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Laboratory Design Guide ASHRAE Laboratory Design Guide Guidelines for Laboratory Design Laboratory Design Handbook Laboratory Design, Construction, and Renovation Laboratories Design and Planning of Research and Clinical Laboratory Facilities Building Type Basics for Research Laboratories ASHRAE Laboratory Design Guide Experimental Design for Laboratory Biologists Planning and Designing Research Animal Facilities Laboratory Design Guide Prudent Practices in the Laboratory Complete Guide to Laboratory Safety Proteomics in Practice Cannabis Laboratory Fundamentals CRC Handbook of Laboratory Safety, 5th Edition Accurate Results in the Clinical Laboratory The Complete Guide to Laboratory Safety, Fifth Edition Guide for the Care and Use of Laboratory Animals Occupational Outlook Handbook Building Type Basics for Research Laboratories Planning and Constructing Book and Paper Conservation Laboratories The Sustainable Laboratory Handbook Guidelines for Laboratory Design Building Scientific Apparatus The Foundations of Laboratory Safety Guide for the Care and Use of Laboratory Animals Laboratory Safety Guide The Laboratory Companion Colloid and Surface Chemistry Laboratory Quality Management System The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals Tuberculosis Laboratory Biosafety Manual Laboratory Biosafety Manual Microbiology Laboratory Guidebook R for Data Science Digital Transformation of the Laboratory Laboratory Design

Achieving, maintaining and improving accuracy, timeliness and reliability are major challenges for health laboratories. Countries worldwide committed themselves to build national capacities for the detection of, and response to, public health events of international concern when they decided to engage in the International Health Regulations implementation process. Only sound management of quality in health laboratories will enable countries to produce test results that the international community will trust in cases of international emergency. This handbook was developed through collaboration between the WHO Lyon Office for National Epidemic Preparedness and Response, the United States of America Centers for Disease Control and Prevention (CDC) Division of Laboratory Systems, and the Clinical and Laboratory Standards Institute (CLSI). It is based on training sessions and modules provided by the CDC and WHO in more than 25 countries, and on guidelines for implementation of ISO 15189 in diagnostic laboratories, developed by CLSI. This handbook is intended to provide a comprehensive reference on Laboratory Quality Management System for all stakeholders in health laboratory processes, from management, to administration, to bench-work laboratorians. This handbook covers topics that are essential for quality management of a public health or clinical laboratory. They are based on both ISO 15189 and CLSI GP26-A3 documents. Each topic is discussed in a separate chapter. The chapters follow the framework developed by CLSI and are organized as the "12 Quality System Essentials". The first comprehensive guide to modern laboratory planning in ten years to address both construction and operating aspects. Many of the 30 authors are affiliated with the European Association for Sustainable Laboratory Technologies (EGNATON), which has also endorsed this ready reference. This expert team covers the entire lifecycle of a laboratory facility, starting with the site layout and the planning of the building, followed by the planning of such areas as housing for laboratory animals, clean rooms and production facilities. The next section of the book deals with the installation of laboratory equipment, including storage and emergency facilities, while the final parts address safety and sustainability standards applicable to laboratories, as well as facility management and optimization during normal laboratory operation. The relevant norms and standards are cited throughout, and examples from recent construction sites are also presented. Hundreds of photographs and drawings, many in full color, provide visual examples of the design and building concepts. As a result, readers will learn how to construct and maintain efficient and long-serving laboratory spaces with a minimum of maintenance costs and a maximum of safety. An invaluable, practical guide for planners, builders and managers of chemical, biological and medical research laboratories of any size. Still the only concise practical guide to laboratory experiments in proteomics, this new edition now also covers DIGE technology and liquid-chromatography, while the troubleshooting section has been considerably extended. Adopting a practical approach, the authors present the relevant techniques and explain the route to successful experimental design and optimal method selection. They cover such electrophoretic techniques as isoelectric focusing, SDS page, 2-D page, and DIGE, as well as liquid-chromatography techniques, such as ion exchange, affinity chromatography and reversed-phase HPLC. Mass-spectrometric techniques include MALDI, ESI, and FT ICR. Generously illustrated, partly in color, the book also features updates of protocols as well as animations illustrating crucial methodological steps on a companion website. Take your lab into the 21st century with