

Engineering Design Proposal Template

Systems engineering

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Systems engineering is an interdisciplinary field of engineering and engineering management that focuses on how to design, integrate, and manage complex systems over their life cycles. At its core, systems engineering utilizes systems thinking principles to organize this body of knowledge. The individual outcome of such efforts, an engineered system, can be defined as a combination of components that work in synergy to collectively perform a useful function.

Issues such as requirements engineering, reliability, logistics, coordination of different teams, testing and evaluation, maintainability, and many other disciplines, aka "ilities", necessary for successful system design, development, implementation, and ultimate decommission become more difficult when dealing with large or complex projects...

Design

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A design is the concept or proposal for an object, process, or system. The word design refers to something that is or has been intentionally created by a thinking agent, and is sometimes used to refer to the inherent nature of something - its design. The verb to design expresses the process of developing a design. In some cases, the direct construction of an object without an explicit prior plan may also be considered to be a design (such as in arts and crafts). A design is expected to have a purpose within a specific context, typically aiming to satisfy certain goals and constraints while taking into account aesthetic, functional and experiential considerations. Traditional examples of designs are architectural and engineering drawings, circuit diagrams, sewing patterns, and less tangible...

Software design

Architecture: An Engineering Approach. O'Reilly Media. 2020. ISBN 978-1492043454. Ralph, P., and Wand, Y. A Proposal for a Formal Definition of the Design Concept

Software design is the process of conceptualizing how a software system will work before it is implemented or modified.

Software design also refers to the direct result of the design process - the concepts of how the software will work which consists of both design documentation and undocumented concepts.

Software design usually is directed by goals for the resulting system and involves problem-solving and planning - including both

high-level software architecture and low-level component and algorithm design.

In terms of the waterfall development process, software design is the activity of

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following requirements specification and before coding.

Open-design movement

consumption. The open-design movement is currently fairly nascent but holds great potential for the future. In some respects design and engineering are even more

The open-design movement involves the development of physical products, machines and systems through use of publicly shared design information. This includes the making of both free and open-source software (FOSS) as well as open-source hardware. The process is generally facilitated by the Internet and often performed without monetary compensation. The goals and philosophy of the movement are identical to that of the open-source movement, but are implemented for the development of physical products rather than software. Open design is a form of co-creation, where the final product is designed by the users, rather than an external stakeholder such as a private company.

Mechanical engineering

an engineering branch that combines engineering physics and mathematics principles with materials science, to design, analyze, manufacture, and maintain

Mechanical engineering is the study of physical machines and mechanisms that may involve force and movement. It is an engineering branch that combines engineering physics and mathematics principles with materials science, to design, analyze, manufacture, and maintain mechanical systems. It is one of the oldest and broadest of the engineering branches.

Mechanical engineering requires an understanding of core areas including mechanics, dynamics, thermodynamics, materials science, design, structural analysis, and electricity. In addition to these core principles, mechanical engineers use tools such as computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided engineering (CAE), and product lifecycle management to design and analyze manufacturing plants, industrial equipment...

Design methods

designing. A "Conference on Systematic and Intuitive Methods in Engineering, Industrial Design, Architecture and Communications", held in London in 1962 is

Design methods are procedures, techniques, aids, or tools for designing. They offer a number of different kinds of activities that a designer might use within an overall design process. Conventional procedures of design, such as drawing, can be regarded as design methods, but since the 1950s new procedures have been developed that are more usually grouped under the name of "design methods". What design methods have in common is that they "are attempts to make public the hitherto private thinking of designers; to externalise the design process".

Design methodology is the broader study of method in design: the study of the principles, practices and procedures of designing.

Design rationale

according to some templates or just type into natural language descriptions. The Toulmin model One commonly accepted way for semiformal design rationale representation

A design rationale is an explicit documentation of the reasons behind decisions made when designing a system or artifact. As initially developed by W.R. Kunz and

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Horst Rittel, design rationale seeks to provide argumentation-based structure to the political, collaborative process of addressing wicked problems.

Design for manufacturability

Design for manufacturability (also sometimes known as design for manufacturing or DFM) is the general engineering practice of designing products in such

Design for manufacturability (also sometimes known as design for manufacturing or DFM) is the general engineering practice of designing products in such a way that they are easy to manufacture. The concept exists in almost all engineering disciplines, but the implementation differs widely depending on the manufacturing technology. DFM describes the process of designing or engineering a product in order to facilitate the manufacturing process in order to reduce its manufacturing costs. DFM will allow potential problems to be fixed in the design phase which is the least expensive place to address them. Other factors may affect the manufacturability such as the type of raw material, the form of the raw material, dimensional tolerances, and secondary processing such as finishing.

Depending on various...

Electrical engineering

Electrical engineering is an engineering discipline concerned with the study, design, and application of equipment, devices, and systems that use electricity

Electrical engineering is an engineering discipline concerned with the study, design, and application of equipment, devices, and systems that use electricity, electronics, and electromagnetism. It emerged as an identifiable occupation in the latter half of the 19th century after the commercialization of the electric telegraph, the telephone, and electrical power generation, distribution, and use.

Electrical engineering is divided into a wide range of different fields, including computer engineering, systems engineering, power engineering, telecommunications, radio-frequency engineering, signal processing, instrumentation, photovoltaic cells, electronics, and optics and photonics. Many of these disciplines overlap with other engineering branches, spanning a huge number of specializations including...

List of engineering branches

Engineering is the discipline and profession that applies scientific theories, mathematical methods, and empirical evidence to design, create, and analyze

Engineering is the discipline and profession that applies scientific theories, mathematical methods, and empirical evidence to design, create, and analyze technological solutions, balancing technical requirements with concerns or constraints on safety, human factors, physical limits, regulations, practicality, and cost, and often at an industrial scale. In the contemporary era, engineering is generally considered to consist of the major primary branches of biomedical engineering, chemical engineering, civil engineering, electrical engineering, materials engineering and mechanical engineering. There are numerous other engineering sub-disciplines and interdisciplinary subjects that may or may not be grouped with these major engineering branches.

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