

Engineering Mechanics Statics Lecture Notes Dingjio

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Composite materials are heterogeneous by nature, and are intended to be, since only the combination of different constituent materials can give them the desired combination of low weight, stiffness and strength. At present, the knowledge has advanced to a level that materials can be tailored to exhibit certain, required properties. At the same time, the fact that these materials are composed of various, sometimes very different constituents, make their mechanical behaviour complex. This observation holds with respect to the deformation behaviour, but especially with respect to the failure behaviour, where complicated and unconventional failure modes have been observed. It is a challenge to develop predictive methods that can capture this complex mechanical behaviour, either using analytical tools, or using numerical methods, the finite element method being the most widespread among the latter. In this respect, developments have

gone fast over the past decade. Indeed, we have seen a paradigm shift in computational approaches to (composite) material behaviour. Where only a decade ago it was still customary to carry out analyses of deformation and failure at a macroscopic level of observation only - one may call this a phenomenological approach - nowadays this approach is being progressively replaced by multiscale methods. In such methods it is recognized a priori that the overall behaviour is highly dependent on local details and laws. Statics is the first volume of a three-volume textbook on Engineering Mechanics. The authors, using a time-honoured straightforward and flexible approach, present the basic concepts and principles of mechanics in the clearest and simplest form possible to advanced undergraduate engineering students of various disciplines and different educational backgrounds. An important objective of this book is to develop problem solving skills in a systematic manner. Another aim of this volume is to provide engineering students as well as practising engineers with a solid foundation to help them bridge the gap between undergraduate studies on the one hand and advanced courses on mechanics and/or practical engineering problems on the other. The book contains numerous examples, along with their complete solutions. Emphasis is placed upon student participation in problem solving. The contents of the book correspond to the topics normally covered in courses on basic engineering mechanics at universities and colleges. Now in its second English edition, this material has been in use for two decades in Germany, and has benefited from many practical improvements and the authors' teaching experience over the years. New to this edition are the extra supplementary examples available online as well as the TM-tools necessary to work with this method.

Civil Engineering Lecture Notes

STATICS - Teacher's Notes for 15 Engineering Mechanics Lessons

Statics & Dynamics

Engineering Mechanics 1

University of Michigan Official Publication

Lecture-notes on the Theory of Electrical Measurements

STRUCTURAL ANALYSIS WITH THE FINITE ELEMENT METHOD Linear Statics Volume 1 : The Basis and Solids Eugenio

Oñate The two volumes of this book cover most of the theoretical and computational aspects of the linear static analysis of structures with the Finite Element Method (FEM). The content of the book is based on the lecture notes of a basic course on Structural Analysis with the FEM taught by the author at the Technical University of Catalonia (UPC) in Barcelona, Spain for the last 30 years. Volume 1 presents the basis of the FEM for structural analysis and a detailed description of the finite element formulation for axially loaded bars, plane elasticity problems, axisymmetric solids and general three dimensional solids. Each chapter describes the background theory for each structural model considered, details of the finite element formulation and guidelines for the application to structural engineering problems. The book includes a chapter on miscellaneous topics such as treatment of inclined supports, elastic foundations, stress smoothing, error estimation and adaptive mesh refinement techniques, among others. The text concludes with a chapter on the mesh generation and visualization of FEM results. The book will be useful for students approaching the finite element analysis of structures for the first time, as well as for practising engineers interested in the details of the formulation and performance of the different finite elements for practical structural analysis. **STRUCTURAL ANALYSIS WITH THE FINITE ELEMENT METHOD**

Linear Statics Volume 2: Beams, Plates and Shells Eugenio Oñate The two volumes of this book cover most of the theoretical and computational aspects of the linear static analysis of structures with the Finite Element Method (FEM). The content of the book is based on the lecture notes of a basic course on Structural Analysis with the FEM taught by the author at the Technical University of Catalonia (UPC) in Barcelona, Spain for the last 30 years. Volume 2 presents a detailed description of the finite element formulation for analysis of slender and thick beams, thin and thick plates, folded plate structures, axisymmetric shells, general curved shells, prismatic structures and three dimensional beams. Each chapter describes the background theory for each structural model considered, details of the finite element formulation and guidelines for the application to structural engineering problems. Emphasis is put on the treatment of structures with layered composite materials. The book will be useful for students approaching the finite element analysis of beam, plate and shell structures for the first time, as well as for practising engineers interested in the details of the formulation and performance of the different finite elements for practical structural analysis.