this insightful and exciting new resource Digital Transformation of the Laboratory: A Practical Guide to the Connected Lab delivers essential and transformative new insights into current and future technologies and strategies for the digitization of laboratories. Thoroughly supported and backed-up with contributions from thought and industry leaders, the book shows scientists in academia and industry how to move from paper to digital in their own labs. The distinguished editors have included resources from industry-leading voices in their respective fields that offer concrete and practical strategies to embrace modern, digital technology. You'll learn to modernize your laboratory, cut costs, improve productivity, and find efficiencies you never considered. You'll discover a stepwise approach to move from paper to digital tech, including guidance on how to understand and define your lab's requirements and evaluate potential solutions. Real-world case studies are included throughout the book to provide specific examples of how the ideas presented in the book can be applied in real life. You'll also benefit from the inclusion of: A thorough introduction to the evolution of the modern laboratory, including new available technologies and the new science being conducted with it An exploration of crucial terms you'll need to understand in order to chart your path into the future of the laboratory Examinations of practical issues you'll need to master in order to define your lab's digitalization strategy Numerous case studies and expert commentary on the subject of moving from paper to digital Perfect for senior executives, lab managers, senior scientists, principal investigators, professors and PhDs working in the field of biotechnology, pharma, chemistry, healthcare, life science, Digital Transformation of the Laboratory: A Practical Guide to the Connected Lab will also earn a place in the libraries of laboratory heads and auditing departments seeking to find efficiencies, cut costs, and maximize productivity in their own labs. This is the third edition of this manual which contains updated practical guidance on biosafety techniques in laboratories at all levels. It is organised into nine sections and issues covered include: microbiological risk assessment; lab design and facilities; biosecurity concepts; safety equipment; contingency planning; disinfection and sterilisation; the transport of infectious substances; biosafety and the safe use of recombinant DNA technology; chemical, fire and electrical safety aspects; safety organisation and training programmes; and the safety checklist. Planning to initiate designs for government, academic, and private research laboratories? Here's the nuts-and-bolts design guidelines that will start any project off on the right track and keep it there through completion. Filled with project photographs, diagrams, floor plans, sections, and details. Combines in-depth coverage of the structural, mechanical, energy, cost, and safety issues that are unique to research laboratories. Order your copy today! "An updated version of the critically acclaimed Laboratory Handbook, this guide to laboratory materials, equipment, and techniques is an important resource for students as well as veteran scientists and lab technicians. From vacuum technology and glass vacuum systems to volumetric glassware, gas-oxygen torches, and cryogenic tanks, The Laboratory Companion provides complete coverage of all commonly used lab equipment, including essential information about its selection, use, cleaning, and maintenance. It clearly explains the historical development and rationale behind how and why things are done in the lab, and includes helpful guidelines and step-by-step procedures for each topic discussed"--back cover. Proven and tested guidelines for designing ideal labs for scientific investigations Now in its Fourth Edition, Guidelines for Laboratory Design continues to enable readers to design labs that make it possible to conduct scientific investigations in a safe and healthy environment. The book brings together all the professionals who are critical to a successful lab design, discussing the roles of architects, engineers, health and safety professionals, and laboratory researchers. It provides the design team with the information needed to ask the right questions and then determine the best design, while complying with current regulations and best practices. Guidelines for Laboratory Design features concise, straightforward advice organized in an easy-to-use format that facilitates the design of safe, efficient laboratories. Divided into five sections, the book records some of the most important discoveries and achievements in: Part IA, Common Elements of Laboratory Design, sets forth technical specifications that apply to most laboratory buildings and modules Part IB, Common Elements of Renovations, offers general design principles for the renovation and modernization of existing labs Part II, Design Guidelines for a Number of Commonly Used Laboratories, explains specifications, best practices, and guidelines for nineteen types of laboratories, with three new chapters covering nanotechnology, engineering, and autopsy labs Part III, Laboratory Support Services, addresses design issues for imaging facilities, support shops, hazardous waste