the*

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*field, this book will be
a unique reference for
optical communications
engineers and
scientists. Students,
technical managers and
telecom executives*

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*seeking to understand
this new technology for
future-generation
optical networks will
find the book
invaluable. William
Shieh is an associate*

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*professor and reader in
the electrical and
electronic engineering
department, The
University of Melbourne,
Australia. He received
his M.S. degree in*

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*electrical engineering
and Ph.D. degree in
physics both from
University of Southern
California. Ivan
Djordjevic is an
Assistant Professor of*

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*Electrical and Computer
Engineering at the
University of Arizona,
Tucson, where he directs
the Optical
Communications Systems
Laboratory (OCSL). His*

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*current research
interests include
optical networks, error
control coding,
constrained coding,
coded modulation, turbo
equalization, OFDM*

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*applications, and
quantum error
correction. "This
wonderful book is the
first one to address the
rapidly emerging optical
OFDM field. Written by*

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*two leading researchers
in the field, the book
is structured to
comprehensively cover
any optical OFDM aspect
one could possibly think
of, from the most*

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*fundamental to the most
specialized. The book
adopts a coherent line
of presentation, while
striking a thoughtful
balance between the
various topics,*

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*gradually developing the
optical-physics and
communication-theoretic
concepts required for
deep comprehension of
the topic, eventually
treating the multiple*

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*optical OFDM methods,
variations and
applications. In my view
this book will remain
relevant for many years
to come, and will be
increasingly accessed by*

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*graduate students,
accomplished researchers
as well as
telecommunication
engineers and managers
keen to attain a
perspective on the*

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*emerging role of OFDM in
the evolution of
photonic networks." --
Prof. Moshe Nazarathy,
EE Dept., Technion,
Israel Institute of
Technology * The first*

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*book on optical OFDM by
the leading pioneers in
the field * The only
book to cover error
correction codes for
optical OFDM *
Applications of OFDM to*

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free-space

*communications, optical
access networks, and
metro and log haul
transports show optical
OFDM can be implemented
* An introduction to*

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*signal processing for
optical communications **
*An introduction to
optical communication
fundamentals for the
wireless engineer*
Put the latest practical

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*information available on
error-control block
coding and decoding to
work for you with this
handy new reference. It
examines in detail
linear block codes,*

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*cyclic codes, BCH codes,
RS codes, and multilevel
block-coded modulation
and provides valuable
simulation results to
save you time in
understanding and using*

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*error-control block
codes.*

*Assuming little previous
mathematical knowledge,
Error Correcting Codes
provides a sound
introduction to key*

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areas of the subject.

*Topics have been chosen
for their importance and
practical significance,
which Baylis
demonstrates in a
rigorous but gentle*

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mathematical

*style. Coverage includes
optimal codes; linear
and non-linear codes;
general techniques of
decoding errors and
erasures; error*

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*detection; syndrome
decoding, and much more.
Error Correcting Codes
contains not only
straight maths, but also
exercises on more
investigational problem*

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*solving. Chapters on
number theory and
polynomial algebra are
included to support
linear codes and cyclic
codes, and an extensive
reminder of relevant*

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*topics in linear algebra
is given. Exercises are
placed within the main
body of the text to
encourage active
participation by the
reader, with*

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*comprehensive solutions
provided. Error
Correcting Codes will
appeal to undergraduate
students in pure and
applied mathematical
fields, software*

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*engineering,
communications
engineering, computer
science and information
technology, and to
organizations with
substantial research and*

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*development in those
areas.*

An Introduction

The Theory of Error

Correcting Codes

Bounds, Codes, Decoders,

Analysis and

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Applications

Coding Theory

Channel Codes

An Engineering Approach

*Discusses information theory,
finite fields, classical error
correcting codes, codes and*

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*combinatorics, and tables and
curves*

*Covering the fast evolving area of
advanced coding, Error Control
Coding for B3G/4G Wireless
Systems targets IMT-Advanced
systems to present the latest*

