Lesson 35 Nptel

Mechatronics is a multidisciplinary field combining Mechanical, Electronic, Computer, and other Engineering fields to develop intelligent processes and products. Based on thirty years of extensive work in industry and teaching, this book provides an overview of the sensors and sensor systems required and applied in mechatronics with an emphasis on understanding the physical principles and possible configurations of sensors rather than simply a discussion of particular types of sensors. Well illustrated with examples of commercially available sensors and of recent and future developments, this book offers help in achieving the best solution to various kinds of sensor problems encountered in mechatronics. In a clear and detailed manner, the author reviews the major types of transducers, presents a characterization of the state-of-the-art in sensing technology and offers a view on current sensor research. This book will be a vital resource for practicing engineers and students in the field. Comprehensive coverage of a wide variety of sensor concepts and basic measurement configurations encountered in the mechatronics domain Written by a recognized expert in the field who has extensive experience in industry and teaching Suitable for practicing engineers and those wanting to learn more about sensors in mechatronics
*Terpenes belong to the diverse class of chemical constituents isolated from materials found in nature (plants, fungi, insects, marine organisms, plant pathogens, animals and endophytes). These metabolites have simple to complex structures derived from Isopentyl diphosphate (IPP), dimethyl allyl diphosphate (DMAPP), mevalonate and deoxyxylulose biosynthetic pathways. Terpenes play a very important role in human health and have significant biological activities (anticancer, antimicrobial, anti-inflammatory, antioxidant, antiallergic, skin permeation enhancer, anti-diabetic, immunomodulatory, anti-insecticidal). This book gives an overview and highlights recent research in the phytochemical and biological understanding of terpenes and terpenoid and explains the most essential functions of these kinds of secondary metabolites isolated from natural sources. The first book on the subject written by a practitioner forpractitioners. Geotechnical Instrumentation for Monitoring FieldPerformance Geotechnical Instrumentation for Monitoring FieldPerformance goes far beyond a mere summary of the technicalliterature and manufacturers' brochures: it guides readersthrough the entire geotechnical instrumentation process, showingthem when to monitor safety and performance, and how to do it well.This comprehensive guide: * Describes the critical*

*steps of planning monitoring programsusing geotechnical instrumentation, including what benefits can beachieved and how construction specifications should bewritten * Describes and evaluates monitoring methods and recommendsinstruments for monitoring groundwater pressure, deformations,total stress in soil, stress change in rock, temperature, and loadand strain in structural members * Offers detailed practical guidelines on instrument calibrations,installation and maintenance, and on the collection, processing,and interpretation of instrumentation data * Describes the role of geotechnical instrumentation during theconstruction and operation phases of civil engineering projects,including braced excavations, embankments on soft ground,embankment dams, excavated and natural slopes, undergroundexcavations, driving piles, and drilled shafts * Provides guidelines throughout the book on the best practices In the early days of digital design, we were concerned with the logical correctness of circuits. We knew that if we slowed down the clock signal sufficiently, the circuit would function correctly. With improvements in the semiconductor process technology, our expectations on speed have soared. A frequently asked question in the last decade has been how fast can the clock run. This puts significant demands on timing analysis and delay testing. Fueled by the above events, a tremendous growth has occurred in the research on delay testing. Recent work includes fault models, algorithms for test generation and fault simulation, and methods for design and synthesis for testability. The authors of this book, Angela Krstic and Tim Cheng, have personally contributed to this research. Now they do an even greater service to the profession by collecting the work of a large number of researchers. In addition to expounding such a great deal of information, they have delivered it with utmost clarity. To further the reader's understanding many key concepts are illustrated by simple examples. The basic ideas of delay testing have reached a level of maturity that makes them suitable for practice. In that sense, this book is the best x DELAY FAULT TESTING FOR VLSI CIRCUITS available guide for an engineer designing or testing VLSI systems. Tech niques for path delay testing and for use of slower test equipment to test high-speed circuits are of particular interest.*

Sustainable Alternative Syngas Fuel
Building a Better Vocabulary
Geotechnical Instrumentation for Monitoring Field Performance
Exposure, Toxicity and Health Effects
Cryogenic Process Engineering

