Mechanical Behavior of Materials
William Hosford
University of Michigan, Ann Arbor, USA

The term mechanical behavior encompasses the response of materials to external forces. This text considers a wide range of topics including mechanical testing to determine material properties, plasticity needed for FEM analyses of automobile crashes, means of altering mechanical properties and treatment of several modes of failure.

Developed for courses on mechanical behavior of materials, it includes numerous examples and problems for student practice with an emphasis on quantitative problem solving. In addition it includes end of chapter notes for students’ review.

Unlike other similar books on the field, the treatment of plasticity as greater emphasis on the interrelationship of the flow, effective strain and effective stress and their use in conjunction with yield criteria to solve problems. The treatment of defects and the analysis of particulate composites are also new to the coverage of the subject.

Features
• Includes numerous examples and end-of-chapter problems
• Provides a comprehensive yet concise treatment of the subject area.
• Up-to-coverage includes: Schmid’s law, treatment of lattice rotations and how they lead to deformation textures, chapter on Fracture Mechanics, and a section on metal forming.

Contents
1. Stress and strain
2. Elasticity
3. Tensile testing
4. Other tests of plastic behavior
5. Strain hardening of metals
6. Plasticity theory
7. Strain-rate and temperature dependence of flow stress
8. Slip
9. Dislocation geometry and energy
10. Dislocation mechanics
11. Mechanical twinning
12. Hardening mechanisms in metals
13. Ductility and fracture
14. Fracture mechanics
15. Viscoelasticity
16. Creep and stress rupture
17. Fatigue
18. Residual stress
19. Ceramics and glasses
20. Polymers
21. Composites
22. Mechanical working
This book relates the complete set of strength characteristics of constituent atoms to their electronic structures. These relationships require knowledge of both chemistry and physics of materials. The book uses both classical and quantum mechanics, since both are needed to describe these properties, and will also appeal to researchers in mechanical and aerospace engineering.

**Features**
- Provides broad coverage of advanced dynamical principles
- Practical problem solving emphasized through worked examples and homework exercises
- Presents several methods that offer simpler analysis and improved computational efficiency over standard approaches

**Contents:**

2003 436pp 168 illustrations 115 exercises 0 521 82612 8 Hardback £50.00
Gear Geometry and Applied Theory
2nd edition
Faydor L. Litvin
University of Illinois, Chicago, USA
and Alfonso Fuentes
Universidad Politécnica de Cartagena, Spain

This revised, expanded edition covers the theory, design, geometry and manufacture of all types of gears and gear drives. This is an invaluable reference for designers, theoreticians, students, and manufacturers. This edition includes advances in gear theory, gear manufacturing, and computer simulation. Among the new topics are: 1. New geometry for gears and pumps. 2. New design approaches for planetary gear trains and bevel gear drives. 3. An enhanced approach for stress analysis. 4. New methods of grinding, and gear shaving. 5. New theory on meshing simulation and its application.

Features
• Litvin is an internationally renowned expert in the area with 10 books and over 280 articles to his credit
• This revised and expanded edition covers all aspects of the theory, design, geometry and manufacture of all types of gears and gear drives
• Presents new and unique advances in gear theory, simulation, and manufacturing

Contents:

Fundamentals of Noise and Vibration Analysis for Engineers
2nd edition
M. P. Norton
and D. G. Karczub
Both from the University of Western Australia, Sydney

In this second edition, Michael Norton’s classic text has been extensively updated to take into account the latest developments in the field. The book treats both noise and vibration in a single volume, with particular emphasis on wave-mode duality and interactions between sound waves and solid structures.

‘Thoroughly enjoyable, well written, economic, and beautifully printed in the traditional style of the Cambridge University Press. It makes a valuable addition to the libraries of students and practitioners alike.’

Applied Mechanics Reviews

Contents:

2003 652pp 300 illustrations
0 521 49913 5 Paperback £45.00
0 521 49561 X Hardback £130.00

Statics and Dynamics with Background Mathematics
2nd edition
Forthcoming

This book covers both Statics and Dynamics together with a section on background mathematics, providing the student with everything needed to complete typical first year undergraduate courses. Students often find it difficult to visualize problems and grasp the mathematics, but Roberts’ friendly approach makes life easier for both student and tutor, tackling concepts from first principles with many examples, exercises and helpful diagrams.

Features
• Combines statics and dynamics in one book
• Includes a useful section on background mathematics

Contents: Part I. Statics; Part II. Dynamics; Part III. Problems; Part IV. Background Mathematics.

