This book is designed to be a comprehensive test for undergraduate as well as first-year master's students of civil engineering in India. Now, in the second edition, the book incorporates a thorough revision and extension of topics covered in the previous edition. In order to keep the treatment focused, the emphasis is on roadways (highways) based transportation systems. SALIENT FEATURES OF THE BOOK: • Analysis of characteristics of vehicles and drivers that affect traffic and design of traffic facilities. • Principles of road geometry design and how to lay a road. • Characterization and analysis of flows on highways, unsignalized and signalized intersections, toll plazas, etc. • Design principles for traffic facilities. • Engineering characteristics of pavement materials. • Structural analysis and design of highways pavements. • Principles of pavement design with special reference to the Indian conditions. • Evaluation and maintenance of highways. HIGHLIGHTS OF THE book: • Incorporates the latest and up-to-date information on the topics covered. • Includes a large number of figures, tables, worked-out examples, and exercises highlighting practical engineering design problems. • Elaborates text by introduction of Models of Traffic Flow at Toll Plazas, Determination of Critical Gap, Occlusion of Signs, Fleet Allocation, Vehicle and Crew Assignment, Elastic Solution of Layered Structures, Analysis of Concrete Pavement Structures, Functional Evaluation of Pavements, Highway Economics and Finance, etc. in respective chapters.

This introductory overview of the major home systems gives students a solid foundation for beginning a career in home inspection. This book helps students get up to speed quickly while serving as a springboard for the 33 advanced electives in the Principles line. Systems & Standards focuses on system component problems, their practical implications, and inspection strategies for finding them. No other single volume offers both the breadth and depth of this introduction.

The main goal of this introductory text is to demonstrate how basic concepts in Soil Mechanics can be used as a "forensic" tool in the investigation of geotechnical failures. This, in turn, provides a good opportunity to show how to use available procedures in the formulation of useful simple models. Geotechnical failure is understood here in a broad sense as the failure of a structure to function properly due to a geotechnical reason. Some of the geotechnical failures selected are well known for their impact on the geotechnical community. Others are close to the author's experience. They have been organized into three main topics: Settlement, Bearing Capacity and Exclusions. They cover a significant part of every day's activity of professional geotechnical engineers. No attempt has been made to create a comprehensive handbook of failures. Instead, the emphasis has been given to creative applications of simple mechanical concepts and well known principles and solutions of Soil Mechanics. The book shows how much can be covered from relatively simple approaches. Despite this emphasis on simplicity, the book provides a deep insight into the cases analyzed. A non-negligible number of new analytical closed-form solutions have also been found. Their derivation is followed in detail. In all the cases described an effort was made to provide a detailed and step by step description of the hypothesis introduced and of the analysis performed.

ICSSD 2002 is the second in the series of International Conferences on Structural Stability and Dynamics, which provides a forum for the exchange of ideas and experiences in structural stability and dynamics among academics, engineers, scientists and applied mathematicians. Held in the modified and vibrant city of Singapore, ICSSD 2002 provides a peer at the areas which experts on structural stability and dynamics will be occupied with in the near future. The technical sessions, it is evident that well-known structural stability and dynamic theories and the computational tools have evolved to an even more advanced stage. Many delegates from diverse lands have contributed to the ICSSD 2002 proceedings, along with the participation of colleagues from the First Asian Workshop on Meshfree Methods and the International Workshop on Recent Advances in Experiments and Computations on Modeling of Heterogeneous Systems. Forming a valuable source for future experts, the proceedings contain 153 papers ( incl. 3 keynote papers and 23 invited papers) contributed by authors from all over the world who are working in advanced multidisciplinary areas of research in engineering. All these papers are peer-reviewed, with excellent quality, and cover the topics of structural stability, structural dynamics, computational methods, wave propagation, nonlinear analysis, failure analysis, inverse problems, non-destructive evaluation, smart materials and structures, vibration control and seismic response. The major topics presented in the conference are: as an introduction to the conference, and as a conclusion to the conference sessions for questions on solutions of the partial differential equations with their complicated boundary conditions for any of these three methods have been obtained only in special cases. In order to obtain solutions, various special methods have been developed to determine the stresses and displacements in structures. The equations have been reduced to two and one dimensional forms for plates, beams, and trusses. By neglecting the local effects at the edges and ends, satisfactory solutions can be obtained for many cases. The procedures for reducing the three dimensional equations to two and one dimensional equations are described in Chapter 1, Volume of the various approximations are pointed out.