This hallmark text on Power System Engineering provides the readers a comprehensive account of all key concepts in the field. The book includes latest

technology developments and talks about some crucial areas of Power system, such as Transmission & Distribution, Analysis & Stability, and Protection & Switchgear. With its rich content, it caters to the requirements of students, instructors, and professionals. Market_Desc: · B. Tech (UG) students of CSE, IT, ECE· College Libraries· Research Scholars· Operational Research· Management Sector Special Features: Dr. S. N. Sivanandam has published 12 books· He has delivered around 150 special lectures of different specialization in Summer/Winter school and also in various Engineering colleges· He has guided and co guided 30 PhD research works and at present 9 PhD research scholars are working under him· The total number of technical publications in International/National Journals/Conferences is around 700· He has also received Certificate of Merit 2005-2006 for his paper from The Institution of Engineers (India)· He has chaired 7 International Conferences and 30 National Conferences. He is a member of various professional bodies like IE (India), ISTE, CSI, ACS and SSI. He is a technical advisor for various reputed industries and engineering institutions· His research areas include Modeling and Simulation, Neural Networks, Fuzzy Systems and Genetic Algorithm, Pattern Recognition, Multidimensional system analysis, Linear and Nonlinear control system, Signal and Image processing, Control System, Power system, Numerical methods, Parallel Computing, Data Mining and Database Security About The Book: This book is meant for a wide range of readers who wish to learn the basic concepts of soft computing. It can also be helpful for programmers, researchers and management experts who use soft computing techniques. The basic concepts of soft computing are dealt in detail with the relevant information and knowledge available for understanding the computing process. The various neural network concepts are explained with examples, highlighting the difference between various architectures. Fuzzy logic techniques have been clearly dealt with suitable examples. Genetic algorithm operators and the various classifications have been discussed in lucid manner, so that a beginner can understand the concepts with minimal effort.

The book provides a comprehensive overview of electromigration and its effects on the reliability of electronic circuits. It introduces the physical process of electromigration, which gives the reader the requisite understanding and knowledge for adopting appropriate counter measures. A comprehensive set of options is presented for modifying the present IC design methodology to prevent electromigration. Finally, the authors show how specific effects can be exploited in present and future technologies to reduce electromigration's negative impact on circuit reliability.

Corporate social responsibility (CSR) has become an increasingly heated topic since the 1980s. But there are severe limitations with the concept of CSR and the effectiveness of CSR practices. Addressing such limitations, this volume proposes that the concept of Corporate Social Irresponsibility (CSI) offers a better theoretical platform to avoid the vagueness, ambiguity, arbitrariness and mysticism of CSR. It challenges conventional modes of thinking, unveils the CSR mask of business practices and redirects public attention to the core issues of CSR. This collective work sets up an initial theoretical framework for the subject of CSI and examines the fundamental reasons for irresponsibility in and beyond a corporate context. Rooted in theory and practice it seeks to understand how boundaries of CSR and CSI have been constructed in society, and explores some systemic and structural issues of CSI in practice.

Sensors for Mechatronics

Recommender Systems Handbook

Handbook on Battery Energy Storage System

Cryptography and Network Security (SIE)

Thermal and Rheological Measurement Techniques for Nanomaterials Characterization

A mummified monkey's paw carrying a spell receives three wishes from a family and proceeds to fulfill them in unexpected and horrible ways.

Keeping the mathematics to a minimum yet losing none of the required rigor, Understanding Solid State Physics, Second Edition clearly explains basic physics principles to provide a firm grounding in the subject. This new edition has been fully updated throughout, with recent developments and literature in the field, including graphene and the use of quasicrystalline materials, in addition to featuring new journalistic boxes and the reciprocal lattice. The author underscores the technological applications of the physics discussed and emphasizes the multidisciplinary nature of scientific research. After introducing students to solid state physics, the text examines the various ways in which atoms bond together to form crystalline and amorphous solids. It also describes the measurement of mechanical properties and the means by which the mechanical properties of solids can be altered or supplemented for particular applications. The author discusses how electromagnetic radiation interacts with the periodic array of atoms that make up a crystal and how solids react to heat on both atomic and macroscopic scales. She then focuses on conductors, insulators, semiconductors, and superconductors, including some basic semiconductor devices. The final chapter addresses the magnetic properties of solids as well as applications of magnets and magnetism. This accessible textbook provides a useful introduction to solid state physics for undergraduates who feel daunted by a highly mathematical approach. By relating the theories and concepts to practical applications, it shows how physics is used in the real world. Key features: Fully updated throughout, with new journalistic boxes and recent applications Uses an accessible writing style and format, offering journalistic accounts of interesting research, worked examples, self-test questions, and a helpful glossary of frequently used terms Highlights various technological applications of physics, from locomotive lights to medical scanners to USB flash drives

