For advanced undergraduate or first-year graduate courses in CAD/CAM, manufacturing systems, and manufacturing control in industrial and mechanical engineering departments. Using a strong science-based and analytical approach, this text provides a modern description of CAM from an engineering perspective to include design specification, process engineering, and production. It begins with discussions of part design and geometric modeling and then gives
detailed coverage of individual technologies and building blocks to provide readers with a clear understanding of CAM technology. Unlike most other texts in the field, this book includes both descriptive information and analytical models. Topics covered include: design technologies and applications; FE simulation for concurrent design and manufacture; methodologies; knowledge engineering and management; CE within virtual enterprises; and CE - the future. The book introduces the fundamentals and development of Computer aided design, Computer aided process planning, and Computer aided manufacturing. The integration of CAD/CAPP/CAM, product data management and Concurrent engineering and collaborative design etc. are also illustrated in detail, which make this book be an essential reference for graduate students, scientists and practitioner in the research fields of computer sciences and engineering.

Metrics and Case Studies for Evaluating Engineering Designs considers four principal metrics for system design: Design Difficulty - Some projects do not immediately reveal their complexity. Taking some time to assess the true intricacy of each situation at the outset allows you to plan appropriately from the beginning. Required Resources - An accurate understanding of the materials and personnel needed to fulfill your goals is another keystone of good planning. Systems Engineering Efficacy - As projects get more sophisticated, the impact of systems structure becomes more and more important for success. Developmental Environment - Both technology and organizational politics affect the progress of any project. Knowing your environment allows you to identify risks before they endanger your project.

Metrics and Case Studies for Evaluating Engineering Designs applies these metrics to 30 real-life case studies. Drawn from the authors' experience in industry and teaching, each case illustrates one or more of the essentials in action. Moving from simple to complex systems, the book shows how readers can apply these theories to develop individual metrics tailored to their own organizations. This common-sense approach does not require readers to understand complicated mathematics or statistical models. The authors' straightforward style makes this book ideal reading for executives in business and government who need to evaluate complex programs without having a heavy technical background. Students in all engineering disciplines can also benefit from this practical, inventive guide. Following the conference theme "affordable manufacturing solutions for the 21st century," contents include: laser
positioning system for advanced composites lay-up, delta III payload fairing; characterization of flow front in resin transfer molding; optical layup template; modeling and assessment of machine tool dynamics and accuracy; the role of castings in part consolidation; automated assembly of large products; automation of the space shuttle solid rocket motor assembly process; evolution to lean manufacturing: a case study of Boeing of Spokane; and advances in real-time monitoring of acoustic emissions. This book is a collection of papers presented at the 7th ISPE International Conference on Concurrent Engineering (CE): Research and Applications. The papers deal with different topics providing information on information modelling, CE in virtual environment, and standards in CE. A thorough, original guide to using Concurrent Engineering principles to develop products that meet customer needs— and to do so as quickly and efficiently as possible. This book shows how CE encompasses manufacturing competitiveness, life-cycle management, process reengineering, cooperative workgroups, systems engineering, information modeling, and product, process and organization integration. This book also identifies, for the first time, 25 fundamental CE metrics and measures. These are categorized into four groups: simulations and analysis, product feasibility and quality assessment, design for X-ability assessment, and process quality assessment. The book describes the new process of Concurrent Function Deployment, which allows workgroups to work concurrently on conflicting values and compare notes and common checkpoints. Extensive exercises and illustrations are included throughout. Managers involved in any type of product development. The CE Conference series is organized annually by the International Society for Productivity Enhancement (ISPE) and constitutes an important forum for international scientific exchange on concurrent and collaborative enterprise engineering. These international conferences attract a significant number of researchers, industrialists and students, as well as government representatives, who are interested in the recent advances in concurrent engineering research and applications. Concurrent Engineering Approaches for Sustainable Product Development in a Multi-Disciplinary Environment: Proceedings of the 19th ISPE International Conference on Concurrent Engineering contains papers accepted, peer reviewed and presented at the annual conference held at the University of Applied Sciences in Trier, Germany, from 3rd-7th of September 2012. This covers a wide