facilities, and laboratory storerooms Part IV, HVAC Systems, explains how to heat, cool, and ventilate labs with an eye towards energy conservation Part V, Administrative Procedures, deals with bidding procedures, final acceptance inspections, and sustainability The final part of the book features five appendices filled with commonly needed data and reference materials. This Fourth Edition is indispensable for all laboratory design teams, whether constructing a new laboratory or renovating an old facility to meet new objectives. Specifically intended for lab-based biomedical researchers, this practical guide shows how to design experiments that are reproducible, with low bias, high precision, and widely applicable results. With specific examples from research using both cell cultures and model organisms, it explores key ideas in experimental design, assesses common designs, and shows how to plan a successful experiment. It demonstrates how to control biological and technical factors that can introduce bias or add noise, and covers rarely discussed topics such as graphical data exploration, choosing outcome variables, data quality control checks, and data pre-processing. It also shows how to use R for analysis, and is designed for those with no prior experience. An accompanying website (<https://stanlazic.github.io/EDLB.html>) includes all R code, data sets, and the labstats R package. This is an ideal guide for anyone conducting lab-based biological research, from students to principle investigators working in either academia or industry. Terry Jo Gile (the Safety Lady) and Dan Scungio have completely updated this trusted lab safety training and compliance resource for 2014. The Complete Guide to Laboratory Safety, Fourth Edition, consolidates regulations from all relevant agencies, including OSHA, The Joint Commission, CAP, CLSI, DOT, and state health departments. This proven guide offers customizable policies, procedures, and checklists to develop and update a compliance program and avoid costly fines. The Complete Guide to Laboratory Safety will help you: - Create and update your policies and procedures with fully customizable templates - Build a culture of safety with checklists and tools related to topics including waste management, specimen transportation, chemical hygiene, and ergonomics in the lab setting - Keep up to date with regulations from OSHA, The Joint Commission, - CAP, CLSI, DOT, and state regulators - Employ best practices to avoid worker injury and costly citations What's New? - This edition is updated with all relevant regulations, including the new American National Standards Institute (ANSI) guidelines for fire safety and the revised International Air Transportation Association (IATA) requirements - New case studies are featured in each chapter - The book includes the Clinical and Laboratory Standards Institute (CLSI) recommendations for laboratory design, which Dan Scungio helped develop - This edition includes newly developed safe work practices - The book includes a new chapter on chemical management that incorporates OSHA's revised hazardous chemical labeling standard This comprehensive reference by a senior architect at the EPA covers guidelines for site selection, the design of complete facilities (including sustainable labs) and individual lab rooms, and strategic master planning for architects, engineers, and project managers as well as those who commission, operate, and manage laboratories at every level from schools to industry. Laboratory Design Guide 3rd edition is a complete guide to the complex process of laboratory design and construction. With practical advice and detailed examples, it is an indispensable reference for anyone involved in building or renovating laboratories. In this working manual Brian Griffin explains how to meet the unique combination of requirements that laboratory design entails. Considerations range from safety and site considerations to instrumentation and special furniture, and accommodate the latest laboratory practices and the constant evolution of science. Case studies from around the world illustrate universal principles of good design while showing a variety of approaches. Revised throughout for this new edition, the book contains a brand new chapter on the role of the computer, covering topics such as the virtual experiment, hot desking, virtual buildings and computer-generated space relationship diagrams. There are also 10 new international case studies, including the Kadoorie Biological Sciences Building at the University of Hong Kong. Expanded and updated, The CRC Handbook of Laboratory Safety, Fifth Edition provides information on planning and building a facility, developing an organization infrastructure, planning for emergencies and contingencies, choosing the correct equipment, developing operational plans, and meeting regulatory requirements. Still the essential reference tool, the New Edition helps you organize your safety efforts to adhere to the latest regulations and use the newest technology. Thoroughly revised, the CRC Handbook of Laboratory Safety, Fifth Edition includes new OSHA laboratory safety standards, the 1994 NRC radiation safety standards, guidelines for X-ray use in hospitals, enforcement of standards for dealing with blood-borne pathogens, OSHA actions covering hazardous