

MECHANICAL ENGINEERING UMASS AMHERST

MECHANICAL ENGINEERING UMASS AMHERST IS A DISTINGUISHED PROGRAM KNOWN FOR ITS RIGOROUS CURRICULUM, CUTTING-EDGE RESEARCH OPPORTUNITIES, AND STRONG INDUSTRY CONNECTIONS. AS PART OF THE UNIVERSITY OF MASSACHUSETTS AMHERST, THE MECHANICAL ENGINEERING DEPARTMENT OFFERS STUDENTS A COMPREHENSIVE EDUCATION THAT PREPARES THEM FOR DIVERSE CAREERS IN ENGINEERING, TECHNOLOGY, AND INNOVATION. THE PROGRAM EMPHASIZES A BLEND OF THEORETICAL KNOWLEDGE AND HANDS-ON EXPERIENCE, ENSURING GRADUATES ARE WELL-EQUIPPED TO TACKLE REAL-WORLD ENGINEERING CHALLENGES. THIS ARTICLE WILL EXPLORE VARIOUS FACETS OF MECHANICAL ENGINEERING AT UMASS AMHERST, INCLUDING ACADEMIC PROGRAMS, RESEARCH INITIATIVES, FACULTY EXPERTISE, STATE-OF-THE-ART FACILITIES, AND CAREER PROSPECTS. WHETHER PROSPECTIVE STUDENTS, INDUSTRY PROFESSIONALS, OR ACADEMIC COLLABORATORS ARE SEEKING INFORMATION, THIS OVERVIEW PROVIDES ESSENTIAL INSIGHTS INTO WHAT MAKES MECHANICAL ENGINEERING AT UMASS AMHERST A LEADING CHOICE IN ENGINEERING EDUCATION.

- ACADEMIC PROGRAMS IN MECHANICAL ENGINEERING AT UMASS AMHERST
- RESEARCH AND INNOVATION IN MECHANICAL ENGINEERING
- FACULTY AND EXPERTISE
- FACILITIES AND RESOURCES
- CAREER OPPORTUNITIES AND INDUSTRY CONNECTIONS

ACADEMIC PROGRAMS IN MECHANICAL ENGINEERING AT UMASS AMHERST

THE MECHANICAL ENGINEERING PROGRAM AT UMASS AMHERST OFFERS A BROAD SPECTRUM OF ACADEMIC OPTIONS DESIGNED TO MEET THE NEEDS OF UNDERGRADUATE AND GRADUATE STUDENTS. THESE PROGRAMS FOCUS ON CORE ENGINEERING PRINCIPLES, ADVANCED TECHNOLOGIES, AND INTERDISCIPLINARY APPROACHES TO MECHANICAL SYSTEMS. THE CURRICULUM IS CONTINUOUSLY UPDATED TO REFLECT THE LATEST DEVELOPMENTS IN ENGINEERING SCIENCE AND PRACTICE.

UNDERGRADUATE DEGREE PROGRAMS

THE BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING PROVIDES A SOLID FOUNDATION IN MATHEMATICS, PHYSICS, AND ENGINEERING FUNDAMENTALS. STUDENTS ENGAGE IN COURSEWORK SUCH AS THERMODYNAMICS, FLUID MECHANICS, MATERIALS SCIENCE, AND MECHANICAL DESIGN. THE PROGRAM ALSO INCORPORATES LABORATORY WORK AND DESIGN PROJECTS TO ENHANCE PRACTICAL SKILLS.

GRADUATE DEGREE PROGRAMS

GRADUATE STUDIES INCLUDE MASTER OF SCIENCE (MS) AND DOCTOR OF PHILOSOPHY (PHD) DEGREES WITH VARIOUS SPECIALIZATIONS. GRADUATE STUDENTS FOCUS ON ADVANCED TOPICS LIKE ROBOTICS, ENERGY SYSTEMS, BIOMECHANICS, AND MANUFACTURING PROCESSES. RESEARCH IS AN INTEGRAL PART OF GRADUATE EDUCATION, WITH OPPORTUNITIES TO WORK ALONGSIDE FACULTY ON INNOVATIVE PROJECTS.