range of cutting-edge topics including: Systems Engineering and Innovation Design for Sustainability Knowledge Engineering and Management Managing product variety Product Life-Cycle Management and Service Engineering Value Engineering The concurrent engineering (CE) approach to product design and development has two major steps: establishing the product realization process, or taxonomy, and applying this methodology to design and develop the total product system. This first volume of the two volume set articulates CE philosophy by illustrating the differences between the best methodologies and what is currently being practiced. Examines the Japanese transformation from rigid, culture-driven companies to world leaders in quality; offers an understanding of the eight primary components of concurrency and simultaneity; describes modeling the concurrent engineering environment and its five essential components; covers the development of a cooperative work-group environment spanned by four concurrent teams. Concurrent Engineering (CE) is a systematic approach to the integrated and concurrent design of products and related processes, including aspects as diverse as manufacture and support. It is only now being carefully applied to the construction sector and offers considerable potential for increasing efficiency and effectiveness. It enables developers to consider all elements of a building or structure's life cycle from the conception stage right through to disposal, and to include issues of quality, cost, schedule, and user requirements. Drawing together papers that reflect various research efforts on the implementation of CE in construction projects, Concurrent Engineering in Construction presents construction professionals and academics with the key issues and technologies important for CE's adoption, starting with fundamental concepts and then going on to the role of organisational enablers and advanced information and communication technologies, then providing conclusions and suggestions of future directions. Presents a top-down approach to the design, development, testing and recyclability of products, components and systems across a wide range of industries. Starting with the desired result and working back through the details, it shows how to produce goods, taking into account the challenges of actual manufacture, what the reliability requirements should be, quality control, associated costs, customer needs and more. Additional features include case studies and team negotiating. Also well-illustrated with figures, photographs, charts and tables and includes
an extensive bibliography. This reference examines the engineering of both natural and human-made systems and the analysis of those systems. For the engineering of systems, the authors emphasize the process of bringing systems into being. Regarding analysis, they explore the improvement of systems already in existence. Includes a wealth of new and revised figures throughout. Features significant revisions and new material on Bringing Systems Into Being (Ch. 2); Conceptual Design (Ch. 3); Design For Supportability (Ch. 15); Design For Affordability - Life-Cycle Costing (Ch. 17). Adds material on the integration of design disciplines in the systems engineering. Concludes each chapter with new Summary Extensions. Provides a new supplier evaluation checklist. Includes a new appendix that lists 35 key related web sites. A useful reference for electrical, electronic, and automotive engineers, as well as professionals in the aeronautics, astronautics, and manufacturing industries. CD-ROM contains: Searchable database from New Century Media -- Answers to end-of-chapter exercises -- OSHA forms. Presenting the gradual evolution of the concept of Concurrent Engineering (CE), and the technical, social methods and tools that have been developed, including the many theoretical and practical challenges that still exist, this book serves to summarize the achievements and current challenges of CE and will give readers a comprehensive picture of CE as researched and practiced in different regions of the world. Featuring in-depth analysis of complex real-life applications and experiences, this book demonstrates that Concurrent Engineering is used widely in many industries and that the same basic engineering principles can also be applied to new, emerging fields like sustainable mobility. Designed to serve as a valuable reference to industry experts, managers, students, researchers, and software developers, this book is intended to serve as both an introduction to development and as an analysis of the novel approaches and techniques of CE, as well as being a compact reference for more experienced readers. This text offers a quantitative and analytical approach to manufacturing processes. It provides a broad coverage of the major aspects of manufacturing processes and attempts to present a balanced view of the important fundamentals, analytical approaches and relevant applications. Examples and end of chapter problems are included as well as a summary of formulae for each chapter. System engineering is the application of scientific and engineering efforts to transform a business need into a defined system.