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findings and implementation solutions. The book begins by detailing the fundamentals of advanced coding techniques such as Coding, Decoding, Design, and Optimization. It provides not only state-of-the-art research findings

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in 3D Turbo-codes, non-binary LDPC Codes, Fountain, and Raptor codes, but also insights into their real-world implementation by examining hardware architecture solutions, for example VLSI complexity,

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FPGA, and ASIC. Furthermore, special attention is paid to Incremental redundancy techniques, which constitute a key feature of Wireless Systems. A promising application of these advanced coding techniques, the

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Turbo-principle (also known as iterative processing), is illustrated through an in-depth discussion of Turbo-MIMO, Turbo-Equalization, and Turbo-Interleaving techniques. Finally, the book presents the status of major

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standardization activities currently implementing such techniques, with special interest in 3GPP UMTS, LTE, WiMAX, IEEE 802.11n, DVB-RCS, DVB-S2, and IEEE 802.22. As a result, the book coherently brings together

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academic and industry vision by providing readers with a uniquely comprehensive view of the whole topic, whilst also giving an understanding of leading-edge techniques. Includes detailed coverage of coding, decoding,

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*design, and optimization
approaches for advanced codes
Provides up to date research
findings from both highly reputed
academics and industry
standpoints Presents the latest
status of standardization activities*

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*for Wireless Systems related to
advanced coding Describes real-
world implementation aspects by
giving insights into architecture
solutions for both LDPC and
Turbo-codes Examines the most
advanced and promising concepts*

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*of turbo-processing applications:
Turbo-MIMO, Turbo-Equalization,
Turbo-Interleaving
Error-correcting codes are
ubiquitous. They are adopted in
almost every modern digital
communication and storage*

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system, such as wireless communications, optical communications, Flash memories, computer hard drives, sensor networks, and deep-space probing. New-generation and emerging applications demand

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codes with better error-correcting capability. On the other hand, the design and implementation of those high-gain error-correcting codes pose many challenges. They usually involve complex mathematical computations, and

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mapping them directly to hardware often leads to very high complexity. VLSI Architectures for Modern Error-Correcting Codes serves as a bridge connecting advancements in coding theory to practical hardware

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implementations. Instead of focusing on circuit-level design techniques, the book highlights integrated algorithmic and architectural transformations that lead to great improvements on throughput, silicon area

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requirement, and/or power consumption in the hardware implementation. The goal of this book is to provide a comprehensive and systematic review of available techniques and architectures, so that they can be

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easily followed by system and hardware designers to develop en/decoder implementations that meet error-correcting performance and cost requirements. This book can be also used as a reference for

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graduate-level courses on VLSI design and error-correcting coding. Particular emphases are placed on hard- and soft-decision Reed-Solomon (RS) and Bose-Chaudhuri-Hocquenghem (BCH) codes, and binary and non-binary

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low-density parity-check (LDPC) codes. These codes are among the best candidates for modern and emerging applications due to their good error-correcting performance and lower implementation complexity

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compared to other codes. To help explain the computations and en/decoder architectures, many examples and case studies are included. More importantly, discussions are provided on the advantages and drawbacks of

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different implementation approaches and architectures. This book discusses both the theory and practical applications of self-correcting data, commonly known as error-correcting codes. The applications included

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demonstrate the importance of these codes in a wide range of everyday technologies, from smartphones to secure communications and transactions. Written in a readily understandable style, the book

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presents the authors' twenty-five years of research organized into five parts: Part I is concerned with the theoretical performance attainable by using error correcting codes to achieve communications efficiency in

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digital communications systems. Part II explores the construction of error-correcting codes and explains the different families of codes and how they are designed. Techniques are described for producing the very best codes.