INTERDISCIPLINARY AND DUAL DEGREE OPTIONS

UMASS AMHERST ENCOURAGES INTERDISCIPLINARY LEARNING, ALLOWING MECHANICAL ENGINEERING STUDENTS TO COLLABORATE WITH OTHER DEPARTMENTS SUCH AS ELECTRICAL ENGINEERING, COMPUTER SCIENCE, AND MATERIALS SCIENCE. DUAL DEGREE PROGRAMS AND CERTIFICATES ENHANCE STUDENT EXPERTISE IN EMERGING FIELDS LIKE SUSTAINABLE ENERGY AND AUTOMATION.

RESEARCH AND INNOVATION IN MECHANICAL ENGINEERING

RESEARCH IS A CORNERSTONE OF MECHANICAL ENGINEERING AT UMASS AMHERST, DRIVING INNOVATION AND TECHNOLOGICAL ADVANCEMENT. THE DEPARTMENT SUPPORTS A WIDE RANGE OF RESEARCH AREAS THAT ADDRESS BOTH FUNDAMENTAL SCIENCE AND PRACTICAL ENGINEERING CHALLENGES. FACULTY AND STUDENTS ENGAGE IN PROJECTS FUNDED BY GOVERNMENT AGENCIES, INDUSTRY PARTNERS, AND INTERNAL GRANTS.

KEY RESEARCH AREAS

MAJOR RESEARCH DOMAINS INCLUDE:

- ROBOTICS AND AUTONOMOUS SYSTEMS
- ADVANCED MANUFACTURING AND MATERIALS
- ENERGY CONVERSION AND SUSTAINABILITY
- BIOMECHANICS AND BIOMEDICAL ENGINEERING
- FLUID DYNAMICS AND THERMAL SCIENCES

CENTERS AND LABORATORIES

THE DEPARTMENT HOSTS SPECIALIZED CENTERS THAT FOSTER COLLABORATION AND INNOVATION, SUCH AS THE MANUFACTURING ENGINEERING LABORATORY AND THE CENTER FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY. THESE FACILITIES PROVIDE THE INFRASTRUCTURE FOR CUTTING-EDGE EXPERIMENTS AND PROTOTYPE DEVELOPMENT.

STUDENT RESEARCH OPPORTUNITIES

UNDERGRADUATE AND GRADUATE STUDENTS ARE ENCOURAGED TO PARTICIPATE IN RESEARCH PROJECTS, OFTEN LEADING TO PUBLICATIONS, CONFERENCE PRESENTATIONS, AND PATENT APPLICATIONS. THIS HANDS-ON RESEARCH EXPERIENCE IS CRITICAL FOR CAREER DEVELOPMENT AND GRADUATE STUDIES.

FACULTY AND EXPERTISE

UMASS AMHERST'S MECHANICAL ENGINEERING FACULTY COMPRISES EXPERIENCED EDUCATORS AND RESEARCHERS WITH DIVERSE

EXPERTISE. THE FACULTY'S DEDICATION TO TEACHING AND RESEARCH EXCELLENCE ENHANCES THE ACADEMIC ENVIRONMENT AND SUPPORTS STUDENT SUCCESS.

FACULTY RESEARCH INTERESTS

FACULTY MEMBERS SPECIALIZE IN AREAS SUCH AS COMPUTATIONAL MECHANICS, NANOSCALE MATERIALS, CONTROL SYSTEMS, AND FLUID-STRUCTURE INTERACTIONS. THEIR WORK CONTRIBUTES TO SCIENTIFIC KNOWLEDGE AND INDUSTRIAL APPLICATIONS WORLDWIDE.

TEACHING EXCELLENCE AND MENTORSHIP

FACULTY MEMBERS ARE COMMITTED TO HIGH-QUALITY INSTRUCTION, INTEGRATING MODERN PEDAGOGICAL TECHNIQUES AND TECHNOLOGY INTO THE CLASSROOM. THEY ALSO PROVIDE MENTORSHIP THROUGH ADVISING, RESEARCH SUPERVISION, AND CAREER GUIDANCE.

COLLABORATIONS AND PARTNERSHIPS

THE DEPARTMENT MAINTAINS COLLABORATIONS WITH NATIONAL LABORATORIES, INDUSTRY LEADERS, AND ACADEMIC INSTITUTIONS, ENHANCING RESEARCH CAPABILITIES AND EDUCATIONAL OPPORTUNITIES FOR STUDENTS AND FACULTY ALIKE.