configuration through the top-down process of requirements, definition, functional analysis, allocation synthesis, design optimization, test and evaluation. This volume features the proceedings of the 14th ISPE Conference on Concurrent Engineering, held in São José dos Campos, São Paulo, Brazil, on the 16th – 20th of July 2007. It highlights the application of concurrent engineering to the development of complex systems. As a concept, Concurrent Engineering (CE) initiates processes with the goal of improving product quality, production efficiency and overall customer satisfaction. Services are becoming increasingly important to the economy, with more than 60% of the GDP in Japan, the USA, Germany and Russia deriving from service-based activities. The definition of a product has evolved from the manufacturing and supplying of goods only, to providing goods with added value, to eventually promoting a complete service business solution, with support from introduction into service and from operations to decommissioning. This book presents the proceedings of the 20th ISPE International Conference on Concurrent Engineering, held in Melbourne, Australia, in September 2013. The conference had as its theme Product and Service Engineering in a Dynamic World, and the papers explore research results, new concepts and insights covering a number of topics, including service engineering, cloud computing and digital manufacturing, knowledge-based engineering and sustainability in concurrent engineering. In the area of computer-integrated manufacturing, concurrent engineering is recognized as the manufacturing philosophy for the next decade. The most balanced coverage of Computer Aided Design and Manufacture available! Providing a balanced coverage of both aspects of CADCAM, this book explores the processes of defining a product design with the aid of computers, of developing manufacturing plans and instructions for the product, and of managing the manufacturing system itself. The book has been thoroughly updated and expanded for this second edition and the mix of theory, practice and analysis makes it suitable for both analytical and overview courses. This book provides an ideal core text for CADCAM courses at undergraduate degree level in Industrial, Mechanical, Manufacturing and Production Engineering. Composite Materials: Concurrent Engineering Approach covers different aspects of concurrent engineering approaches in the development of composite products. It is an equally valuable reference for teachers, students, and industry sectors, including information and knowledge on concurrent
engineering for composites that are gathered together in one comprehensive resource. Contains information that is specially designed for concurrent engineering studies. Includes new topics on conceptual design in the context of concurrent engineering for composites. Presents new topics on composite materials selection in the context of concurrent engineering for composites. Written by an expert in both areas (concurrent engineering and composites). Provides information on ‘green’ composites. Argues that integration of design and development processes will improve productivity and tells how to take advantage of new technological trends. While being an experiment within itself to teach normative design theory, this comprehensive book treats engineering design as a decision-making process, which it is, from a quantitative point of view. This opens a host of well-developed methods to application, including a mathematically rigorous treatment of risk and uncertainty in design. The book is designed to assist the reader by defining the boundaries of a discipline, providing order for the learning process, and assisting the reader in self-testing. Provides a number of new methods and aids to engineering design: Cartoons for identifying system options; Scenario Diagrams for system simulation; an approach to the measurement of information relating to specific decisions; an overall and general approach to engineering design; a rigorous treatment of risk and uncertainty in engineering design, including measures of system value that are valid under risk and uncertainty; and an explanation of the principles of game theory as applied to engineering design. BACKGROUND There is an increasing awareness that 'time to market' is the key competitive issue in the manufacturing industry today. The global markets are demanding products that are well designed, are of high quality and are at low prices with ever decreasing lead times. Hence manufacturers are forced to utilize the best methods of technology with efficient control and management accompanied by suitably enabling organizational structures. Concurrent engineering (CE) is widely seen to be the methodology that can help satisfy these strenuous demands and keep the profitability and viability of product developers, manufacturers and suppliers high. There have been many reported successes of CE in practice. Rover were able to launch Land Rover Discovery in 18 months as compared with 48-63 months for similar products in Europe. Because of its early introduction to the market it became the best selling product in its class. AT&T report part counts down to one
ninth of their previous levels and quality one hundred times (in surface defects) for VLSI (very improvements of large scale integration) circuits as a result of using the CE approach.

WHO SHOULD READ THIS TEXT? This book will aim to provide a sound basis for the very diverse subject known as concurrent engineering. Concurrent engineering is recognized by an increasingly large proportion of the manufacturing industry as a necessity in order to compete in today's markets. This recognition has created the demand for information, awareness and training in good concurrent engineering practice.