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Part III addresses the analysis of low-density parity-check (LDPC) codes, primarily to calculate their stopping sets and low-weight codeword spectrum which determines the performance of these codes. Part IV deals with

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decoders designed to realize optimum performance. Part V describes applications which include combined error correction and detection, public key cryptography using Goppa codes, correcting errors in passwords

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and watermarking. This book is a valuable resource for anyone interested in error-correcting codes and their applications, ranging from non-experts to professionals at the forefront of research in their field. This book

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*An Introduction to Error
Correcting Codes with
Applications
OFDM for Optical
Communications*

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*Performance Modeling for
Computer Architects
Mathematical Methods and
Algorithms
Error Control Systems for Digital
Communication and Storage
Fundamentals of Convolutional*

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Coding

Fundamentals of Convolutional
Coding, Second Edition, regarded
as a bible of convolutional coding
brings you a clear and
comprehensive discussion of the
basic principles of this field Two

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new chapters on low-density parity-
check (LDPC) convolutional codes
and iterative coding Viterbi, BCJR,
BEAST, list, and sequential
decoding of convolutional codes
Distance properties of convolutional
codes Includes a downloadable

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An unparalleled learning tool and guide to error correction coding Error correction coding techniques allow the detection and correction of errors occurring during the transmission of data in digital

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communication systems. These techniques are nearly universally employed in modern communication systems, and are thus an important component of the modern information economy. Error Correction Coding: Mathematical

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Methods and Algorithms provides a comprehensive introduction to both the theoretical and practical aspects of error correction coding, with a presentation suitable for a wide variety of audiences, including graduate students in electrical

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engineering, mathematics, or computer science. The pedagogy is arranged so that the mathematical concepts are presented incrementally, followed immediately by applications to coding. A large number of exercises expand and

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deepen students' understanding. A unique feature of the book is a set of programming laboratories, supplemented with over 250 programs and functions on an associated Web site, which provides hands-on experience and

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a better understanding of the material. These laboratories lead students through the implementation and evaluation of Hamming codes, CRC codes, BCH and R-S codes, convolutional codes, turbo codes, and LDPC

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codes. This text offers both "classical" coding theory-such as Hamming, BCH, Reed-Solomon, Reed-Muller, and convolutional codes-as well as modern codes and decoding methods, including turbo codes, LDPC codes, repeat-

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accumulate codes, space time codes, factor graphs, soft-decision decoding, Guruswami-Sudan decoding, EXIT charts, and iterative decoding. Theoretical complements on performance and bounds are presented. Coding is also put into

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its communications and information theoretic context and connections are drawn to public key cryptosystems. Ideal as a classroom resource and a professional reference, this thorough guide will benefit electrical

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and computer engineers,
mathematicians, students,
researchers, and scientists.

Rapid advances in electronic and
optical technology have enabled
the implementation of powerful
error-control codes, which are now

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used in almost the entire range of information systems with close to optimal performance. These codes and decoding methods are required for the detection and correction of the errors and erasures which inevitably occur in digital

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information during transmission, storage and processing because of noise, interference and other imperfections. Error-control coding is a complex, novel and unfamiliar area, not yet widely understood and appreciated. This book sets out to

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provide a clear description of the essentials of the subject, with comprehensive and up-to-date coverage of the most useful codes and their decoding algorithms. A practical engineering and information technology emphasis,

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as well as relevant background material and fundamental theoretical aspects, provides an in-depth guide to the essentials of Error-Control Coding. Provides extensive and detailed coverage of Block, Cyclic, BCH, Reed-Solomon,

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Convolutional, Turbo, and Low
Density Parity Check (LDPC)
codes, together with relevant
aspects of Information Theory EXIT
chart performance analysis for
iteratively decoded error-control
techniques Heavily illustrated with

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tables, diagrams, graphs, worked examples, and exercises Invaluable companion website features slides of figures, algorithm software, updates and solutions to problems Offering a complete overview of Error Control Coding, this book is

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an indispensable resource for students, engineers and researchers in the areas of telecommunications engineering, communication networks, electronic engineering, computer science, information systems and

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technology, digital signal
processing and applied
mathematics.