FACILITIES AND RESOURCES

MECHANICAL ENGINEERING STUDENTS AND RESEARCHERS AT UMASS AMHERST BENEFIT FROM STATE-OF-THE-ART FACILITIES DESIGNED TO SUPPORT EDUCATION, EXPERIMENTATION, AND INNOVATION. THESE RESOURCES ARE CRITICAL FOR HANDS-ON LEARNING AND ADVANCED RESEARCH ENDEAVORS.

LABORATORIES AND EQUIPMENT

THE DEPARTMENT FEATURES SPECIALIZED LABS EQUIPPED WITH THE LATEST TECHNOLOGY, INCLUDING:

- COMPUTER-AIDED DESIGN (CAD) AND MANUFACTURING TOOLS
- MATERIALS TESTING AND CHARACTERIZATION EQUIPMENT
- ROBOTICS AND AUTOMATION SYSTEMS
- THERMAL AND FLUID DYNAMICS TESTING FACILITIES
- 3D PRINTING AND RAPID PROTOTYPING MACHINES

COMPUTING AND SIMULATION RESOURCES

HIGH-PERFORMANCE COMPUTING CLUSTERS AND ADVANCED SIMULATION SOFTWARE ENABLE COMPLEX MODELING AND ANALYSIS IN AREAS SUCH AS FLUID DYNAMICS, STRUCTURAL MECHANICS, AND THERMAL SYSTEMS.

LIBRARY AND LEARNING SUPPORT

STUDENTS HAVE ACCESS TO EXTENSIVE DIGITAL AND PHYSICAL RESOURCES, INCLUDING SCIENTIFIC JOURNALS, ENGINEERING DATABASES, AND COLLABORATIVE STUDY SPACES, SUPPORTING ACADEMIC ACHIEVEMENT AND RESEARCH DEVELOPMENT.

CAREER OPPORTUNITIES AND INDUSTRY CONNECTIONS

THE MECHANICAL ENGINEERING PROGRAM AT UMASS AMHERST EMPHASIZES CAREER READINESS THROUGH PROFESSIONAL DEVELOPMENT, INTERNSHIPS, AND STRONG TIES WITH INDUSTRY. GRADUATES ARE WELL-POSITIONED FOR EMPLOYMENT IN A VARIETY OF SECTORS.

INTERNSHIPS AND CO-OP PROGRAMS

STUDENTS GAIN PRACTICAL EXPERIENCE THROUGH INTERNSHIPS AND COOPERATIVE EDUCATION PLACEMENTS WITH LEADING COMPANIES IN AEROSPACE, AUTOMOTIVE, ENERGY, MANUFACTURING, AND TECHNOLOGY SECTORS. THESE OPPORTUNITIES ENHANCE SKILLS AND PROFESSIONAL NETWORKS.

CAREER SERVICES AND ALUMNI NETWORK

THE UNIVERSITY PROVIDES CAREER COUNSELING, JOB FAIRS, AND RESUME WORKSHOPS TAILORED FOR ENGINEERING STUDENTS. A ROBUST ALUMNI NETWORK SUPPORTS MENTORING AND JOB PLACEMENT, CONNECTING GRADUATES WITH INDUSTRY LEADERS WORLDWIDE.

EMPLOYMENT SECTORS AND ROLES

GRADUATES OF MECHANICAL ENGINEERING UMASS AMHERST FIND ROLES IN:

- DESIGN AND DEVELOPMENT ENGINEERING
- RESEARCH AND DEVELOPMENT
- MANUFACTURING AND PRODUCTION
- ENERGY SYSTEMS ENGINEERING
- ROBOTICS AND AUTOMATION
- CONSULTING AND PROJECT MANAGEMENT

FREQUENTLY ASKED QUESTIONS

WHAT UNDERGRADUATE PROGRAMS ARE OFFERED BY THE MECHANICAL ENGINEERING DEPARTMENT AT UMASS AMHERST?

UMASS AMHERST OFFERS A BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING, PROVIDING A STRONG FOUNDATION IN MECHANICS, MATERIALS, THERMODYNAMICS, AND DESIGN.

DOES UMASS AMHERST MECHANICAL ENGINEERING HAVE GRADUATE RESEARCH OPPORTUNITIES?

YES, THE MECHANICAL ENGINEERING DEPARTMENT AT UMASS AMHERST OFFERS GRADUATE RESEARCH OPPORTUNITIES IN AREAS SUCH AS ROBOTICS, ENERGY SYSTEMS, BIOMECHANICS, AND ADVANCED MANUFACTURING.