This book introduces the subject of predictive analysis to engineers and can be used as a reference in applying this knowledge to specific problems. This comprehensive volume provides a platform from which both major and minor infectious diseases related topics are addressed in-depth among highly susceptible patients. The book begins with an overview of infections in various modalities. This is followed by chapters on clinical disorders, etiologic agents, immunology, host response, prevention. Chapters include tables, radiologic images, and pictorial demonstrations of various disease states to familiarize you with the vaccine strains and therapies in practice and training, and those belonging to subspecialty providing supportive care for these patients. Discussions to emphasize the noninfectious causes that mimic infectious diseases; clinical relevance and effective utility of existing and emerging diagnostic tools are presented throughout the book. Authorized by leaders in their field, this book is the go-to reference for management of patients undergoing hematopoietic and solid organ transplantation.

Written in a concise, style, Principles of Chemical Engineering provides an introduction to the basic sciences necessary to understand chemical processes. The text focuses on problems in material and energy balances in relation to chemical reactors and introduces software that employs numerical methods to solve these problems. Upon masters of this material, readers will be able to: Understand basic processing technology (batch, semibatch, continuous, purging, and recycle) and standard operations (reaction, distillation, adiabatic compression, and filtration) Draw and fully label a flowchart for a given process description Choose a convenient basis for calculation for both single- and multiple-unit processes Identify possible subsistencies for which material and energy balances might be written Perform a degree of freedom analysis for the overall system and each possible subsystem. Formulate the appropriate material and energy balance equations. Apply the first law of thermodynamics, calculate energy and entropy changes, and construct energy balances on closed and open systems. Written as a text to fully meet the needs of advanced undergraduate students, it is also suitable as a reference for chemical engineers with its wide coverage across the biochemical and electromechanical fields. Each chapter of the text provides examples, case studies, and end-of-chapter problems, and the accompanying CD-ROM contains software designed for solving problems in chemical engineering.

Recent developments in the fields of energy, property and industrial engineering have led to the emergence of new types of structures and infrastructures subject to variable stresses, for which the usual methods for designing pile foundations are now inadequate. The recommendations presented in this book will help to partly fill this technical gap by proposing a methodological approach and industrial calculations methods to take account of the effects of cyclic loads in the design of foundations on piles. These are both laboratory and full laboratory experiments, and on modeling carried out within the framework of the
Principle of Reinforced Concrete introduces the main problems of structural concrete and its mechanical behavior under various conditions as well as all aspects of the combined function of reinforcement and concrete. Based on the experimental investigation, the variation regularity of mechanical behavior, working properties, and design methods are presented for reinforced concrete members under various internal forces. Approach to the basic principles of the reinforced method of reinforced concrete, the book covers some extreme circumstances, including fatigue failure, load earthquake, explosion, high temperature (fire accident), and durability damage, and the special responses and analysis methods of its members under certain conditions. This work is valuable as a textbook for post-graduates, and can be used as a reference for university teachers and under-graduates in the structural engineering field. It is also useful for structural engineers working in scientific research, design, or construction. Focuses on the principles of reinforced concrete, providing professional and academic readers with a single volume reference. Experimental data enables readers to make full use of the theory presented. The mechanical behavior of both concrete and reinforcement materials, plus the combined function of both are covered, enabling readers to understand the behaviors of reinforced concrete structures and their members. Covers behavior of the materials and members under normal and extreme conditions.

"Engineering geology" is one of those terms that invite definition. The American Geological Institute, for example, has expanded the term to mean "the application of the geological sciences to engineering practice for the purpose of assuring that the geological factors affecting the location, design, construction, operation and maintenance of engineering works are recognized and adequately provided for." It has also been defined by W. R. Judd in the McGraw-Hill Encyclopedia of Science and Technology as the "application of all the experience in geology and other sciences to solve geological problems posed by civil engineering structures." Judd goes on to specify those branches of the geological or geo-scientifics as surface (or superficial) geology, structural/ fabric geology, geochemistry, geophysics, soil and rock mechanics. Soil mechanics is firmly included as a geological science in spite of the perhaps rather unfortunate trends over the years (now happily being reversed) towards purely mechanistic analysis which may well provide acceptable results for only the simplest geology. Many subjects evolve through their subject areas from an interdisciplinary background and it is just such instances that prove the greatest difficulties of definition. Since the form of development experienced by the practitioners of the subject almost always bears strongly upon the corporate concept of the term engineering geology.