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Principles of Statics

Engineering and Technical Education in India

Schaum's Outline of Engineering Mechanics: Statics, Seventh Edition

Dynamics

Prepared for the Third-year Classes of the Cooper Union Night-school of Science

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Notes from lectures on physics, statics, and mechanics, assuming a Newtonian perspective and citing 17th-century scientists such as Galileo, Descartes, Pierre Gassendi, and Pieter van Musschenbroek. The latest citation is to Henri Pitot, professor of engineering at the University of Paris who died in 1771.

Offers a concise yet thorough presentation of engineering mechanics theory and application. The material is reinforced with numerous examples to illustrate principles and imaginative, well-illustrated problems of varying degrees of difficulty. The book is committed to developing users' problem-solving skills. Features "Photorealistic" figures (over 400) that have been rendered in often 3D photo quality detail to appeal to visual learners. Presents a thorough combination of both static and dynamic engineering mechanics theory and applications. Features a large variety of problem types from a broad range of engineering disciplines, stressing practical, realistic situations encountered in professional practice, varying levels of difficulty, and problems that involve solution by computer. For professionals in mechanical engineering, civil engineering, aeronautical engineering, and engineering mechanics careers.

Engineering Mechanics, Statics

Volume 2: Beams, Plates and Shells

Analytical Mechanics

A Boundary Element Method for Two-Dimensional Contact Problems

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course and offers hundreds of practice questions to help you succeed. Use Schaum's to shorten your study time - and get your best test scores!

The 7th edition of this classic text continues to provide the same high quality material seen in previous editions. The text is extensively rewritten with updated prose for content clarity, superb new problems in new application areas, outstanding instruction on drawing free body diagrams, and new electronic supplements to assist readers. Furthermore, this edition offers more Web-based problem solving to practice solving problems, with immediate feedback; computational mechanics booklets offer flexibility in introducing Matlab, MathCAD, and/or Maple into your mechanics classroom; electronic figures from the text to enhance lectures by pulling material from the text into Powerpoint or other lecture formats; 100+ additional electronic transparencies offer problem statements and fully worked solutions for use in lecture or as outside study tools.

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Fluidics

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videos walk students through how to solve a problem, consistent with the author's voice and approach from the book. 0135841437/ 9780135841433 Engineering Mechanics: Statics, 14/e Plus Mastering Engineering Revision with Pearson eText -- Access Card Package, 14/e Package consists of: 0133918920/9780133918922 Engineering Mechanics: Statics, 14/e 0135681987/9780135681985 Mastering Engineering Revision with Pearson eText -- Standalone Access Card -- for Engineering Mechanics: Statics, 14/e Lectures on Engineering Mechanics: Statics and Dynamics is suitable for Bachelor's level education at schools of engineering with an academic profile. It gives a concise and formal account of the theoretical framework of elementary Engineering Mechanics. A distinguishing feature of this textbook is that its content is consistently structured into postulates, definitions and theorems, with rigorous derivations. The reader finds support in a wealth of illustrations and a cross-reference for each deduction. This textbook underscores the importance of properly drawn free-body diagrams to enhance the problem-solving skills of students. Table of contents I. STATICS . . . 1. Introduction . . . 2. Force-couple systems . . . 3. Static equilibrium . . . 4. Center of mass . . . 5. Distributed and internal forces . . . 6. Friction II. PARTICLE DYNAMICS . . . 7. Planar kinematics of particles . . . 8. Kinetics of particles . . . 9. Work-energy method for particles . . . 10. Momentum and angular momentum of particles . . . 11. Harmonic oscillators III. RIGID BODY DYNAMICS . . . 12. Planar kinematics of rigid bodies . . . 13. Planar kinetics of rigid bodies . . . 14. Work-energy method for rigid bodies . . . 15. Impulse relations for rigid bodies . . . 16. Three-dimensional kinematics of rigid bodies . . . 17. Three-dimensional kinetics of rigid bodies APPENDIX . . . A. Selected mathematics . . . B. Quantity, unit and dimension . . . C. Tables