WHAT FACILITIES AND LABS ARE AVAILABLE FOR MECHANICAL ENGINEERING STUDENTS AT UMASS AMHERST?

UMASS AMHERST PROVIDES STATE-OF-THE-ART FACILITIES INCLUDING ADVANCED MANUFACTURING LABS, ROBOTICS LABS, MATERIALS TESTING LABS, AND COMPUTATIONAL SIMULATION CENTERS FOR MECHANICAL ENGINEERING STUDENTS.

ARE THERE INTERNSHIP OPPORTUNITIES FOR MECHANICAL ENGINEERING STUDENTS AT UMASS AMHERST?

YES, UMASS AMHERST HAS STRONG INDUSTRY CONNECTIONS AND OFFERS VARIOUS INTERNSHIP PROGRAMS TO HELP MECHANICAL ENGINEERING STUDENTS GAIN PRACTICAL EXPERIENCE.

WHAT ARE THE CAREER PROSPECTS FOR MECHANICAL ENGINEERING GRADUATES FROM UMASS AMHERST?

GRADUATES FROM UMASS AMHERST MECHANICAL ENGINEERING PROGRAM HAVE EXCELLENT CAREER PROSPECTS IN INDUSTRIES SUCH AS AEROSPACE, AUTOMOTIVE, ENERGY, ROBOTICS, AND MANUFACTURING.

DOES UMASS AMHERST MECHANICAL ENGINEERING OFFER ONLINE COURSES OR DEGREES?

UMASS AMHERST OFFERS SOME ONLINE COURSES AND PROFESSIONAL DEVELOPMENT PROGRAMS, BUT THE CORE MECHANICAL ENGINEERING DEGREES ARE PRIMARILY ON-CAMPUS.

HOW DOES UMASS AMHERST SUPPORT DIVERSITY AND INCLUSION IN ITS MECHANICAL ENGINEERING DEPARTMENT?

THE DEPARTMENT ACTIVELY PROMOTES DIVERSITY AND INCLUSION THROUGH OUTREACH PROGRAMS, SCHOLARSHIPS, MENTORING, AND STUDENT ORGANIZATIONS FOCUSED ON UNDERREPRESENTED GROUPS IN ENGINEERING.

WHAT STUDENT ORGANIZATIONS RELATED TO MECHANICAL ENGINEERING ARE AVAILABLE AT UMASS AMHERST?

STUDENTS CAN JOIN ORGANIZATIONS LIKE THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) STUDENT CHAPTER, ROBOTICS CLUB, AND SOCIETY OF WOMEN ENGINEERS (SWE) AT UMASS AMHERST.

WHAT IS THE APPLICATION PROCESS FOR THE MECHANICAL ENGINEERING GRADUATE PROGRAM AT UMASS AMHERST?

APPLICANTS MUST SUBMIT TRANSCRIPTS, GRE SCORES (IF REQUIRED), LETTERS OF RECOMMENDATION, A STATEMENT OF PURPOSE, AND MEET THE MINIMUM ACADEMIC REQUIREMENTS SPECIFIED BY THE UMASS AMHERST GRADUATE ADMISSIONS.

ADDITIONAL RESOURCES

1. *MECHANICAL ENGINEERING PRINCIPLES AT UMASS AMHERST*

THIS BOOK OFFERS A COMPREHENSIVE OVERVIEW OF FUNDAMENTAL MECHANICAL ENGINEERING CONCEPTS AS TAUGHT AT UMASS AMHERST. IT COVERS TOPICS SUCH AS STATICS, DYNAMICS, THERMODYNAMICS, AND MATERIALS SCIENCE, BLENDING THEORETICAL PRINCIPLES WITH PRACTICAL APPLICATIONS. THE TEXT IS TAILORED TO SUPPORT UNDERGRADUATE STUDENTS IN BUILDING A SOLID FOUNDATION IN MECHANICAL ENGINEERING.

2. *ADVANCED THERMODYNAMICS AND HEAT TRANSFER*

FOCUSING ON ADVANCED TOPICS IN THERMODYNAMICS AND HEAT TRANSFER, THIS BOOK ALIGNS WITH THE CURRICULUM OF UMASS AMHERST'S MECHANICAL ENGINEERING PROGRAM. IT EXPLORES ENERGY SYSTEMS, ENTROPY, AND THERMODYNAMIC CYCLES, ALONGSIDE CONDUCTION, CONVECTION, AND RADIATION HEAT TRANSFER MECHANISMS. THE BOOK INCLUDES REAL-WORLD CASE STUDIES AND PROBLEM SETS TO DEEPEN UNDERSTANDING.