Error Coding for Arithmetic
Processors provides an
understanding of arithmetically
invariant codes as a primary

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technique of fault-tolerant computing by discussing the progress in arithmetic coding theory. The book provides an introduction to arithmetic error code, single-error detection, and long-distance codes. It also

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discusses algebraic structures, linear congruences, and residues. Organized into eight chapters, this volume begins with an overview of the mathematical background in number theory, algebra, and error control techniques. It then explains

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the basic mathematical models on a register and its number representation system. The reader is also introduced to arithmetic processors, as well as to error control techniques. The text also explores the functional units of a

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digital computer, including control unit, arithmetic processor, memory unit, program unit, and input/output unit. Students in advanced undergraduate or graduate level courses, researchers, and readers who are interested in applicable

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knowledge on arithmetic codes will
find this book extremely useful.

Error Coding for Arithmetic
Processors

A Mathematical Introduction

Error Control Coding for B3G/4G
Wireless Systems

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Error-Control Techniques for Digital
Communication

Fundamentals of Wireless
Communication

Algebraic Coding Theory (Revised
Edition)

Fundamentals of Codes,

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*Graphs, and Iterative
Decoding is an
explanation of how to
introduce local
connectivity, and how to
exploit simple
structural descriptions.*

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Chapter 1 provides an overview of Shannon theory and the basic tools of complexity theory, communication theory, and bounds on code construction.

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*Chapters 2 - 4 provide
an overview of
"classical" error
control coding, with an
introduction to abstract
algebra, and block and
convolutional codes.*

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*Chapters 5 - 9 then
proceed to
systematically develop
the key research results
of the 1990s and early
2000s with an
introduction to graph*

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theory, followed by chapters on algorithms on graphs, turbo error control, low density parity check codes, and low density generator codes.

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As computers become more complex, the number and complexity of the tasks facing the computer architect have increased. Computer performance often

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*depends in complex way
on the design parameters
and intuition that must
be supplemented by
performance studies to
enhance design
productivity. This book*

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*introduces computer
architects to computer
system performance
models and shows how
they are relatively
simple, inexpensive to
implement, and*

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*sufficiently accurate
for most purposes. It
discusses the
development of
performance models based
on queuing theory and
probability. The text*

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*also shows how they are
used to provide quick
approximate calculations
to indicate basic
performance tradeoffs
and narrow the range of
parameters to consider*

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when determining system configurations. It illustrates how performance models can demonstrate how a memory system is to be configured, what the

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cache structure should be, and what incremental changes in cache size can have on the miss rate. A particularly deep knowledge of probability theory or

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*any other mathematical
field to understand the
papers in this volume is
not required.*

*An introduction to the
theory of error-
correction codes, and in*

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*particular to linear
block codes is provided
in this book. It
considers such codes as
Hamming codes and Golay
codes, correction of
double errors, use of*

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finite fields, cyclic codes, BCH codes and weight distributions, as well as design of codes. In this second edition, the author includes more material on non-binary

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code and cyclic codes.

*In addition some proofs
have been simplified and
there are many more
examples and problems.*

*The text has been aimed
at mathematicians,*

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*electrical engineers and
computer scientists.
The work introduces the
fundamentals concerning
the measure of discrete
information, the
modeling of discrete*

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*sources without and with
a memory, as well as of
channels and coding. The
understanding of the
theoretical matter is
supported by many
examples. One particular*

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*emphasis is put on the
explanation of Genomic
Coding. Many examples
throughout the book are
chosen from this
particular area and
several parts of the*

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*book are devoted to this
exciting implication of
coding.*

*Essentials of Error-
Control Coding
Classical and Modern
Error Correcting Codes*

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*Signal Coding and
Processing*

*Introduction To Error
Control Codes*

*Error-Control Coding for
Data Networks*

Quantum Information Processing

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and Quantum Error Correction is a self-contained, tutorial-based introduction to quantum information, quantum computation, and quantum error-correction. Assuming no knowledge of quantum mechanics and written at an