2003 384pp 482 illustrations
0 521 52087 8 Paperback £30.00
0 521 81766 8 Hardback £85.00

Nonlinear Modelling and Analysis of Structures and Solids

Numerical analysis and in particular, the Finite Element method is now a regular part of experimental analysis. In his book Steen Krenk emphasises the formulation of appropriate models for solids and structures in the non-linear regime.

Contents:

2006 350pp 50 Illustrations
0 521 83054 0 Hardback £40.00
New Edition

Dynamics of Multibody Systems
3rd edition
Ahmed A. Shabana
University of Illinois, Chicago, USA

A modern introduction to multibody dynamics, with an emphasis on flexible body dynamics. It begins with a review of kinematics and dynamics of rigid and deformable bodies before moving to advanced topics and computer implementation. This third edition covers important developments in problems of large deformations and numerical algorithms as applied to flexible multi body systems.

Features
- Focuses on flexible multibody dynamics
- Clear explanation of latest computational techniques for modeling multibody systems
- Practical examples and exercises are included

Contents:

June 2005 384pp 92 illustrations 133 exercises
0 521 85011 8 Hardback £45.00

New Edition

Mathematical Modeling in Continuum Mechanics
2nd edition
Roger M. Temam
Indiana University, Bloomington, USA
and Alain Michael Miranville
Université de Poitiers, France

This second edition will be a unique resource for those studying continuum mechanics at the advanced undergraduate and beginning graduate level whether in engineering, mathematics, physics or the applied sciences. Exercises and hints for solutions have been added to the majority of chapters, and the final part on solid mechanics has been substantially expanded. These additions have now made it appropriate for use as a textbook, but it also remains an ideal reference book for students and anyone interested in continuum mechanics.

Features
- Part III (Solid Mechanics) has been substantially expanded and improved
- Exercises and hints have been added to almost all chapters


June 2005 512pp 223 illustrations
0 521 60988 7 Paperback £40.00

Engineering Tribology
John Williams
University of Cambridge, UK

An ideal textbook for a first tribology course and a reference for designers and researchers, Engineering Tribology gives the reader interdisciplinary understanding of tribology including materials constraints. Real design problems and solutions, such as those for journal and rolling element bearings, cams and followers, and heavily loaded gear teeth, elucidate concepts and motivate understanding. This work integrates qualitative and quantitative material from a wide variety of disciplines including physics, materials science, surface and lubricant chemistry, with traditional engineering approaches.

Features
- Recognizes the Interdisciplinary Nature of Tribology
- Integrates qualitative and quantitative methodology
- Reviewers have praised the coverage of elastic and plastic surfaces in contact, the mechanisms of friction, wear and surface distress, and many other topics


May 2005 512pp 223 illustrations
0 521 60988 7 Paperback £40.00
Convex Optimization
Stephen Boyd
Stanford University, California, USA
and Lieven Vandenberghe
University of California, Los Angeles, USA
Convex optimization problems arise frequently in many fields including circuit design, financial modelling, signal processing, networking and econometrics. This book provides a comprehensive introduction to the subject, and shows in detail how such problems can be solved numerically with great efficiency. It focuses on recognizing convex optimization problems and then finding the most appropriate technique for solving them.

Features
• Comprehensive details on how to recognize convex optimization problems in a wide variety of settings
• Provides a broad range of practical algorithms for solving real problems
• Contains hundreds of worked examples and homework exercises

Contents:

2004 730pp 178 illustrations 337 exercises
0 521 83378 7 Hardback £45.00

Liquid Sloshing Dynamics
Theory and Applications
Raouf A. Ibrahim
Wayne State University, Michigan, USA
The problem of liquid sloshing in moving or stationary containers remains of great concern to aerospace, civil, and nuclear engineers, physicists, designers of road tankers and ship tankers, and mathematicians. Beginning with the fundamentals of liquid sloshing theory, this book takes the reader systematically from basic theory to advanced analytical and experimental results in a self-contained and coherent format. It presents liquid sloshing effects on space vehicles, storage tanks, road vehicle tanks and ships and elevated water towers under ground motion.

Features
• Covers almost ever aspect of liquid sloshing dynamics
• Presents liquid sloshing effects on space vehicles, storage tanks, road vehicle tanks and ships and elevated water towers under ground motion
• Cites over 2,600 references


June 2005 640pp 376 illustrations
0 521 83885 1 Hardback £100.00

Numerical Methods, Optimization and Mathematics
Decisions under Uncertainty
Probabilistic Analysis for Engineering Decisions
Ian Jordaan
Memorial University of Newfoundland, St John’s, Canada.
Risk assessment is a critical part of every engineer’s role, whether it is simply to determine the likelihood of failure of a new product within the warranty period, or the potential cost, human and financial, of the catastrophic failure of a bridge. This book helps the reader to understand the tradeoffs between time, costs and risk in an engineering setting, and includes a wide range of case studies and worked examples.