3. *MECHANICAL DESIGN AND MANUFACTURING PROCESSES*

THIS TITLE DELVES INTO THE PRINCIPLES OF MECHANICAL DESIGN, MATERIALS SELECTION, AND MANUFACTURING PROCESSES RELEVANT TO UMASS AMHERST STUDENTS. IT EMPHASIZES CAD MODELING, MACHINING, CASTING, AND ADDITIVE MANUFACTURING TECHNIQUES, OFFERING INSIGHTS INTO MODERN PRODUCTION METHODS. THE BOOK SERVES AS A PRACTICAL GUIDE FOR DESIGN PROJECTS AND LABORATORY WORK.

4. *DYNAMICS AND CONTROL SYSTEMS IN MECHANICAL ENGINEERING*

COVERING THE ESSENTIAL ASPECTS OF DYNAMICS AND CONTROL THEORY, THIS BOOK SUPPORTS COURSEWORK AT UMASS AMHERST. IT DISCUSSES THE BEHAVIOR OF MECHANICAL SYSTEMS UNDER VARIOUS FORCES AND HOW TO MODEL, ANALYZE, AND CONTROL THEM USING FEEDBACK MECHANISMS. THE TEXT INCLUDES EXAMPLES FROM ROBOTICS, AUTOMOTIVE SYSTEMS, AND AEROSPACE APPLICATIONS.

5. *MATERIALS SCIENCE FOR MECHANICAL ENGINEERS*

THIS BOOK PROVIDES A DETAILED EXAMINATION OF MATERIALS USED IN MECHANICAL ENGINEERING, FOCUSING ON PROPERTIES, TESTING, AND FAILURE ANALYSIS. IT IS DESIGNED TO COMPLEMENT UMASS AMHERST'S MECHANICAL ENGINEERING SYLLABUS BY LINKING MATERIAL CHARACTERISTICS TO DESIGN REQUIREMENTS. TOPICS INCLUDE METALS, POLYMERS, CERAMICS, AND COMPOSITE MATERIALS.

6. *FLUID MECHANICS AND APPLICATIONS*

A CORE RESOURCE FOR UNDERSTANDING FLUID BEHAVIOR, THIS BOOK IS TAILORED TO THE FLUID MECHANICS COURSES AT UMASS AMHERST. IT COVERS FUNDAMENTAL PRINCIPLES SUCH AS FLUID STATICS, DYNAMICS, AND FLOW IN PIPES AND CHANNELS, WITH APPLICATIONS IN HVAC, HYDRAULICS, AND AERODYNAMICS. PRACTICAL PROBLEMS AND LABORATORY EXPERIMENTS ARE INTEGRATED TO ENHANCE LEARNING.

7. *ENERGY SYSTEMS ENGINEERING*

FOCUSED ON THE DESIGN AND ANALYSIS OF ENERGY SYSTEMS, THIS BOOK ALIGNS WITH THE SUSTAINABLE ENGINEERING INITIATIVES AT UMASS AMHERST. IT ADDRESSES FOSSIL FUELS, RENEWABLE ENERGY SOURCES, ENERGY CONVERSION, AND EFFICIENCY OPTIMIZATION. THE TEXT ENCOURAGES CRITICAL THINKING ABOUT ENERGY CHALLENGES AND INNOVATIVE SOLUTIONS IN MECHANICAL ENGINEERING.

8. *ROBOTICS AND MECHATRONICS: CONCEPTS AND APPLICATIONS*

THIS BOOK INTRODUCES ROBOTICS AND MECHATRONICS ENGINEERING PRINCIPLES AS TAUGHT WITHIN UMASS AMHERST'S MECHANICAL ENGINEERING DEPARTMENT. IT EXPLORES SENSORS, ACTUATORS, EMBEDDED SYSTEMS, AND CONTROL ALGORITHMS, EMPHASIZING THEIR INTEGRATION IN ROBOTIC SYSTEMS. THE CONTENT IS SUPPORTED BY PROJECT-BASED LEARNING AND LABORATORY EXERCISES.