This handbook serves as a guide to deploying battery energy storage technologies, specifically for distributed energy resources and flexibility resources. Battery energy storage technology is the most promising, rapidly developed technology as it provides higher efficiency and ease of control. With energy transition through decarbonization and decentralization, energy storage plays a significant role to enhance grid efficiency by alleviating volatility from demand and supply. Energy storage also contributes to the grid integration of renewable energy and promotion of microgrid.

A thorough exposition of quantum computing and the underlying concepts of quantum physics, with explanations of the relevant mathematics and numerous examples. The combination of two of the twentieth century's most influential and revolutionary scientific theories, information theory and quantum mechanics, gave rise to a radically new view of computing and information. Quantum information processing explores the implications of using quantum mechanics instead of classical mechanics to model information and its processing. Quantum computing is not about changing the physical substrate on which computation is done from classical to quantum but about changing the notion of computation itself, at the most basic level. The fundamental unit of computation is no longer the bit but the quantum bit or qubit. This comprehensive introduction to the field offers a thorough exposition of quantum computing and the underlying concepts of quantum physics, explaining all the relevant mathematics and offering numerous examples. With its careful development of concepts and thorough explanations, the book makes quantum computing accessible to students and professionals in mathematics, computer science, and engineering. A reader with no prior knowledge of quantum physics (but with sufficient knowledge of linear algebra) will be able to gain a fluent understanding by working through the book.

Power Electronics

Hydraulics and Pneumatics

Mathematics for Machine Learning

Vibrations and Waves

Fundamentals of Electromigration-Aware Integrated Circuit Design

Applied Mathematical Methods covers the material vital for research in today's world and can be covered in a regular semester course. It is the consolidation of the efforts of teaching the compulsory first semester post-graduate applied mathematics course at the Department of Mechanical Engineering at IIT Kanpur in two successive years.

Throughout most of the twentieth century, electric propulsion was considered the technology the future. Now, the future has arrived. This important new book explains the fundamentals of electric propulsion for spacecraft and describes in detail the physics and characteristics of the two major electric thrusters in use today, ion and Hall thrusters. The authors provide an introduction to plasma physics in order to allow readers to understand the models and derivations used in determining electric thruster performance. They then go on to present detailed explanations of: Thruster principles Ion thruster plasma generators and accelerator grids Hollow cathodes Hall thrusters Ion and Hall thruster plumes Flight ion and Hall thrusters Based largely on research and development performed at the Jet Propulsion Laboratory (JPL) and complemented with scores of tables, figures, homework problems, and references, Fundamentals of Electric Propulsion: Ion and Hall Thrusters is an indispensable textbook for advanced undergraduate and graduate students who are preparing to enter the aerospace industry. It also serves as an equally valuable resource for professional engineers already at work in the field.

This second edition of a well-received text, with 20 new chapters, presents a coherent and unified repository of recommender systems' major concepts, theories, methodologies, trends, and challenges. A variety of real-world applications and detailed case studies are included. In addition to wholesale revision of the existing chapters, this edition includes new topics including: decision making and recommender systems, reciprocal recommender systems, recommender systems in social networks, mobile recommender systems, explanations for recommender systems, music recommender systems, cross-domain recommendations, privacy in recommender systems, and semantic-based recommender systems. This multi-disciplinary handbook involves world-wide experts from diverse fields such as artificial intelligence, human-computer interaction, information retrieval, data mining, mathematics, statistics, adaptive user interfaces, decision support systems, psychology, marketing, and consumer behavior. Theoreticians and practitioners from these fields will find this reference to be an invaluable source of ideas, methods and techniques for developing more efficient, cost-effective and accurate recommender systems.