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intuitive level suitable for the engineer, the book gives all the essential principles needed to design and implement quantum electronic and photonic circuits. Numerous examples from a wide area of application are given to show how

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the principles can be implemented in practice. This book is ideal for the electronics, photonics and computer engineer who requires an easy-to-understand foundation on the principles of quantum information processing and quantum error

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correction, together with insight into how to develop quantum electronic and photonic circuits. Readers of this book will be ready for further study in this area, and will be prepared to perform independent research. The reader completed the

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book will be able design the information processing circuits, stabilizer codes, Calderbank-Shor-Steane (CSS) codes, subsystem codes, topological codes and entanglement-assisted quantum error correction codes; and propose

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corresponding physical implementation. The reader completed the book will be proficient in quantum fault-tolerant design as well. Unique Features Unique in covering both quantum information processing and

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quantum error correction -

everything in one book that an engineer needs to understand and implement quantum-level circuits. Gives an intuitive understanding by not assuming knowledge of quantum mechanics, thereby avoiding heavy

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mathematics. In-depth coverage of the design and implementation of quantum information processing and quantum error correction circuits. Provides the right balance among the quantum mechanics, quantum error correction, quantum

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computing and quantum
communication. Dr. Djordjevic is an
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with a joint appointment in the

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Eatontown, USA; and National
Technical University of Athens,
Athens, Greece. His current
research interests include optical
networks, error control coding,
constrained coding, coded

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modulation, turbo equalization, OFDM applications, and quantum error correction. He presently directs the Optical Communications Systems Laboratory (OCSL) within the ECE Department at the University of Arizona. Provides

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everything an engineer needs in one tutorial-based introduction to understand and implement quantum-level circuits Avoids the heavy use of mathematics by not assuming the previous knowledge of quantum mechanics Provides in-depth

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coverage of the design and
implementation of quantum
information processing and
quantum error correction circuits
Comprehensive introduction to non-
binary error-correction coding
techniques Non-Binary Error

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Control Coding for Wireless
Communication and Data Storage
explores non-binary coding schemes
that have been developed to provide
an alternative to the Reed –
Solomon codes, which are expected
to become unsuitable for use in

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future data storage and communication devices as the demand for higher data rates increases. This book will look at the other significant non-binary coding schemes, including non-binary block and ring trellis-coded modulation

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(TCM) codes that perform well in fading conditions without any expansion in bandwidth use, and algebraic-geometric codes which are an extension of Reed-Solomon codes but with better parameters.

Key Features: Comprehensive and

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self-contained reference to non-binary error control coding starting from binary codes and progressing up to the latest non-binary codes
Explains the design and construction of good non-binary codes with descriptions of efficient non-binary

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decoding algorithms with applications for wireless communication and high-density data storage Discusses the application to specific cellular and wireless channels, and also magnetic storage channels that model the

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reading of data from the magnetic disc of a hard drive. Includes detailed worked examples for each coding scheme to supplement the concepts described in this book
Focuses on the encoding, decoding and performance of both block and

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convolutional non-binary codes, and covers the K ö tter-Vardy algorithm and Non-binary LDPC codes This book will be an excellent reference for researchers in the wireless communication and data storage communities, as well as

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development/research engineers in
telecoms and storage companies.
Postgraduate students in these fields
will also find this book of interest.
This book is an introduction to
information and coding theory at
the graduate or advanced

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undergraduate level. It assumes a basic knowledge of probability and modern algebra, but is otherwise self-contained. The intent is to describe as clearly as possible the fundamental issues involved in these subjects, rather than covering all

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aspects in an encyclopedic fashion.

The first quarter of the book is devoted to information theory, including a proof of Shannon's famous Noisy Coding Theorem.