Failure of components or systems must be prevented by both designers and operators of systems, but knowledge of the underlying mechanisms is often lacking. Since the relation between the expected usage of a system and its failure behavior is unknown, unexpected failures often occur, with possibly serious financial and safety consequences. Reliability and Maintainability provides a complete overview of all relevant failure mechanisms, ranging from mechanical fatigue and creep to corrosion and electric failures. Both qualitative and quantitative descriptions of the mechanisms and their governing loads enable a solid assessment of a system's reliability in a given or assumed operational context. Moreover, a unique range of applications of this knowledge in the fields of maintenance, reliability and design are presented. The benefits of understanding the physics of failure are demonstrated for subjects like condition monitoring, predictive maintenance, prognostics and health management, failure analysis and reliability engineering. Finally, the role of the relevant mechanisms in design processes and design for maintenance are illustrated.

This textbook discusses the basic principles of load and failure mechanisms. Applications in maintenance, reliability, safety, and the environment. It contains a large number of case studies and exercises. The book is divided into four sections: Introduction—Learn what site reliability engineering is and why it differs from conventional IT industry practices. Principles—Examine the patterns, behaviors, and areas of concern that influence the work of a site reliability engineer (SRE) Practices—Understand the theory and practice of an SRE's day-to-day work. Building and operating large distributed computing systems Management—Explore Google's best practices for training, communication, and meetings that your organization can use.

Handbook of Materials Failure Analysis: With Case Studies from the Oil and Gas Industry presents an updated understanding on why materials fail in specific situations, a vital element in developing and engineering new applications. This handbook covers analysis of materials failure in the oil and gas industry, where a single failed pipe can result in devastating consequences for people, wildlife, the environment, and the economy of a region. The book combines introductory sections on failure analysis with numerous real world case studies of pipelines and other types of materials failure in the oil and gas industry, including joint failure, leakage, failure in crude oil storage tanks, failure of glass fibre reinforced epoxy pipes, and failure of stainless steel components in offshore platforms, amongst others. Introduces readers to modern analytical techniques in materials failure analysis. Combines foundational knowledge with in-depth practical knowledge from the oil and gas industry. Includes numerous case studies, including oil and gas incident failures.

Present recent breakthroughs in the theory, methods, and applications of safety principles and risk analysis. The book reviews the state of the art in risk analysis, including the latest developments and trends. In the field of risk analysis, the subject is expanding and growing. The book covers a wide range of topics, including risk assessment, risk management, and risk communication. It provides an overview of the state of the art in risk analysis, including the latest developments and trends.

Recent years have seen a growing trend to derive models of macroscopic phenomena encountered in the fields of engineering, physics, chemistry, ecology, self-organisation theory and econophysics from various variational or extremum principles. Through the link between the integral extremum of a functional and the local extremum of a function (explicit, for example, in the Pontryagin’s maximum principle variational and extremum principles are mutually related. Thus it makes sense to consider them within a common context. The main goal of Variational and Extremum Principles in Macroscopic Systems is to collect various mathematical formulations and examples of physical reasoning that involve both basic theoretical aspects and applications of variational and extremum approaches to systems of the macroscopic world. The first part of the book is focused on the theory, whereas the second focuses on applications. The unifying variational approach is used to derive the balance or conservation equations, phenomenological equations linking fluxes and forces, equations of change for processes with coupled transfer of energy and substance, and optimal conditions for energy management. A unique multidisciplinary synthesis of variational and extremum principles in theory and application A comprehensive review of current and past achievements in variational formulations for macroscopic processes Uses Lagrangian and Hamiltonian formalisms as a basis for the exposition of novel approaches to transfer and conversion of thermal, solar and chemical energy