Thermal and Rheological Measurement Techniques for Nanomaterials Characterization, Second Edition covers thermal and rheological measurement techniques, including their principle working methods, sample preparation and interpretation of results. This important reference is an ideal source for materials scientists and industrial engineers who are working with nanomaterials and need to know how to determine their properties and behaviors. Outlines key characterization techniques to determine the thermal and rheological behavior of different nanomaterials Explains how the thermal and rheological behavior of nanomaterials affect their usage Provides a method-orientated approach that explains how to successfully use each technique

Ion and Hall Thrusters

Testing Digital Circuits

PRINCIPLES OF SOFT COMPUTING (With CD)

Devices, Circuits and Industrial Applications

An Introduction

The development and use of sustainable and alternative fuels (syngas, biogas, biodiesel, bio-oil, hydrogen) derived from sources other than petroleum is needed

due to the limited fossil fuel resources, the need for reduction of atmospheric greenhouse gas emissions, energy security, and to meet the future high energy demand due to population growth. New alternative fuels that can be produced locally and derived from renewable sources will be more sustainable compared to fossil fuels. Alternative and renewable fuels can be produced using different thermochemical and bio-chemical processes. Gasification is a thermochemical process used to produce syngas fuel (mainly hydrogen and carbon dioxide) from renewable (biomass) and conventional (coal) sources. The syngas fuels produced from the gasification process can be used for different applications: power generation (combustion of syngas fuel in gas turbine engines), heating, and transportation (internal combustion engines). This book intends to provide the reader with an overview of the current technologies, methods, and strategies of syngas fuel production, characterization, and application.

These six lessons will help you learn how to move your dietary choices toward healthier, more enjoyable options by using superstar ingredients in your daily cooking.

The M.I.T. Introductory Physics Series is the result of a program of careful study, planning, and development that began in 1960. The Education Research Center at the Massachusetts Institute of Technology (formerly the Science Teaching Center) was established to study the process of instruction, aids thereto, and the learning process itself, with special reference to science teaching at the university level. Generous support from a number of foundations provided the means for assembling and maintaining an experienced staff to co-operate with members of the Institute's Physics Department in the examination, improvement, and development of physics curriculum materials for students planning careers in the sciences. After careful analysis of objectives and the problems involved, preliminary versions of textbooks were prepared, tested through classroom use at M.I.T. and other institutions, re-evaluated, rewritten, and tried again. Only then were the final manuscripts undertaken.

Power Electronics: Devices, Circuits and Industrial Applications would serve as an invaluable text for undergraduate and postgraduate courses on power electronics. It would also be a useful reference for practicing design engineers. The book provides an exhaustive coverage of various power electronic devices with emphasis on the thyristor. The characteristics of modern power semiconductor devices like the power transistor, MOSFET and the IGBT are also discussed. Other relevant topics like cycloconverters, brushless DC motors, microprocessor fundamentals, microprocessor control of industrial equipment, and field-oriented control of AC motors, are dealt with in detail. With its in-depth presentation of topics, detailed and easy-to-understand derivations, the emphasis of the book is on the understanding of fundamental concepts. The theory is well-supported by a large number of solved and unsolved problems and multiple choice questions. The lucid treatment in the book encourages self-study and motivates the student towards independent problem solving.

Exploring Data in Python 3
Power Electronics: Circuits, Devices, and Application (for Anna University)
Fundamentals of Manufacturing, Third Edition
Understanding Solid State Physics
Delay Fault Testing for VLSI Circuits