9. *COMPUTATIONAL METHODS IN MECHANICAL ENGINEERING*

DESIGNED TO ENHANCE COMPUTATIONAL SKILLS, THIS BOOK FOCUSES ON NUMERICAL METHODS, FINITE ELEMENT ANALYSIS, AND COMPUTER-AIDED ENGINEERING TECHNIQUES RELEVANT TO UMASS AMHERST STUDENTS. IT PROVIDES PRACTICAL GUIDANCE ON SIMULATIONS, MODELING, AND PROBLEM-SOLVING USING SOFTWARE TOOLS. THE BOOK BRIDGES THEORY AND APPLICATION FOR MODERN MECHANICAL ENGINEERING CHALLENGES.

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mechanical engineering umass amherst: Infusing Real World Experiences into Engineering Education AMD NextGen Engineer, National Academy of Engineering, 2012-11-15
The aim of this report is to encourage enhanced richness and relevance of the undergraduate engineering education experience, and thus produce better-prepared and more globally competitive graduates, by providing practical guidance for incorporating real world experience in US engineering programs. The report, a collaborative effort of the National Academy of Engineering (NAE) and Advanced Micro Devices, Inc. (AMD), builds on two NAE reports on The Engineer of 2020 that cited the importance of grounding engineering education in real world experience. This project also aligns with other NAE efforts in engineering education, such as the Grand Challenges of Engineering, Changing the Conversation, and Frontiers of Engineering Education. This publication presents 29 programs that have successfully infused real world experiences into engineering or engineering technology undergraduate education. The Real World Engineering Education committee acknowledges the vision of AMD in supporting this project, which provides useful exemplars for institutions of higher education who seek model programs for infusing real world experiences in their programs. The NAE selection committee was impressed by the number of institutions committed to grounding their programs in real world experience and by the quality, creativity, and diversity of approaches reflected in the submissions. A call for nominations sent to engineering and engineering technology deans, chairs, and faculty yielded 95 high-quality submissions. Two conditions were required of the nominations: (1) an accredited 4-year undergraduate engineering or engineering technology program was the lead institutions, and (2) the nominated program started operation no later than the fall 2010 semester. Within these broad parameters, nominations ranged from those based on innovations within a single course to enhancements across an entire curriculum or institution. Infusing Real World Experiences into Engineering Education is intended to provide sufficient information to enable engineering and engineering technology faculty and administrators to assess and adapt effective, innovative models of programs to their own institution's objectives. Recognizing that change is rarely trivial, the project included a brief survey of selected engineering deans concern in the adoption of such programs.

mechanical engineering umass amherst: Wind Energy Explained James F. Manwell, Emmanuel Branlard, Jon G. McGowan, Bonnie Ram, 2024-04-30 Authoritative and bestselling textbook detailing the many aspects of using wind as an energy source Wind Energy Explained provides complete and comprehensive coverage on the topic of wind energy, starting with general concepts like the history of and rationale for wind energy and continuing into specific technological components and applications along with the new recent developments in the field. Divided into 16 chapters, this edition includes up-to-date data, diagrams, and illustrations, boasting an impressive 35% new material including new sections on metocean design conditions, wind turbine design, wind

power plants and the electrical system, fixed and floating offshore wind turbines, project development, permitting and environmental risks and benefits, turbine installation, operation and maintenance, and high penetration wind energy systems and power-to-X. Wind Energy Explained also includes information on: Modern wind turbines, covering the design and their many components such as the rotor, drive train, and generator Aerodynamics of wind energy, covering one-dimensional momentum theory, the Betz limit, and ideal horizontal axis wind turbine with wake rotation Environmental external design conditions, such as wind, waves, currents, tides, salinity, floating ice, and many more Commonly used materials and components, such as steel, composites, copper, and concrete, plus machinery elements, such as shafts, couplings, bearings, and gears Modern design methods, including probabilistic design Environmental effects and mitigation strategies for wind project siting and the role of public engagement in the development process This book offers a complete examination of one of the most promising sources of renewable energy and is a great introduction to this cross-disciplinary field for practicing engineers. It may also be used as a textbook resource for university level courses in wind energy, both introductory and advanced.

mechanical engineering umass amherst: Engineering Societies and Undergraduate Engineering Education National Academy of Engineering, 2017-12-12 Engineering professional societies in the United States are engaged in a wide range of activities involving undergraduate education. However, these activities generally are not coordinated and have not been assessed in such a way that information about their procedures and outcomes can be shared. Nor have they been assessed to determine whether they are optimally configured to mesh with corresponding initiatives undertaken by industry and academia. Engineering societies work largely independently on undergraduate education, leaving open the question of how much more effective their efforts could be if they worked more collaboratively—each other as well as with academia and industry. To explore the potential for enhancing societies' role at the undergraduate level, the National Academy of Engineering held a workshop on the engagement of engineering societies in undergraduate engineering education. This publication summarizes the presentations and discussions from the workshop.