FLUIDICS : Civil Engineering Lecture Notes - is written in order to use it as lecture notes for FLUID MECHANICS. This book contains 5 chapters, viz., Chapter 1 - Fluid Properties and Fluid Statics, Chapter 2 - Fluid Dynamics, Chapter 3 - Fluid Kinematics, Chapter 4 - Boundary Layer and Flow through Pipes, and Chapter 5 - Similitude and Model Study, This book covers full syllabus of Mechanics of Fluids or Fluid Mechanics course taught to B.E. (Civil Engineering), covers most of the syllabus for Fluid Mechanics or Mechanics of Fluids taught to B.E. (Aeronautical Engineering) and partly covers the syllabus for Fluid Mechanics and Machinery taught to B.E. (Mechanical Engineering).

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Statics

Statics and Dynamics

Lectures on Engineering Mechanics

ENGINEERING MECHANICS

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This book addresses a range of basic and essential topics, selected from the author's teaching and research activities, offering a

comprehensive guide in three parts: Statics, Kinematics and Kinetics. Chapter 1 briefly discusses the history of classical and modern mechanics, while Chapter 2, presents preliminary knowledge, preparing readers for the subsequent chapters. Chapters 3 to 7 introduce statics, force analysis, simplification of force groups, equilibrium of the general coplanar force group, and the center of the parallel force group. The Kinematics section (Chapters 8 to 10), covers the motion of a particle, basic motion and planar motion of a rigid body. Lastly, the Kinetics section (Chapters 11 to 14) explores Newton's law of motion, theorem of momentum, theorem of angular momentum, and theorem of kinetic energy. With numerous examples from engineering, illustrations, and step-by-step tutorials, the book is suitable for both classroom use and self-study. After completing the course, students will be able to simplify complex engineering structures and perform force and motion analyses on particles and structures, preparing them for further study and research. The book can be used as a textbook for undergraduate courses on fundamental aspects of theoretical mechanics, such as aerospace, mechanical engineering, petroleum engineering, automotive and civil engineering, as well as material science and engineering.

The principles of statics and dynamics are applied in order to understand and describe the behaviour of bodies in motion, displaying engineering mechanics principles and supported with worked examples.

This is a comprehensive, state-of-the-art, treatise on the energetic mechanics of Lagrange and Hamilton, that is, classical analytical dynamics, and its principal applications to constrained systems (contact, rolling, and servoconstraints). It is a book on advanced dynamics from a unified viewpoint, namely, the kinetic principle of virtual work, or principle of Lagrange. As such, it continues, renovates, and expands the grand tradition laid by such mechanics masters as Appell, Maggi, Whittaker, Heun, Hamel, Chetaev, Synge, Pars, Luré, Gantmacher, Neimark, and Fufaev. Many completely solved examples complement the theory, along with many problems (all of the latter with their answers and many of them with hints). Although written at an advanced level, the topics covered in this 1400-page volume (the most extensive ever written on analytical mechanics) are eminently readable and inclusive. It is of interest to engineers, physicists, and mathematicians; advanced undergraduate and graduate students and teachers; researchers and professionals; all will find this encyclopedic work an extraordinary asset; for classroom use or self-study. In this edition, corrections (of the original edition, 2002) have been incorporated.

Contents: Introduction Background: Basic Concepts and Equations of Particle and Rigid-Body Mechanics Kinematics of Constrained Systems Kinetics of Constrained Systems Impulsive Motion Nonlinear Nonholonomic Constraints Differential Variational Principles, and Associated Generalized Equations of Motion of Nielsen, Tsenov, et al. Time-Integral Theorems and Variational Principles Introduction to Hamiltonian/Canonical Methods: Equations of Hamilton and Routh; Canonical Formalism Readership: Students and researchers in engineering, physics, and applied mathematics. Key Features: No book of this scope (comprehensiveness and state-of-the-art level) has ever been written, in any language, there are no real competitors. This (like the author's other books) is an entirely original work; several of its topics are based on the author's own research, and appear for the first time in book form Readability ("reader friendliness") in spite of its advanced level Economy of thinking: Unified treatment based on Lagrange's kinetic principle of virtual work Superior and clear notation: both indicial and direct notations for vectors, Cartesian tensors etc. Self-contained exposition: All background mathematics and mechanics are summarized in the handbook like chapter 1 Keywords: Analytical Mechanics; Classical Mechanics; Classical Dynamics; Theoretical Mechanics; Advanced Engineering Dynamics; Applied Mechanics Reviews: "A monumental treatise ... which is going to become a reference book on the subject ... It should not be missed by anybody working in the area of analytical dynamics or only wanting to understand major problems of the subject ... This landmark reference source ... [is] the most comprehensive exposition available of the advanced engineering-oriented dynamics."