Features
• Covers risk from an engineering perspective
• Contains real engineering case studies
• Assumes only basic maths as prerequisite


April 2005 688pp 250 illustrations
0 521 78277 5 Hardback £65.00
Numerical Methods of Engineering with MATLAB®
Jaan Kiusalaas
Pennsylvania State University, USA

A text for engineering students and a reference for practicing engineers, especially those who wish to explore the power and efficiency of MATLAB®. Examples and applications were chosen for their relevance to real world problems, and where numerical solutions are most efficient. The numerical methods are discussed thoroughly and illustrated with problems involving both hand computation and programming. MATLAB® mfiles accompany each method and are available on the book web site. Explore numerical methods with MATLAB®, a great program for teaching scientific computation.

Contents

September 2005    608pp    145 illustrations    346 exercises    0 521 85288 9 Hardback £35.00

Thermodynamics
Concepts and Applications
Steven R. Turns

The focus of Thermodynamic Concepts and Applications is on thermodynamics, while structurally it introduces thermal-fluid sciences. 2nd law topics are introduced hierarchically in one chapter, important structure for a beginner. Pedagogy includes objectives, overviews, summaries, historical perspectives, numerous examples, questions and problems with lavish illustrations.


2006    768pp    1622 illustrations    1717 exercises    0 521 85042 8 Hardback £65.00

Forthcoming
Thermal-Fluid Sciences
An Integrated Approach
Steven R. Turns
Pennsylvania State University, USA

This text is an integrated approach to thermal-fluid science. Links between theory and applications are stressed through examples and by using the fundamental mass, energy, and momentum conservation laws as organizing principles and by using five practical applications as themes.


2006    1200pp    1794 illustrations    1842 exercises    0 521 85043 6 Hardback £65.00

Also of interest
Innovation on Demand
New Product Development Using TRIZ
Victor Fey and Eugene Rivin
Both from Wayne State University, USA

This book describes a revolutionary methodology for enhancing technological innovation called TRIZ. Whether you’re trying to make a better beer can, find a new way to package microchips or reduce the number of parts in a lawnmower engine, this book can help.


September 2005    256pp    233 illustrations    23 exercises    0 521 82620 9 Hardback £35.00

Complex Analysis with MATHEMATICA®
William T. Shaw
Oxford Systems Solutions, UK

This is a new way of learning and teaching a subject at the heart of much of pure and applied mathematics, physics, engineering and even art. The book lets teachers and students learn about complex numbers in a state-of-the-art computational environment. Includes CD with electronic version of the book.

August 2005    592pp    193 illustrations    375 exercises    0 521 83626 3 Hardback £40.00
Also of Interest

An Introduction to Programming with Mathematica
3rd edition
Paul R. Wellin
Wolfram Research, Illinois, USA
Richard J. Gaylord
and Samuel N. Kamin
Both from the University of Illinois, Urbana-Champaign, USA
This new, and substantially larger edition, includes new chapters giving significant coverage to the latest functions featured in the software. Software support and solutions to exercises available on the web.
2005 570pp 145 illustrations 234 exercises
0 521 84678 1 Hardback £40.00

Numerical Solution of Partial Differential Equations
2nd edition
K. W. Morton
University of Bath, UK
and D. F. Mayers
Oxford University, UK
Second edition of a highly successful graduate text giving a complete introduction to partial differential equations and numerical analysis. Revised to include new sections on finite volume methods, modified equation analysis, multigrid, and conjugate gradient methods brings the reader up-to-date with the latest theoretical and industrial developments.
April 2005 302pp 272 illustrations 50 exercises
0 521 60793 0 Paperback £24.99

An Introduction to Partial Differential Equations
Yehuda Pinchover
Technion - Israel Institute of Technology, Haifa, Israel
and Jacob Rubinstein
Indiana University, USA
A complete introduction to partial differential equations, this textbook provides a rigorous yet accessible guide to students in mathematics, physics and engineering. The presentation is lively and up to date, paying particular emphasis to developing an appreciation of underlying mathematical theory.
April 2005 396pp 70 illustrations 200 exercises
0 521 61323 X Paperback £26.00
0 521 84886 5 Hardback £65.00

Information is correct at time of going to press but is subject to change without prior notice

ISBN 0-521-92752-8