

2008 Ashrae Environmental Guidelines For Datacom Equipment

ICT Sustainability is about how to assess, and reduce, the carbon footprint and materials used with computers and telecommunications. These are the notes for an award winning on-line graduate course on strategies for reducing the environmental impact of computers and how to use the Internet to make business more energy efficient. These notes have been used for courses by the Australian Computer Society, Australian National University and Athabasca University (Canada). The book includes an extensive bibliography. Free open access course-ware is available on-line to accompany this text.

Energy Management Principles: Applications, Benefits, Savings, Second Edition is a comprehensive guide to the fundamental principles and systematic processes of maintaining and improving energy efficiency and reducing waste. Fully revised and updated with analysis of world energy utilization, incentives and utility rates, and new content highlighting how energy efficiency can be achieved through 1 of 16 outlined principles and programs, the book presents cost effective analysis, case studies, global examples, and guidance on building and site auditing. This fully revised edition provides a theoretical basis for conservation, as well as the avenues for its application, and by doing so, outlines the potential for cost reductions through an analysis of inefficiencies. Provides extensive coverage of all major fundamental energy management principles Applies general principles to all major components of energy use, such as HVAC, electrical end use and lighting, and transportation Describes how to initiate an energy management program for a building, a process, a farm or an industrial facility

Globally recognized and backed by the Cloud Security Alliance (CSA) and the (ISC)2 the CCSP credential is the ideal way to match marketability and credibility to your cloud security skill set. The Official (ISC)2 Guide to the CCSP CBK Second Edition is your ticket for expert insight through the 6 CCSP domains. You will find step-by-step guidance through real-life scenarios, illustrated examples, tables, best practices, and more. This Second Edition features clearer diagrams as well as refined explanations based on extensive expert feedback. Sample questions help you reinforce what you have learned and prepare smarter. Numerous illustrated examples and tables are included to demonstrate concepts, frameworks and real-life scenarios. The book offers step-by-step guidance through each of CCSP's domains, including best practices and techniques used by the world's most experienced practitioners. Developed by (ISC)2, endorsed by the Cloud Security Alliance® (CSA) and compiled and reviewed by cloud security experts across the world, this book brings together a global, thorough perspective. The Official (ISC)2 Guide to the CCSP CBK should be utilized as your fundamental study tool in preparation for the CCSP exam and provides a comprehensive reference that will serve you for years to come.

A respected resource for decades, the Guide for the Care and Use of Laboratory Animals has been updated by a committee of experts, taking into consideration input from the scientific and laboratory animal communities and the public at large. The Guide incorporates new scientific information on common laboratory animals, including aquatic species, and includes extensive references. It is organized around major components of animal use: Key concepts of animal care and use. The Guide sets the framework for the humane care and use of laboratory animals. Animal care and use program. The Guide discusses the concept of a broad Program of Animal Care and Use, including roles and responsibilities of the Institutional Official, Attending Veterinarian and the Institutional Animal Care and Use Committee. Animal environment, husbandry, and management. A chapter on this topic is now divided into sections on terrestrial and aquatic animals and provides recommendations for housing and environment, husbandry, behavioral and population management, and more. Veterinary care. The Guide discusses veterinary care and the responsibilities of the Attending Veterinarian. It includes recommendations on animal procurement and transportation, preventive medicine (including animal biosecurity), and clinical care and management. The Guide addresses distress and pain recognition and relief, and issues surrounding euthanasia. Physical plant. The Guide identifies design issues, providing construction guidelines for functional areas; considerations such as drainage, vibration and noise control, and environmental monitoring; and specialized facilities for animal housing and research needs. The Guide for the Care and Use of Laboratory Animals provides a framework for the judgments required in the management of animal facilities. This updated and expanded resource of proven value will be important to scientists and researchers, veterinarians, animal care personnel, facilities managers, institutional administrators, policy makers involved in research issues, and animal welfare advocates.

Introductory technical guidance for professional engineers and others interested in energy efficient design of buildings. Here is what is discussed: 1. HVAC SYSTEM UPGRADES 2. HVAC CONTROLS 3. LIGHTING UPGRADES 4. AIR DISTRIBUTION UPGRADES 5. ENERGY EFFICIENCY FOR DATA CENTERS 6. SOLAR COLLECTORS 7. PASSIVE SOLAR HEATING 8. SOLAR WATER HEATING FUNDAMENTALS 9. SOLAR COOLING SYSTEMS

For many decades, IT infrastructure has provided the foundation for successful application deployments. Yet, general knowledge of infrastructures is not widespread. Experience shows that software developers, system administrators, and project managers usually have little knowledge of the large influence IT infrastructures have on the performance, availability and security of software applications. This book explains the concepts, history, and implementation of a robust and balanced IT infrastructure. Although many of books can be found on individual infrastructure building blocks, this is the first book to describe all of them: datacenters, servers, networks, storage, virtualization, operating systems, and end user devices. Whether you need an introduction to infrastructure technologies, a refresher course, or a study guide for a computer science class, you will find that the presented building blocks and concepts provide a solid foundation for understanding the complexity of today's IT infrastructures.