This is a new release of the original 1934 edition. Fundamentals of Manufacturing, Third Edition provides a structured review of the fundamentals of manufacturing for individuals planning to take SME'S Certified Manufacturing Technologist (CMfgT) or Certified Manufacturing Engineer (CMfgE) certification exams. This book has been updated according to the most recent Body of Knowledge published by the Certification Oversight and Appeals Committee of the Society of Manufacturing Engineers. While the objective of this book is to prepare for the certification process, it is a primary source of information for individuals interested in learning fundamental manufacturing concepts and practices. This book is a valuable resource for anyone with limited manufacturing experience or training. Instructor slides and the Fundamentals of Manufacturing Workbook are available to complement course instruction and exam preparation. Table of Contents Chapter 1: Mathematics Chapter 2: Units of Measure Chapter 3: Light Chapter 4: Sound Chapter 5: Electricity/Electronics Chapter 6: Statics Chapter 7: Dynamics Chapter 8: Strength of Materials Chapter 9: Thermodynamics and Heat Transfer Chapter 10: Fluid Power Chapter 11: Chemistry Chapter 12: Material Properties Chapter 13: Metals Chapter 14: Plastics Chapter 15: Composites Chapter 16: Ceramics Chapter 17: Engineering Drawing Chapter 18: Geometric Dimensioning and Tolerancing Chapter 19: Computer-Aided Design/Engineering Chapter 20: Product Development and Design Chapter 21: Intelllectual Property Chapter 22: Product Liability Chapter 23: Cutting Tool Technology Chapter 24: Machining Chapter 25: Metal Forming Chapter 26: Sheet Metalworking Chapter 27: Powdered Metals Chapter 28: Casting Chapter 29: Joining and Fastening Chapter 30: Finishing Chapter 31: Plastics Processes Chapter 32: Composite Processes Chapter 33: Ceramic Processes Chapter 34: Printed Circuit Board Fabrication and Assembly Chapter 35: Traditional Production Planning and Control Chapter 36: Lean Production Chapter 37: Process Engineering Chapter 38: Fixture and Jig Design Chapter 39: Materials Management Chapter 40: Industrial Safety, Health and Environmental Management Chapter 41: Manufacturing Networks Chapter 42: Computer Numerical Control Machining Chapter 43: Programmable Logic Controllers Chapter 44: Robotics Chapter 45: Automated Material Handling and Identification Chapter 46: Statistical Methods for Quality Control Chapter 47: Continuous Improvement Chapter 48: Quality

*Standards Chapter 49: Dimensional Metrology Chapter 50:
Nondestructive Testing Chapter 51: Management Introduction
Chapter 52: Leadership and Motivation Chapter 53: Project
Management Chapter 54: Labor Relations Chapter 55: Engineering
Economics Chapter 56: Sustainable Manufacturing Chapter 57:
Personal Effectiveness*

*This revised third edition presents the subject with the help of
learning objectives (LO) guided by Bloom's Taxonomy and supports
outcome-based learning. It discusses concepts from elementary to
advanced levels with focus on mathematical preliminaries.
Numerous solved examples, algorithms, illustrations & usage of
fictitious characters make the text interesting and simple to
read. Salient Features: Dedicated section on Elementary
Mathematics Pseudo codes used to illustrate implementation of
algorithm Includes new topics on Shannon's theory and Perfect
Secrecy, Unicity Distance and Redundancy of Language Interesting
elements introduced through QR codes – Solutions to select
chapter-end problems (End of every chapter) – 19 Proofs of
theorems (Appendix Q) – Secured Electronic Transaction (Appendix
R) Enhanced Pedagogical Features: – Solved Examples: 260 –
Exercises: 400 – Review Questions: 200 – Illustration: 400
Python for Everybody is designed to introduce students to
programming and software development through the lens of
exploring data. You can think of the Python programming language
as your tool to solve data problems that are beyond the
capability of a spreadsheet.Python is an easy to use and easy to
learn programming language that is freely available on
Macintosh, Windows, or Linux computers. So once you learn Python
you can use it for the rest of your career without needing to
purchase any software.This book uses the Python 3 language. The
earlier Python 2 version of this book is titled "Python for
Informatics: Exploring Information".There are free downloadable
electronic copies of this book in various formats and supporting
materials for the book at www.pythonlearn.com. The course
materials are available to you under a Creative Commons License
so you can adapt them to teach your own Python course.*
Expanding the Vision of Sensor Materials
VLSI Testing
Micro Irrigation Engineering for Horticultural Crops

Corporate Social Irresponsibility
**This text primarily analyses different methods of design of
concrete structures as per IS 456: 2000 (Plain and Reinforced
Concrete—Indian Standard Code of Practice, 4th revision,
Bureau of Indian Standards). It gives greater emphasis on the
limit state method so as to illustrate the acceptable limits for**

the safety and serviceability requirements of structures. Besides dealing with yield line analysis for slabs, the book explains the working stress method and its use for designing reinforced concrete tension members, theory of redistribution of moments, and earthquake resistant design of structures. This well-structured book develops an effective understanding of the theory through numerous solved problems, presenting step-by-step calculations. The use of SP-16 (Design Aids for Reinforced Concrete to IS: 456–1978) has also been explained in solving the problems. KEY FEATURES : Instructional Objectives at the beginning of the chapter highlight important concepts. Summary at the end of the chapter to help student revise key points. Sixty-nine solved illustrative examples presenting step-by-step calculations. Chapter-end exercises to test student's understanding of the concepts. Forty Tests to enable students to gauge their preparedness for actual exams. This comprehensive text is suitable for undergraduate students of civil engineering and architecture. It can also be useful to professional engineers.