Zentralblatt für Math. "This unique treatise should be part of every scientific library and scholarly collection in engineering science." *IEEE Control Systems Magazine* "I recommend without hesitation Prof Papastravridis' treatise as a reference source to be acquired by every library of Mathematics, Physics, or Mechanical/Aeronautical/Electrical Engineering department. It is a different book, especially in our Internet era where instant satisfaction is often the primary (sometimes sole) goal of the student or researcher. Putting together 1392 (!) pages of carefully prepared text and 172 figures (which then become somehow sparse) represents a major effort, to say the least." *Bulletin of the American Mathematical Society* "Recipient of the annual competition award, in engineering, of the Association of American Publishers." *The Outstanding Professional and Scholarly Titles of 2002 (March 2003)* "Unique in Contents and Perspective ... has no Competition in Depth and Breadth." Dr George Simitzes Professor of Engineering Science, Mechanics, and Aerospace Engineering University of Cincinnati and Georgia Institute of Technology, USA "Probably the best of its kind and likely to become standard reference." Dr Alex Dalgarno FRS, member of US National Academy of Sciences, and "father of molecular astrophysics" and Phillips Professor of Astronomy, Harvard University, and Harvard-Smithsonian Center for Astrophysics, USA "The reviewer shares the author's statement that this book with its almost 1,400 pages is unique among the comparable treatises in the breadth and the depth of the covered material. Regarding technicalities — the students and the young scientists will find a lot of interesting examples and solved up to their very end problems. I recommend you to read this special book in analytical mechanics. It is a useful tool to undergraduate and graduate students, professors and researchers in the area of applied mechanics, engineering science, and mechanical, aerospace, and structural engineering, as well for the physicists and applied mathematicians." *Journal of Geometry and Symmetry in Physics*

Statics & Introduction to Dynamics ; Course Notes

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Current Topics and Achievements

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Engineering Mechanics: Combined Statics & Dynamics, Twelfth Edition is ideal for civil and mechanical engineering professionals. In his substantial revision of Engineering Mechanics, R.C. Hibbeler empowers students to succeed in the whole learning experience. Hibbeler achieves this by calling on his everyday classroom experience and his knowledge of how students learn inside and outside of lecture. In addition to over 50% new homework problems, the twelfth edition introduces the new elements of Conceptual Problems, Fundamental Problems and MasteringEngineering, the most technologically advanced online tutorial and homework system.

Arthur Boresi and Richard Schmidt's innovative textbook (and its partner text, ENGINEERING MECHANICS: DYNAMICS) presents mechanics in the most exciting and relevant context possible, with painstaking clarity and accuracy throughout. The authors strive to present the topics thoroughly and directly, with fundamental principles emerging through application to real-world problems. They present the technical principles of mechanics within the framework of a structured learning methodology, enabling students to better understand and retain the material. The integrated use of learning aids throughout the book is based on the authors' experience that students can be taught effective study habits while they learn mechanics.