waste operations and emergency response, and the latest CDC guidelines for research with microbial hazards. Every word on every page has been scrutinized, and literally hundreds of changes have been made to bring the material up to date. See what's new in the New Edition New figures and tables illustrating the new material Internet references in addition to journal articles Changes in the Clean Air Act regarding incineration of hospital, medical, and infectious waste Obsolete articles removed and replaced - over one hundred pages of new material New information on respiratory protection guidelines Guidelines for Laboratory Design: Health and Safety Considerations, Third Edition provides reliable design information related to specific health and safety issues that need to be considered when building or renovating laboratories.". Research institutions have or are planning to build, expand and renovate animal research facilities to keep up with the demands of biomedical research caused in part by growth in the use of genetically altered rodents and the upsurge of research in infectious diseases. Properly designed facilities greatly facilitate effective management and high-quality day-to-day animal care that is required to optimally support animal research and testing. There are multiple solutions to address the myriad of factors that influence the design and construction of animal research facilities. There is no "best design applicable for all facilities and arguably not even a single "best design for a given facility. For this reason, Planning and Designing Research Animal Facilities is not intended to be a "how to book. The goal is to cover the basic programmatic requirements of animal research facilities, provide ideas for meeting those requirements while, hopefully, stimulating the creative process in which designers in consultation with those who work in animal research facilities generate even better ideas. That is how progress has been made and will continue to be made. Facilitates communication between the parties involved in planning and designing animal facilities by providing contemporary information, and stimulating creativity that will help lead to wise decisions and advance the knowledge base for planning, design and constructing animal research facilities Learn how to use R to turn raw data into insight, knowledge, and understanding. This book introduces you to R, RStudio, and the tidyverse, a collection of R packages designed to work together to make data science fast, fluent, and fun. Suitable for readers with no previous programming experience, R for Data Science is designed to get you doing data science as quickly as possible. Authors Hadley Wickham and Garrett Grolmund guide you through the steps of importing, wrangling, exploring, and modeling your data and communicating the results. You'll get a complete, big-picture understanding of the data science cycle, along with basic tools you need to manage the details. Each section of the book is paired with exercises to help you practice what you've learned along the way. You'll learn how to: Wrangle—transform your datasets into a form convenient for analysis Program—learn powerful R tools for solving data problems with greater clarity and ease Explore—examine your data, generate hypotheses, and quickly test them Model—provide a low-dimensional summary that captures true "signals" in your dataset Communicate—learn R Markdown for integrating prose, code, and results The seminal reference on the care of laboratory and captive animals, The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals is a must-have for anyone working in this field. The UFAW Handbook has been the definitive text since 1947. Written for an international audience, it contains contributions from experts from around the world. The book focuses on best practice principles throughout, providing comprehensive coverage, with all chapters being peer reviewed by anonymous referees. As well as addressing the husbandry of laboratory animals, the content is also of great value to zoos and aquaria. Changes for the eighth edition: Revised and updated to reflect developments since publication of the previous edition. New chapters on areas of growing concern, including: the 3Rs: phenotyping; statistics and experimental design; welfare assessment; legislation; training of people caring for lab animals; and euthanasia. All material combined into one volume for ease of reference. This book is published on behalf of UFAW (The Universities Federation for Animal Welfare), with whom we also publish the UFAW/Wiley-Blackwell Animal Welfare Book Series. This major series of books provides an authoritative source of information on worldwide developments, current thinking and best practice in the field of animal welfare science and technology. For details of all of the titles in the series see <http://www.wiley.com/go/ufaw> www.wiley.com/go/ufaw/a. "Reference manual for planning, design, and operation of laboratory HVAC systems to reduce the laboratory's energy footprint while ensuring safety, providing good comfort and indoor air quality, and protecting the integrity of experiments; includes online access to electronic design tools that illustrate features of laboratories and provide practical design aids"-- Comprehensive and up-to-date, this book