Formaldehyde is virtually ubiquitous in the modern environment due to its cost-effective nature, its use in resin formation, and its preservative properties. Though formaldehyde is necessary for many products and processes important to the world's economy, this economic dependence on formaldehyde comes at a cost to public health. Growth and consequent industrialization rely heavily on formaldehyde use. New buildings—residences, public places, and offices—are not only built with timber preserved by formaldehyde, but they are also furnished with wood, wool, and textile products that contain formaldehyde. The general population faces environmental exposure from indoor and outdoor air pollution, food, and even medicine. Scientific inquiry into formaldehyde exposure has grown in response. This book consolidates the new and established body of formaldehyde research in the scholarly community, focusing on exposure, genotoxicity, and adverse health outcomes. Through this resource, we hope to increase awareness of the broad range of health effects posed by formaldehyde exposure, and to encourage interdisciplinary interest, as well as research, into this pervasive compound—especially in the United States and China, where formaldehyde production and usage is high. This book will be useful to researchers of environmental and occupational exposure, students, and government regulators and anyone

exposed to formaldehyde in the workplace and/or at home. HVAC Simplified (zip file)This text provides an understanding of fundamental HVAC concepts and how to extend these principles to the explanation of simple design tools used to create building systems that are efficient and provide comfortable and healthy environments. The text contains twelve chapters that review the fundamentals of refrigeration, heat transfer, and psychrometrics. Information from the ASHRAE Handbook"Fundamentals is summarized and supplemented with items from industry sources. The remaining chapters assemble information from ASHRAE Handbooks, ASHRAE standards and manufacturer data present design procedures commonly used by professional engineers. Other topics include equipment selection and specification, comfort and IAQ, building assemblies, heating and cooling loads, air distribution system design, water distribution system design, electrical and control systems, design for energy efficiency, and design for economic value. A suite of complementary spreadsheet programs that incorporate design and computation procedures from the text are provided on the CD that accompanies this book. These programs include psychrometric analysis, equipment selection, heating and cooling load calculation, an electronic "ductulator," piping system design, a ductwork cost calculator, and programs to evaluate building system demand and energy efficiency. Future updates to these programs can be found at www.ashrae.org/updates. The downloadable version of this product comes as a zip file and includes a PDF of the User's Manual and all the supporting files located on the CD that accompanies the print version. You must have WinZip to open the download.

Cryogenics, a term commonly used to refer to very low temperatures, had its beginning in the latter half of the last century when man learned, for the first time, how to cool objects to a temperature lower than had ever existed na tu rally on the face of the earth. The air we breathe was first liquefied in 1883 by a Polish scientist named Olszewski. Ten years later he and a British scientist, Sir James Dewar, liquefied hydrogen. Helium, the last of the so-caBed permanent gases, was finally liquefied by the Dutch physicist Kamerlingh Onnes in 1908. Thus, by the beginning of the twentieth century the door had been opened to astrange new world of experimentation in which aB substances, except liquid

helium, are solids and where the absolute temperature is only a few microdegrees away. However, the point on the temperature scale at which refrigeration in the ordinary sense of the term ends and cryogenics begins has ne ver been weB defined. Most workers in the field have chosen to restrict cryogenics to a tem perature range below -150°C (123 K). This is a reasonable dividing line since the normal boiling points of the more permanent gases, such as helium, hydrogen, neon, nitrogen, oxygen, and air, lie below this temperature, while the more common refrigerants have boiling points that are above this temperature. Cryogenic engineering is concerned with the design and development of low-temperature systems and components.
Applied Mathematical Methods:
Soil Dynamics
HVAC Simplified
A Story in Three Scenes
Refrigeration and Air Conditioning

Distills key concepts from linear algebra, geometry, matrices, calculus, optimization, probability and statistics that are used in machine learning.