This compact and easy-to-read text provides a clear analysis of the principles of equilibrium of rigid bodies in statics and dynamics when they are subjected to

external mechanical loads. The book also introduces the readers to the effects of force or displacements so as to give an overall picture of the behaviour of an engineering system. Divided into two parts-statics and dynamics-the book has a structured format, with a gradual development of the subject from simple concepts to advanced topics so that the beginning undergraduate is able to comprehend the subject with ease. Example problems are chosen from engineering practice and all the steps involved in the solution of a problem are explained in detail. The book also covers advanced topics such as the use of virtual work principle for finite element analysis; introduction of Castigliano's theorem for elementary indeterminate analysis; use of Lagrange's equations for obtaining equilibrium relations for multibody system; principles of gyroscopic motion and their applications; and the response of structures due to ground motion and its use in earthquake engineering. The book has plenty of exercise problems-which are arranged in a graded level of difficulty-, worked-out examples and numerous diagrams that illustrate the principles discussed. These features along with the clear exposition of principles make the text suitable for the first year undergraduate students in engineering.

Schaum's Outline of Engineering Mechanics Dynamics, Seventh Edition

Statics & dynamics

Annual Catalogue of the Stevens Institute of Technology

Lecture notes on physics, statics, and mechanics

SI Version. Statics

Practice Problems Workbook for Engineering Mechanics

Engineering Mechanics I Statics & Introduction to Dynamics ; Course Notes Lectures on Engineering

Mechanics Statics and Dynamics Lindström, Stefan

ENGINEERING MECHANICS: STATICS, 4E, written by authors Andrew Pytel and Jaan Kiusalaas, provides readers with a solid understanding of statics without the overload of extraneous detail. The authors use their extensive teaching experience and first-hand knowledge to deliver a presentation that's ideally suited to the skills of today's learners. This edition clearly introduces critical concepts using features that connect real problems and examples with the fundamentals of engineering mechanics. Readers learn how to effectively analyze problems before substituting numbers into formulas -- a skill that will benefit them tremendously as they encounter real problems that do not always fit into standard formulas. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

For introductory statics courses found in mechanical engineering, civil engineering, aeronautical engineering, and engineering mechanics departments. This 400 page paperback text contains all the topics and examples of the bestselling hardback text, and free access to Hibbeler's Onekey course where instructors select and post assignments. All this comes with significant savings for students! Hibbeler's course contains over 3,000 Statics and Dynamics problems instructors can personalize and post for student assignments. OneKey lets instructors edit the values in a problem, guaranteeing a fresh problem for the students, and then use use MathCAD solutions worksheets to generate solutions for use in grading (and post for student review). Each problem also comes with optional student hints and an

assignment guide. PHGradeAssist - Hibbeler's PHGradeassist course contains over 600 Statics and Dynamics problems an instructor can use to generate algorithmic homework. PHGA grades and tracks student answers and performance, and offers sample solutions as feedback. Students will also find a complete Activebook (cross referenced in hints) as well as a set of animations and simulations for use on-line. Professors will find complete support including Powerpoints, JPEGs, Active Learning Slides for CRS systems, Matlab/Mathcad support, and student Math Review Of course, the Hibbeler Principles book retains all it's core features that make it the most student friendly book on the market -- the most examples, 3D photorealistic artwork, Procedure for Analysis problem solving boxes, triple accuracy checking, photographs that teach, and a carefully-crafted, student centered design.

Engineering Mechanics I

Engineering Mechanics: Statics, SI Edition

STATICS AND DYNAMICS

A Comprehensive Treatise on the Dynamics of Constrained Systems

Engineering Mechanics

Engineering Mechanics of Solids

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The Boundary Element Method (BEM) has been established as a powerful numerical tool for the analysis of continua in recent years. The method is based on an attempt to transfer the governing differential equations into integral equations over the boundary. Thus, the discretization scheme or the introduction of any approximations must be done over the boundary. This book presents a BEM for two-dimensional elastic, thermo-elastic and body-force contact problems. The formulation is implemented for the general case of contact with various frictional conditions. The analysis is limited to linear elastostatics and small strain theory. Following a review of the basic nature of contact problems, the analytical basis of the direct formulation of the BEM method is described. The numerical implementation employs three-noded isoparametric line elements for the representation of the boundary of the bodies in contact. Opposite nodal points in equi-length element-pairs are defined on the two surfaces in the area which is expected to come into contact under an increasing load. The use of appropriate contact IV conditions enables the integral equations for the two bodies to be coupled together. To find the proper contact dimensions and the contact load a combined incremental and iterative approach is utilised. With this approach, the loads are applied progressively, and the sliding and adhering portion of the contact region is established for each load increment using an iterative procedure. A Coulomb type of friction law is assumed.