guides the reader through the complex stages of laboratory design and construction with practical advice and examples. With principles that are shaping today's most advanced technologies, from nanomedicine to electronic nanorobots, colloid and interface science has become a truly interdisciplinary field, integrating chemistry, physics, and biology. Colloid and Surface Chemistry: Exploration of the Nano World- Laboratory Guide explains the basic principles of colloid and interface science through experiments that emphasize the fundamentals. It bridges the gap between the underlying theory and practical applications of colloid and surface chemistry. Separated into five chapters, the book begins by addressing research methodology, how to design successful experiments, and ethics in science. It also provides practical information on data collection and analysis, keeping a laboratory notebook, and writing laboratory reports. With each section written by a distinguished researcher, chapter 2 reviews common techniques for the characterization and analysis of colloidal structures, including surface tension measurements, viscosity and rheological measurements, electrokinetic methods, scattering and diffraction techniques, and microscopy. Chapters 3–5 provide 19 experiments, each including the purpose of the experiment, background information, pre-laboratory questions, step-by-step procedures, and post-laboratory questions. Chapter 3 contains experiments about colloids and surfaces, such as sedimentation, exploration of wetting phenomena, foam stability, and preparation of miniemulsions. Chapter 4 covers various techniques for the preparation of nanoparticles, including silver, magnetic, and silica nanoparticles. Chapter 5 demonstrates daily-life applications of colloid science, describing the preparation of food colloids, body wash, and body cream. Laboratory Design Handbook describes the process, motivation, constraints, challenges, opportunities, and specific design data related to the creation of a modern research laboratory. The information presented is based on a large pool of experience in the development of new and renovated laboratory buildings for universities, teaching hospitals, ph This manual was developed from the Expert Group meeting. The recommendations are based on assessments of the risks associated with different technical procedures performed in different types of TB laboratories; the manual describes the basic requirements for facilities and practices, which can be adapted to follow local or national regulations or as the result of a risk assessment. Risk assessments require careful judgement: on the one hand, underestimating risks may lead to laboratory staff being exposed to biological hazards but, on the other hand, implementing more rigorous risk mitigation measures than are needed may result in an unnecessary burden on laboratory staff and higher costs to establish and maintain the laboratory's infrastructure. The Complete Guide to Laboratory Safety, Fifth Edition, consolidates regulations from all relevant agencies, including OSHA, The Joint Commission, CAP, CLSI, DOT, and state health departments. This book also offers customizable policies, procedures, and checklists to avoid costly fines and enhance your compliance program. The ASHRAE Laboratory Design Guide has been organized and developed to provide owners, designers, contractors, and operators with key information on the essential requirements for achieving high quality laboratory facilities. This design guide can be used for the design, troubleshooting, and operation of laboratory facilities or can be used as a comprehensive reference. The fastest way to straighten out the learning curve on specialized design projects "The series is welcome . . . By providing recent buildings as examples, supported with technical information and charts of design criteria, these books attempt to bridge the gap between theory and practice."-Oculus Building Type Basics books provide architects with the essentials they need to jump-start the design of a variety of specialized facilities. In each volume, leading national figures in the field address the key questions that shape the early phases of a project commission. The answers to these questions provide instant information in a convenient, easy-to-use format. The result is an excellent, hands-on reference that puts critical information at your fingertips. Building Type Basics for Research Laboratories provides the essential information needed to initiate designs for government, academic, and private research laboratories. Filled with project photographs, diagrams, floor plans, sections, and details, it combines in-depth coverage of the structural, mechanical, energy, cost, and safety issues that are unique to research laboratories with the nuts-and-bolts design guidelines that will start any project off on the right track and keep it there through completion. Laboratory facilities are complex, technically sophisticated, and mechanically intensive structures that are expensive to build and to maintain. Hundreds of decisions must be made before and during new construction or renovation that will determine how successfully the facility will function when completed and how successfully it can be maintained once put into service. This book provides guidance on