Class-tested and coherent, this textbook teaches classical and web information retrieval, including web search and the related areas of text classification and text clustering from basic concepts. It gives an up-to-date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents; methods for evaluating systems; and an introduction to the use of machine learning methods on text collections. All the important ideas are explained using examples and figures, making it perfect for introductory courses in information retrieval for advanced undergraduates and graduate students in computer science. Based on feedback from extensive classroom experience, the book has been carefully structured in order to make teaching more natural and effective. Slides and additional exercises (with solutions for lecturers) are also available through the book's supporting website to help course instructors prepare their lectures.

This book presents a variety of policy adoption methods, irrigation scheduling, and design procedures in micro irrigation engineering for horticultural crops. The chapters range from policy interventions to applications of systems for different crops and under different land conditions. Compiling valuable information and research, the book is divided into three main sections: Policy Options: Drip Irrigation Among Adopters Irrigation Scheduling of Horticultural Crops Design of Drip Irrigation Systems The editors present valuable research and information on micro irrigation methods in an effort to focus on innovation and evolving new paradigms for efficient utilization of water resources. The adoption of micro irrigation systems can be a panacea for irrigation related problems and can help to increase the yield and area under cultivation, especially for small farmers without abundant technological resources. Micro Irrigation Engineering for Horticultural Crops: Policy Options, Scheduling, and Design will be valuable for agricultural engineering students, irrigation engineers, and scientists/professors in engineering.

The modern electronic testing has a forty year history. Test professionals hold some fairly large

conferences and numerous workshops, have a journal, and there are over one hundred books on testing. Still, a full course on testing is offered only at a few universities, mostly by professors who have a research interest in this area. Apparently, most professors would not have taken a course on electronic testing when they were students. Other than the computer engineering curriculum being too crowded, the major reason cited for the absence of a course on electronic testing is the lack of a suitable textbook. For VLSI the foundation was provided by semiconductor device techn- ogy, circuit design, and electronic testing. In a computer engineering curriculum, therefore, it is necessary that foundations should be taught before applications. The field of VLSI has expanded to systems-on-a-chip, which include digital, memory, and mixed-signalsubsystems. To our knowledge this is the first textbook to cover all three types of electronic circuits. We have written this textbook for an undergraduate "foundations" course on electronic testing. Obviously, it is too voluminous for a one-semester course and a teacher will have to select from the topics. We did not restrict such freedom because the selection may depend upon the individual expertise and interests. Besides, there is merit in having a larger book that will retain its usefulness for the owner even after the completion of the course. With equal tenacity, we address the needs of three other groups of readers.

A Challenging Concept
A Text Book of Automobile Engineering
Fundamentals of Electric Propulsion
Python for Everybody
Terpenes and Terpenoids

Advances in materials science and engineering have paved the way for the development of new and more capable sensors. Drawing upon case studies from manufacturing and structural monitoring and involving chemical and long wave-length infrared sensors, this book suggests an approach that frames the relevant technical issues in such a way as to expedite the consideration of new and novel sensor materials. It enables a multidisciplinary approach for identifying opportunities and making realistic assessments of technical risk and could be used to guide relevant research and development in sensor technologies.
This book provides a first course in Refrigeration and Air Conditioning. The subject matter has been developed in a logical and coherent manner with neat illustrations and a fairly large number of solved examples and unsolved problems. The text, developed from the author's teaching experience of many years, is suitable for the senior-level undergraduate and first-year postgraduate students of mechanical engineering, automobile engineering as well as chemical engineering. The text commences with an introduction to the fundamentals of thermodynamics and a brief treatment of the various methods of refrigeration. Then follows the detailed discussion and analysis of air refrigeration systems, vapour compression and vapour absorption refrigeration systems with special emphasis on developing sound physical concepts and gaining problem solving skills. Refrigerants are exhaustively dealt with in a separate chapter. The remainder chapters of the book deal with psychrometry and various processes required for the analysis of air conditioning systems. Technical descriptions of compressors, evaporators, condensers, expansion devices and ducts are

provided along with design practices for cooling and heating load calculations. Finally, a brief review of the basic principles and applications of cryogenic gases and air liquefaction systems are given.

This title offers a comprehensive treatment of the principles of hydraulics and pneumatics. The main objective is to provide a clear understanding of the concepts underlying hydraulics and pneumatics. Solved question papers and numerical examples are given to aid understanding.

The Children's Hour

A Gentle Introduction

The Monkey's Paw

Essentials of Electronic Testing for Digital, Memory and Mixed-Signal VLSI Circuits

Policy Options, Scheduling, and Design