mechanical engineering umass amherst: Non-halogenated Flame-Retardant Technology for Epoxy Thermosets and Composites Yuan Hu, Xin Wang, 2024-07-19 Non-halogenated Flame-Retardant Technology for Epoxy Resins, Thermosets and Composites provides a comprehensive and up-to-date review of the latest advances and technological developments in this field. The chapters cover important flame-retardant systems based on phosphorus, nitrogen, silicon, and boron as well as novel flame retardant epoxy nanocomposites such as graphene, graphitic carbon nitride, MoS₂, phosphorene, CNTs, LDHs, and POSS. The use of flame retardant epoxy thermosets and composites in varying applications are also covered, for example, in coatings and paints, in electric and electronic applications and in aviation and automotive sectors. This comprehensive book will be an essential reference resource for academic and industrial researchers, as well as materials scientists and polymer engineers, and for those who are working in the development of flame retardant epoxy-based materials. - Covers basic properties, flame retardant mechanisms, emerging nanomaterials, and industrial applications - Provides the latest information on biobased flame retardants - Discusses hybridization technologies between different morphologies

mechanical engineering umass amherst: Flame Retardant and Thermally Insulating Polymers Yanfei Xu, 2021-09-08 Polymers have infiltrated almost every aspect of modern technology, as they have wide applications ranging from building insulation and firefighter uniforms to the Boeing 787 Dreamliner aircraft and electronics packaging. However, common polymers are flammable. Inflammability and thermal insulation properties in polymers are important for specific applications. This book discusses recent advances in developing eco-friendly, flame-retardant, and thermally insulative polymer-based materials. It not only focuses on developments of high-performance flame retardants, but also examines flame retardant behaviors in polymers. Eco-friendly polymers with superior flame retardancy, extraordinary thermal insulation, and excellent mechanical strength will provide new opportunities for existing and future applications.

mechanical engineering umass amherst: Fabricate Achim Menges, Bob Sheil, Ruairi Glynn, Marilena Skavara, 2017-04-03 Bringing together pioneers in design and making within architecture, construction, engineering, manufacturing, materials technology and computation, Fabricate is a triennial international conference, now in its third year (ICD, University of Stuttgart, April 2017). The 2017 edition features 32 illustrated articles on built projects and works in progress from academia and practice, including contributions from leading practices such as Foster + Partners, Zaha Hadid Architects, Arup, and Ron Arad, and from world-renowned institutions including ICD Stuttgart, Harvard, Yale, MIT, Princeton University, The Bartlett School of Architecture (UCL) and the Architectural Association. Each year it produces a supporting publication, to date the only one of its kind specialising in Digital Fabrication.

mechanical engineering umass amherst: Undisciplining Knowledge Harvey J. Graff, 2015-08 Scholars across the disciplines, specialists in higher education, administrators, and interested readers will find the book's multiple perspectives and practical advice on building and operating--and avoiding fallacies and errors--in interdisciplinary research and education invaluable.--Michael Bevis, The Ohio State University, School of Earth Sciences The Quarterly Review of Biology

mechanical engineering umass amherst: 21st International Symposium on Automotive Technology & Automation , 1989

mechanical engineering umass amherst: Handbook of Human Factors for Automated, Connected, and Intelligent Vehicles Donald L. Fisher, William J. Horrey, John D. Lee, Michael A. Regan, 2020-05-31 Handbook of Human Factors for Automated, Connected, and Intelligent Vehicles Subject Guide: Ergonomics & Human Factors Automobile crashes are the seventh leading cause of death worldwide, resulting in over 1.25 million deaths yearly. Automated, connected, and intelligent vehicles have the potential to reduce crashes significantly, while also reducing congestion, carbon emissions, and increasing accessibility. However, the transition could take decades. This new handbook serves a diverse community of stakeholders, including human factors researchers, transportation engineers, regulatory agencies, automobile manufacturers, fleet operators, driving instructors, vulnerable road users, and special populations. It provides information about the human driver, other road users, and human-automation interaction in a single, integrated compendium in order to ensure that automated, connected, and intelligent vehicles reach their full potential. Features Addresses four major transportation challenges—crashes, congestion, carbon emissions, and accessibility—from a human factors perspective Discusses the role of the human operator relevant to the design, regulation, and evaluation of automated, connected, and intelligent vehicles Offers a broad treatment of the critical issues and technological advances for the designing of transportation systems with the driver in mind Presents an understanding of the human factors issues that are central to the public acceptance of these automated, connected, and intelligent vehicles Leverages lessons from other domains in understanding human interactions with automation Sets the stage for future research by defining the space of unexplored questions