effective approaches for building laboratory facilities in the chemical and biochemical sciences. It contains both basic and laboratory-specific information addressed to the user community—the scientists and administrators who contract with design and construction experts. The book will also be important to the design and construction communities—the architects, laboratory designers, and engineers who will design the facility and the construction personnel who will build it—to help them communicate with the scientific community for whom they build laboratory facilities. Accurate Results in the Clinical Laboratory: A Guide to Error Detection and Correction, Second Edition, provides a comprehensive review of the factors leading to errors in all areas of clinical laboratory testing. This trusted guide addresses interference issues in all laboratory tests, including patient epigenetics, processes of specimen collection, enzymes and biomarkers. Clinicians and laboratory scientists will both benefit from this reference that applies discussions to both accurate specimen analysis and optimal patient care. Hence, this is the perfect reference for clinical laboratorians, from trainees, to experienced pathologists and directors. Provides comprehensive coverage across endocrine, oncology, hematology, immunohistochemistry, immunology, serology, microbiology, and molecular testing Includes new case studies that highlight clinical relevance and errors to avoid Highlights the best titles published within a variety of medical specialties Reviewed by medical librarians and content

specialists, with key selections compiled in their annual list Unrivalled in its coverage and unique in its hands-on approach, this guide to the design and construction of scientific apparatus is essential reading for every scientist and student of engineering, and physical, chemical, and biological sciences. Covering the physical principles governing the operation of the mechanical, optical and electronic parts of an instrument, new sections on detectors, low-temperature measurements, high-pressure apparatus, and updated engineering specifications, as well as 400 figures and tables, have been added to this edition. Data on the properties of materials and components used by manufacturers are included. Mechanical, optical, and electronic construction techniques carried out in the lab, as well as those let out to specialized shops, are also described. Step-by-step instruction supported by many detailed figures, is given for laboratory skills such as soldering electrical components, glassblowing, brazing, and polishing. 'Laboratory Design Guide' takes the reader through the complex stages of laboratory design and construction, offering practical advice and detailed examples. Brian Griffin's working manual covers the latest designs for new and evolving laboratory practices and equipment and includes current and future requirements for laboratories such as automation. Case studies illustrate the points made and represent the international view of the principles of laboratory design. 'Laboratory Design Guide' will prove invaluable to all those responsible for the design of laboratory buildings: the client; architect; engineer; building project manager and scientist. Brian Griffin is a full-time laboratory design consultant. His 15 years' experience in this field have resulted in many published articles on the subject and numerous lectures to laboratory managers and scientists. This close contact with the industry has increased Brian Griffin's awareness of the trends in laboratory practice and the need for effective design of new facilities. Working design manual for all members of the lab design team Shows the design process from start to finish Incorporates the very latest designs for new and evolving laboratory practices and equipment Safety is a word that has many connotations, of risk of a possible accident that is acceptable conjuring up different meanings to different to one person- may not be acceptable to an people. What is safety? A scientist views safety other. This may be one reason why skydiving as a consideration in the design of an exper and mountain climbing are sports that are not inent. A manufacturing plant engineer looks as popular as are, say, boating or skiing. on safety as one of the necessary factors in But even activities that have high levels of developing a manufacturing process. A legis potential risk can be engaged in safely. How lator is likely to see safety as an important part can we minimize risks so that they decrease of an environmental law. A governmental ad to acceptable levels? We can do this by iden ministrator may consider various safety issues tifying sources of hazards and by assessing the when reviewing the environmental conse risks of accidents inherent to these hazards. quences of a proposed project. An attorney Most hazards that are faced in the laboratory may base a negligence suit on safety defects. 