Presents design strategies, operational approaches, and technologies to help data centers improve energy efficiency and become eco-friendly.

This is a major new handbook that covers hundreds of subjects that cross numerous industry sectors; however, the handbook is heavily slanted to oil and gas environmental management, control and pollution prevention and energy efficient practices. Multi-media pollution technologies are covered : air, water, solid waste, energy. Students, technicians, practicing engineers, environmental engineers, environmental managers, chemical engineers, petroleum engineers, and environmental attorneys are all professionals who will benefit from this major new reference source. The handbook is organized in three parts. Part A provides an extensive compilation of abbreviations and concise glossary of pollution control and engineering terminology. More than 400 terms are defined. The section is intended to provide a simple look-up guide to confusing terminology used in the regulatory field, as well as industry jargon. Cross referencing between related definitions and acronyms are provided to assist the user. Part B provides physical properties and chemical safety information. This part is not intended to be exhaustive; however it does provide supplemental information that is useful to a number of the subject entries covered in the main body of the handbook. Part C is the Macropedia of Subjects. The part is organized as alphabetical subject entries for a wide range of pollution controls, technologies, pollution prevention practices and tools, computational methods for preparing emission estimates and emission inventories and much more. More than 100 articles have been prepared by the author, providing a concise overview of each subject, supplemented by sample calculation methods and examples where appropriate, and references. Subjects included are organized and presented in a macropedia format to assist a user in gaining an overview of the subject, guidance on performing certain calculations or estimates as in cases pertinent to preliminary sizing and selection of pollution controls or in preparing emissions inventories for reporting purposes, and recommended references materials and web sites for more in-depth information, data or computational tools. Each subject entry provides a working overview of the technology, practice, piece of equipment, regulation, or other relevant issue as it pertains to pollution control and management. Cross referencing between related subjects is included to assist the reader to gain as much of a practical level of knowledge.

A comprehensive resource that builds a bridge between engineering disciplines and the building sciences and trades, *Forensic Engineering: Damage Assessments for Residential and Commercial Structures* provides an extensive look into the world of forensic engineering. With a focus on investigations associated with insurance industry claims, the book describes methodologies for performing insurance-related investigations including the causation and origin of damage to residential and commercial structures and/or unhealthy interior environments and adverse effects on the occupants of these structures. Edited by an industry expert with more than 30 years of experience, and authors with more than 100 years of experience in the field, the book takes the technical aspects of engineering and scientific principles and applies them to real-world issues in a non-technical manner. It provides readers with the experiences, investigation methodologies, and investigation protocols used in, and derived from completing thousands of forensic engineering investigations. It begins with providing a baseline methodology for completing forensic investigations and closes with advice on testifying as an expert witness. Much of what must be known in this field is not learned in school, but is based upon experience since recognizing the cause of a building system failure requires a blending of skills from the white collar and blue collar worlds. Such knowledge can be vital since failures (e.g., water entry) often result from construction activities completed out of sequence.. This book details proven methodologies based on over 7,000 field investigations, methodologies which can be followed by both professionals and laymen alike.

The 2011 ASHRAE Handbook: HVAC Applications comprises over 60 chapters covering a broad range of facilities and topics, and is written to help engineers design and use equipment and systems described in other Handbook volumes. ASHRAE Technical Committees have revised nearly every chapter to cover current requirements, technology, and design practice. An accompanying CD-ROM contains all the volume's chapters in both I-P and SI units.

"Provides in-depth design recommendations and proven, cost effective, and reliable solutions for health care HVAC design that provide low maintenance cost and high reliability based on best practices from consulting and hospital engineers with decades of experience in the design, construction, and operation of health care facilities"--

ICDL conferences are recognized on of the most important platform in the world where noted expert share their experiences. Many DL experts have contributed thought provoking papers in ICDL 2013. These important papers are reviewed and conceptualized into ICDL on different areas of DL proceedings. The Proceedings have two volumes and has over 1100 pages.