mechanical engineering umass amherst: Graduate Programs in Engineering & Applied Sciences 2011 (Grad 5) Peterson's, 2011-05-01 Peterson's Graduate Programs in Engineering & Applied Sciences contains a wealth of information on colleges and universities that offer graduate degrees in the fields of Aerospace/Aeronautical Engineering; Agricultural Engineering & Bioengineering; Architectural Engineering, Biomedical Engineering & Biotechnology; Chemical Engineering; Civil & Environmental Engineering; Computer Science & Information Technology; Electrical & Computer Engineering; Energy & Power engineering; Engineering Design; Engineering Physics; Geological, Mineral/Mining, and Petroleum Engineering; Industrial Engineering; Management of Engineering & Technology; Materials Sciences & Engineering; Mechanical Engineering & Mechanics; Ocean Engineering; Paper & Textile Engineering; and Telecommunications. Up-to-date data, collected through Peterson's Annual Survey of Graduate and Professional Institutions, provides valuable information on degree offerings, professional accreditation, jointly offered degrees, part-time and evening/weekend programs, postbaccalaureate

distance degrees, faculty, students, degree requirements, entrance requirements, expenses, financial support, faculty research, and unit head and application contact information. As an added bonus, readers will find a helpful See Close-Up link to in-depth program descriptions written by some of these institutions. These Close-Ups offer detailed information about the specific program or department, faculty members and their research, and links to the program Web site. In addition, there are valuable articles on financial assistance and support at the graduate level and the graduate admissions process, with special advice for international and minority students. Another article discusses important facts about accreditation and provides a current list of accrediting agencies.

mechanical engineering umass amherst: Materials Processing Fundamentals 2017 Antoine Allanore, Guillaume Lambotte, Jonghyun Lee, 2017-02-05 Covering the physical and numerical modeling of materials processing, this book includes contributions across the range of metals and minerals. This collection offers a unique opportunity to present models and results for key processes involved in extraction, joining, separation, and casting of materials. The corresponding fundamentals of mass and heat transport as well as physical and thermodynamics properties are addressed, allowing for a cross-disciplinary vision of the field.

mechanical engineering umass amherst: Handbook of Optimization in Telecommunications Mauricio G.C. Resende, Panos M. Pardalos, 2008-12-10 This comprehensive handbook brings together experts who use optimization to solve problems that arise in telecommunications. It is the first book to cover in detail the field of optimization in telecommunications. Recent optimization developments that are frequently applied to telecommunications are covered. The spectrum of topics covered includes planning and design of telecommunication networks, routing, network protection, grooming, restoration, wireless communications, network location and assignment problems, Internet protocol, World Wide Web, and stochastic issues in telecommunications. The book's objective is to provide a reference tool for the increasing number of scientists and engineers in telecommunications who depend upon optimization.

mechanical engineering umass amherst: Springer Handbook of Ocean Engineering Manhar R. Dhanak, Nikolaos I. Xiros, 2016-07-23 This handbook is the definitive reference for the interdisciplinary field that is ocean engineering. It integrates the coverage of fundamental and applied material and encompasses a diverse spectrum of systems, concepts and operations in the maritime environment, as well as providing a comprehensive update on contemporary, leading-edge ocean technologies. Coverage includes an overview on the fundamentals of ocean science, ocean signals and instrumentation, coastal structures, developments in ocean energy technologies and ocean vehicles and automation. It aims at practitioners in a range of offshore industries and naval establishments as well as academic researchers and graduate students in ocean, coastal, offshore and marine engineering and naval architecture. The Springer Handbook of Ocean Engineering is organized in five parts: Part A: Fundamentals, Part B: Autonomous Ocean Vehicles, Subsystems and Control, Part C: Coastal Design, Part D: Offshore Technologies, Part E: Energy Conversion

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