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. DESIGN and PLANNING of Research and Clinical LABORATORY FACILITIES In this primer/professional reference, Leonard Mayer demystifies one of the most complex architectural specialties. An architect with more than thirty-three years' experience as a master planner and programmer of laboratories and clinical facilities, Mr. Mayer offers a comprehensive overview of the fundamental issues related to laboratory planning and design. He also provides designers with a clear and rational framework through which to approach this highly challenging and rewarding design specialty. A superb learning tool for students and professionals just getting started in lab design and a valuable one-volume reference for the experienced professional, Design and Planning of Research and Clinical Laboratory Facilities features: * Step-by-step guidance through the complex maze of codes, specifications, standards, and official guidelines, relating to the planning, design, and construction processes * New and updated design criteria based on the most recent laws and regulations * Master plans, facility programs, functional programs and requirements programs for a wide variety of scientific and medical disciplines and support facilities * Comprehensive lists of relevant codes, regulations, standards, guidelines, and important architectural, structural, mechanical, electrical, and plumbing criteria Research and clinical laboratory facilities are, perhaps, the most complex structures to plan and design. Intimidated by a vast and seemingly impenetrable body of codes, regulations, and design criteria pertaining to lab design and construction, many architects, unfortunately, choose to avoid what can be one of the most profitable and professionally rewarding areas of specialization. Written by an architect with more than thirty-three years of experience as a master planner and programmer of laboratories and clinical facilities, this book demystifies the process of laboratory planning and design. It provides a comprehensive overview of the fundamental issues related to laboratory design and offers readers detailed, step-by-step guidance through the complex maze of design specifications and codes, standards, and official guidelines that must be addressed during the programming, planning, design, and construction process. Focusing mainly on laboratory programming, planning, and design criteria for "wet" laboratory environments, Leonard Mayer provides examples from numerous master plans, facility programs, functional programs and requirements programs applicable to a wide variety of scientific and medical disciplines, and related facilities. Related functions and activities include administrative offices, computer centers, core service and support, building services facilities, and more. He presents new and updated design criteria based on recent laws and regulations and supplies readers with comprehensive lists of relevant codes, regulations, standards, guidelines, and architectural, structural, mechanical, electrical, and plumbing criteria. Design and Planning of Research and Clinical Laboratory Facilities is an excellent primer for architecture students and newcomers to the field, as well as an indispensable single-volume reference for experienced professionals. It is also an invaluable resource for researchers and investigators, facility planners and managers, plant engineers, and all others involved with the design, construction, maintenance, and administration of laboratory facilities. The legislative requirement for cannabis to undergo laboratory testing has followed legalization of medical and recreational use in every U.S. state to date. Cannabis safety testing is a new investment opportunity within the emerging cannabis market that is separate from cultivation, processing, and distribution, allowing individuals and organizations who may have been reluctant to enter previously a new entry route to the cannabis space. However, many of the costs, timelines, operational requirements, and compliance issues are overlooked by people who have not been exposed to regulated laboratory testing. Cannabis Laboratory Fundamentals provides an in-depth review of the key issues that impact cannabis testing laboratories and provides recommendations and solutions to avoid common – but expensive – mistakes. The text goes beyond methodology to include sections on economics, regulation, and operational challenges, making it useful for both new and experienced cannabis laboratory operators, as well as all those who want to understand the opportunities and risks of this industry. Prudent Practices in the Laboratory—the book that has served for decades as the standard for chemical laboratory safety practice—now features updates and new topics. This revised edition has an expanded chapter on chemical management and delves into new areas, such as nanotechnology, laboratory security, and emergency planning. Developed by experts from academia and industry, with specialties in such areas as chemical sciences, pollution prevention, and laboratory safety, Prudent Practices in the Laboratory provides guidance on planning procedures for the handling, storage, and disposal of chemicals. The book offers prudent practices designed to promote safety and includes practical information on assessing hazards, managing chemicals, disposing of wastes, and more. Prudent Practices in the Laboratory will continue to serve as the leading source of chemical safety guidelines for people working with laboratory chemicals: research chemists, technicians, safety officers, educators, and students.

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