IT is currently going through one of its most critical phases of transformation. IT vendors and IT service organizations are revolutionizing their production and service processes, adopting industrial practices. It is only through the consistent transformation into factory-like structures that quality, effectiveness and efficiency can be increased. By integrating professional concepts and methods taken from the context of industrial production, it is possible to meet functional and qualitative requirements from the departments and therefore from the end user. On top of that this new paradigm enables the implementation of optimal processes in the organization. An interdisciplinary team of authors addresses the current challenges for global IT services organizations and describes the process of IT industrialization. The transformation of the IT industry towards the model of an IT factory is the core theme of this book, which takes the latest findings from applied research, consulting and IT business practices and combines them into a consistent and innovative approach to IT services.

This book explains the concepts, history, and implementation of IT infrastructures. Although many of books can be found on each individual infrastructure building block, this is the first book to describe all of them: datacenters, servers, networks, storage, operating systems, and end user devices. The building blocks described in this book provide functionality, but they also provide the non-functional attributes performance, availability, and security. These attributes are explained on a conceptual level in separate chapters, and specific in the chapters about each individual building block. Whether you need an introduction to infrastructure technologies, a refresher course, or a study guide for a computer science class, you will find that the presented building blocks and concepts provide a solid foundation for understanding the complexity of today's IT infrastructures. This book can be used as part of IT architecture courses based on the IS 2010.4 curriculum.

Cloud Control Systems: Analysis, Design and Estimation introduces readers to the basic definitions and various new developments in the growing field of cloud control systems (CCS). The book begins with an overview of cloud control systems (CCS) fundamentals, which will help beginners to better understand the depth and scope of the field. It then discusses current techniques and developments in CCS, including event-triggered cloud control, predictive cloud control, fault-tolerant and diagnosis cloud control, cloud estimation methods, and secure control/estimation under cyberattacks. This book benefits all researchers including professors, postgraduate students and engineers who are interested in modern control theory, robust control, multi-agents control. Offers insights into the innovative application of cloud

This book showcases a large variety of multiple criteria decision applications (MCDAs), presenting them in a coherent framework provided by the methodology chapters and the comments accompanying each case study. The chapters describing MCDAs invite the reader to experiment with MCDA methods and perhaps develop new variants using data from these case studies or other cases they encounter, equipping them with a broader perception of real-world problems and how to overcome them with the help of MCDAs.

Introductory technical guidance for mechanical and electrical engineers and construction managers interested in improved energy efficiency for electronic data centers. Here is what is discussed: 1.

INTRODUCTION 2. INFORMATION TECHNOLOGY (IT) SYSTEMS 3. ENVIRONMENTAL CONDITIONS 4. AIR MANAGEMENT 5. COOLING SYSTEMS 6. ELECTRICAL SYSTEMS 7. OTHER OPPORTUNITIES FOR ENERGY-EFFICIENT DESIGN 8. DATA CENTER METRICS AND BENCHMARKING.

The 2008 ASHRAE Handbook--HVAC Systems and Equipment discusses various systems and the equipment (components or assemblies) that comprise them, and describes features and differences. This information helps system designers and operators in selecting and using equipment. It is divided into seven sections: Air-Conditioning and Heating Systems; Air-Handling Equipment and Components; Heating Equipment and Components; Cooling Equipment and Components; General Components; Packaged, Unitary and Split-System Equipment, and General. An accompanying CD-ROM (free with the book"also sold separately) contains all the volume's chapters in both I-P and SI units.

This book is about how to reduce carbon emissions and achieve other environmental benefits by using computers and telecommunications technology. It is designed to be used within an online course for professionals, using mentored and collaborative learning techniques.

Provides the fundamentals, technologies, and best practices in designing, constructing and managing mission critical, energy efficient data centers Organizations in need of high-speed connectivity and nonstop systems operations depend upon data centers for a range of deployment solutions. A data center is a facility used to house computer systems and associated components, such as telecommunications and storage systems. It generally includes multiple power sources, redundant data communications connections, environmental controls (e.g., air conditioning, fire suppression) and security devices. With contributions from an international list of experts, The Data Center Handbook instructs readers to: Prepare strategic plan that includes location plan, site selection, roadmap and capacity planning Design and build "green" data centers, with mission critical and energy-efficient infrastructure Apply best practices to reduce energy consumption and carbon emissions Apply IT technologies such as cloud and virtualization Manage data centers in order to sustain operations with minimum costs Prepare and practice disaster recovery and business continuity plan The book imparts essential knowledge needed to implement data center design and construction, apply IT technologies, and continually improve data center operations.