The remainder of the book is devoted to coding theory and is

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independent of the information theory portion of the book. After a brief discussion of general families of codes, the author discusses linear codes (including the Hamming, Golary, the Reed-Muller codes), finite fields, and cyclic codes

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(including the BCH, Reed-Solomon, Justesen, Goppa, and Quadratic Residue codes). An appendix reviews relevant topics from modern algebra.

Although devoted to constructions of good codes for error control,

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secrecy or data compression, the emphasis is on the first direction. Introduces a number of important classes of error-detecting and error-correcting codes as well as their decoding methods. Background material on modern algebra is

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presented where required. The role of error-correcting codes in modern cryptography is treated as are data compression and other topics related to information theory. The definition-theorem proof style used in mathematics texts is employed

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through the book but formalism is avoided wherever possible.

Fundamentals of Digital
Communication

Error-control Block Codes for
Communications Engineers

Quantum Information Processing

Online Library Error Control
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Procedures 168 5. 7 Burst**

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**Fundamentals of Error
Correcting Codes is an in-
depth introduction to
coding theory from both an
engineering and
mathematical viewpoint. As
well as covering classical**

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topics, there is much coverage of techniques which could only be found in specialist journals and book publications.

Numerous exercises and examples and an accessible

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**writing style make this a
lucid and effective
introduction to coding
theory for advanced
undergraduate and graduate
students, researchers and
engineers, whether**

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**approaching the subject
from a mathematical,
engineering or computer
science background.
This textbook takes a
unified view of the
fundamentals of wireless**

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**communication and explains
cutting-edge concepts in a
simple and intuitive way.
An abundant supply of
exercises make it ideal
for graduate courses in
electrical and computer**

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**engineering and it will
also be of great interest
to practising engineers.
A comprehensive
introduction to the
complex fields of signal
coding and signal**

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processing.

**Essentials of Error-
Control Coding Techniques
Foundations of Coding
Fundamentals of Classical
and Modern Error-
Correcting Codes**

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Most coding theory experts date the origin of the subject with the 1948 publication of A Mathematical Theory of Communication by Claude Shannon. Since then, coding theory has grown into a discipline with many practical

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applications (antennas, networks, memories), requiring various mathematical techniques, from commutative algebra, to semi-definite programming, to algebraic geometry. Most topics covered in the Concise Encyclopedia of

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Coding Theory are presented in short sections at an introductory level and progress from basic to advanced level, with definitions, examples, and many references. The book is divided into three parts: Part I fundamentals: cyclic codes,

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skew cyclic codes, quasi-cyclic codes, self-dual codes, codes and designs, codes over rings, convolutional codes, performance bounds Part II families: AG codes, group algebra codes, few-weight codes, Boolean function codes,

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codes over graphs Part III

applications: alternative metrics,
algorithmic techniques,
interpolation decoding, pseudo-
random sequences, lattices,
quantum coding, space-time codes,
network coding, distributed storage,

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secret-sharing, and code-based-cryptography. Features Suitable for students and researchers in a wide range of mathematical disciplines Contains many examples and references Most topics take the reader to the frontiers of research

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Essentials of Error-Control Coding Techniques presents error-control coding techniques with an emphasis on the most recent applications. It is written for engineers who use or build error-control coding equipment. Many

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examples of practical applications are provided, enabling the reader to obtain valuable expertise for the development of a wide range of error-control coding systems. Necessary background knowledge of coding theory (the theory of error-

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correcting codes) is also included so that the reader is able to assimilate the concepts and the techniques. The book is divided into two parts. The first provides the reader with the fundamental knowledge of the coding theory that

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is necessary to understand the material in the latter part. Topics covered include the principles of error detection and correction, block codes, and convolutional codes. The second part is devoted to the practical applications of error-

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control coding in various fields. It explains how to design cost-effective error-control coding systems. Many examples of actual error-control coding systems are described and evaluated. This book is particularly suited for the

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engineer striving to master the practical applications of error-control coding. It is also suitable for use as a graduate text for an advanced course in coding theory.