Over the past 50 years, Meriam & Kraige's Engineering Mechanics: Statics has established a highly respected tradition of excellence—a tradition that emphasizes accuracy, rigor, clarity, and applications. Now in a Sixth Edition, this classic text builds on these strengths, adding a comprehensive course management system, Wiley Plus, to the text, including an e-text, homework management, animations of concepts, and additional teaching and learning resources. New sample problems, new homework problems, and updates to content make the book more accessible. The Sixth Edition continues to provide a wide variety of high quality problems that are known for their accuracy, realism, applications, and variety motivating students to learn and develop their problem solving skills. To build necessary visualization and problem-solving skills, the Sixth Edition continues to offer comprehensive coverage of drawing free body diagrams—the most important skill needed to solve mechanics problems.

Lecture Notes on Composite Materials

Structural Analysis with the Finite Element Method. Linear Statics

This is a complete set of lecture notes for a college-level statics course. They are in "board-note" format, with each square containing exactly what you as the instructor should write on the chalkboard. The notes are in color, with comments to the instructor in pink. The topics include: Lesson 1 - Introduction to Statistics - System of Units - Methods of Problem Solution Lesson 2 - Forces in a Plane, 2D - Force Addition (2D) problem and solution - Force Resolution (X and Y components) problem and solution Lesson 3 - Equilibrium of a Particle -

Force resolution (Connection equilibrium) problem and solution Lesson 4 - Forces in space, 3D - Force resolution (3D) problem and solution - Force resultant (3D) #1 problem and solution - Force resultant (3D) #2 problem and solution Lesson 5 - Equivalent systems of forces - Moment calculation #1 problem and solution - Moment calculation #2 problem and solution Lesson 6 - Scalar product of two vectors - Scalar product problem and solution - Movement of a force about a particular axis problem and solution Lesson 6 - 1/2 - Moment of a couple - Couple problem and solution - Equivalent couple problem and solution Lesson 7 - Moments and forces - Equivalent forces problem and solution - Moving a force couple problem and solution - Wrench problem and solution Lesson 8 - Equilibrium of rigid bodies - Finding reactions #1 problem and solution - Finding reactions #2 problem and solution - Finding reactions #3 problem and solution Lesson 9 - Centroids and center of gravity - Problem 5.5 and solution Lesson 10 - Determination of centroids - Problem 5.77 and solution Lesson 11 - Analysis of structures - Zero force members Lesson 12 - Method of sections - Method of sections problem and solution - Frames problem and solution - Machine problem and solution Lesson 13 - Forces in beams - Reactions of a machine problem and solution - M&V diagrams, 2 examples, problems and solutions - M&V diagrams by integration, 2 examples, problems and solutions - Problem 5.14 and solution - Problem 5.23 and solution Lesson 14 - Friction - Friction #1 problem and solution - Friction #2 problem and solution - Friction #3 problem and solution - Friction #4 problem and solution These are handwritten notes; example problems are worked out, and each example problem is included as a separate page, suitable for creating a student handout sheet.

Over the past 50 years, Meriam & Kraige's Engineering Mechanics: Statics has established a highly respected tradition of Excellence—A Tradition that emphasizes accuracy, rigor, clarity, and applications. Now completely revised, redesigned, and modernized, the fifth edition of this classic text builds on these strengths, adding new problems and a more accessible, student-friendly presentation. Solving Statics Problems Using Maple If Maple is the computer algebra system you need to use for your engineering calculations and graphical output, this reference will be a valuable tutorial for your studies. Written as a guidebook for students in the Engineering Statics class, it will help you with your engineering assignments throughout the course

Dynamics can be a major frustration for those students who don't relate to the logic behind the material -- and this includes many of them! Engineering Mechanics: Dynamics meets their needs by combining rigor with user friendliness. The presentation in this text is very personalized, giving students the sense that they are having a one-on-one discussion with the authors. This minimizes the air of mystery that a more austere presentation can

engender, and aids immensely in the students' ability to retain and apply the material. The authors do not skimp on rigor but at the same time work tirelessly to make the material accessible and, as far as possible, fun to learn.