Ideal for architects, engineers, or contractors seeking the LEED Building Design & Construction (BD&C) credential, the book is a clearly organized study guide that includes sample quizzes throughout at the end of each section. Authored by an expert who teaches seminars on LEED BD&C to professionals, this LEED exam prep book stands out from its competitors in its engaging and stimulating approach.

Material includes include drawings, charts, and diagrams to help the reader visually understand the concepts.

To celebrate Professor Avi Bar-Cohen's 65th birthday, this unique volume is a collection of recent advances and emerging research from various luminaries and experts in the field. Cutting-edge technologies and research related to thermal management and thermal packaging of micro- and nanoelectronics are covered, including enhanced heat transfer, heat sinks, liquid cooling, phase change materials, synthetic jets, computational heat transfer, electronics reliability, 3D packaging, thermoelectrics, data centers, and solid state lighting. This book can be used by researchers and practitioners of thermal engineering to gain insight into next generation thermal packaging solutions. It is an excellent reference text for graduate-level courses in heat transfer and electronics packaging. Contents:A Review of Cooling Road Maps for 3D Chip Packages (Dereje Agonafer)Thermal Performance Mapping of Direct Liquid Cooled 3D Chip Stacks (Karl J L Geisler and Avram Bar-Cohen)Dynamic Thermal Management Considering Accurate Temperature-Leakage Interdependency (Bing Shi and Ankur Srivastava)Energy Reduction and Performance Maximization Through Improved Cooling (David Copeland)Optimal Choice of Heat Sinks from an Industrial Point of View (Clemens J M Lasance)Synthetic Jets for Heat Transfer Augmentation in Microelectronics Systems (Mehmet Arik and Enes Tamdogan)Recent Advance in Thermoelectric Devices for Electronics Cooling (Peng Wang)Energy Efficient Solid-State Cooling for Hot Spot Removal (Kazuaki Yazawa, Andrei Fedorov, Yogendra Joshi and Ali Shakouri)An Overview of the Use of Phase Change Materials for the Thermal Management of Transient Portable Electronics: Benefits and Challenges (Amy S Fleischer)Estimation of Cooling Performance of Phase Change Material (PCM) Module (Masaru Ishizuka and Tomoyuki Hatakeyama)Optimization Under Uncertainty for Electronics Cooling Design (Karthik K Bodla, Jayathi Y Murthy and Suresh V Garimella)Hydrophilic CNT-Sintered Copper Composite Wick for Enhanced Cooling (Glen A Powell, Anuradha Bulusu, Justin A Weibel, Sungwon S Kim, Suresh V Garimella and Timothy S Fisher)A Cabinet Level Thermal Test Vehicle to Evaluate Hybrid Double-Sided Cooling Schemes (Qihong Nie and Yogendra Joshi)Energy Efficiency and Reliability Risk Mitigation of Data Centers Through Prognostics and Health Management (Jun Dai, Michael Ohadi and Michael Pecht)Damage Pre-Cursors Based Assessment of Accrued Thermomechanical Damage and Remaining Useful Life in Field Deployed Electronics (Pradeep Lall, Mahendra Harsha, Kai Goebel and Jim Jones)Towards Embedded Cooling — Gen 3 Thermal Packaging Technology (Avram Bar-Cohen) Readership: Researchers, practitioners, and postgraduates in mechanical engineering, nanoelectronics, computer engineering, and electrical & electronic engineering. Keywords:Electronics Cooling;Electronics Packaging;Thermal Management;Thermal Sciences;Electronics Reliability;Thermoelectrics;Computational Heat Transfer;Liquid Cooling

Thermofluid Modeling for Sustainable Energy Applications provides a collection of the most recent, cutting-edge developments in the application of fluid mechanics modeling to energy systems and energy efficient technology. Each chapter introduces relevant theories alongside detailed, real-life case studies that demonstrate the value of thermofluid modeling and simulation as an integral part of the engineering process. Research problems and modeling solutions across a range of energy efficiency scenarios are presented by experts, helping users build a sustainable engineering knowledge base. The text offers novel examples of the use of computation fluid dynamics in relation to hot topics, including passive air cooling and thermal storage. It is a valuable resource for academics, engineers, and students undertaking research in thermal engineering. Includes contributions from experts in energy efficiency modeling across a range of engineering fields Places thermofluid modeling and simulation at the center of engineering design and development, with theory supported by detailed, real-life case studies Features hot topics in energy and sustainability engineering, including thermal storage and passive air cooling Provides a valuable resource for academics, engineers, and students undertaking research in thermal engineering

Energy Efficient Thermal Management of Data Centers examines energy flow in today's data centers. Particular focus is given to the state-of-the-art thermal management and thermal design approaches now being implemented across the multiple length scales involved. The impact of future trends in information technology hardware, and emerging software paradigms such as cloud computing and virtualization, on thermal management are also addressed. The book explores computational and experimental characterization approaches for determining temperature and air flow patterns within data centers.

Thermodynamic analyses using the second law to improve energy efficiency are introduced and used in proposing improvements in cooling methodologies. Reduced-order modeling and robust multi-objective design of next generation data centers are discussed.

"Provides information that is essential to the prevention and control of particulate and gaseous contamination within datacom facilities and gives a common set of guidelines for contamination prevention and control that can enhance datacom equipment reliability"--

This book brings together concepts from the building, environmental, behavioural and health sciences to provide an interdisciplinary understanding of office and workplace design. Today, with changes in the world of work and the relentless surge in technology, offices have emerged as the repositories of organizational symbolism, denoted by the spatial design of offices, physical settings and the built environment (architecture, urban locale). Drawing on Euclidian geometry that quantifies space as the distance between two or more points, a body of knowledge on office buildings, the concept of office and office space, and the interrelationships of spatial and behavioural attributes in office design are elucidated. Building and office work-related illnesses, namely sick building syndrome and ailments arising from the indoor environment, and the menace of musculoskeletal disorders are the alarming manifestations that critically affect employee satisfaction, morale and work outcomes. With a focus on office ergonomics, the book brings the discussion on the fundamentals of work design, with emphasis on computer workstation users. Strategic guidance of lighting systems and visual performance in workplaces are directed for better application of ergonomics and improvement in office indoor environment. It discusses the profiles of bioclimatic, indoor air quality, ventilation intervention, lighting and acoustic characteristics in office buildings. Emphasis has been given to the energy performance of buildings, and contemporary perspectives of building sustainability, such as green office building assessment schemes, and national and international building-related standards and codes. Intended for students and professionals from ergonomics, architecture, interior design, as well as construction engineers, health care professionals, and office planners, the book brings a unified overview of the health, safety and environment issues associated with the design of office buildings.

HPC is used to solve a number of complex questions in computational and data-intensive sciences. These questions include the simulation and modeling of physical phenomena, such as climate change, energy production, drug design, global security, and materials design; the analysis of large data sets such as those in genome sequencing, astronomical observation, and cybersecurity; and the intricate design of engineered products, such as airplanes and automobiles. This second volume of Contemporary High Performance Computing: From Petascale toward Exascale continues to document international HPC ecosystems, including the sponsors and sites that host them. Each chapter is punctuated with a site's flagship system and: Presents highlights of applications, workloads, and benchmarks Describes hardware architectures, system software, and programming systems Explores storage, visualization, and analytics Examines the data center/facility as well as system statistics Featuring pictures of buildings and systems in production, floorplans, and many block diagrams and charts to illustrate system design and performance, Contemporary High Performance Computing: From Petascale toward Exascale, Volume Two delivers a detailed snapshot of the rich history of practice in modern HPC. This book provides a valuable reference for researchers in HPC and computational science.

In 2007, scientists estimated the direct cost of diseases associated with mould and dampness on the US population to be in the range of 4 billion dollars, and the indirect costs of lost work and school days are gauged even higher. The US Centers for Disease Control recently concluded that elimination of moisture and mouldy materials in the home definitively results in improved health. Unfortunately, problems of accurate assessment and precise identification plague the full understanding of the effects of mould on human health. Addressing exposure assessment and identification, Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control, Second Edition discusses the methodology for conducting investigations on indoor environments, including details on key fungi and actinobacteria, and reflects advances in predicting their occurrence in buildings in various parts of the world. Beginning with a review of types of microorganisms in outdoor and indoor air, their growth and control in home and work environments, and their role in respiratory disease, this second edition presents new studies on pollen and its allergenic effects, the mechanistic basis for the effects of toxins and inflammatory agents on lung biology, and the use of molecular methods for determining microbial contaminants. On the practical side, this edition examines remediation, control, and quality assurance; occupational exposures in a wide range of environments; and infectious fungi and bacterial endotoxins in the built environment. Bringing together the state-of-the-science in this health-critical field, this accurate and timely book offers researchers, public health officials, and industrial hygienists crucial information on specific microorganisms in the built environment, along with current measurement and assessment solutions to clean up indoor air and keep residents and workers healthy in the future.

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