



PRODUCT DESIGN AND DEVELOPMENT

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PRE - REQUISITES : Any student enrolled for a UG/PG degree in any discipline of humanities, management, science and engineering can complete the course.

INDUSTRY SUPPORT : All industries where products are being conceptualized, designed and developed in order to satisfy the human needs and requirements.

INTENDED AUDIENCE: It is a core course for UG and PG

COURSE OUTLINE :

It has been established worldwide that the most successful economies are based on innovation and creativity led entrepreneurship. The government is focusing on putting concerted efforts to produce job creators. The current MOOC on Product Design and Development is conceptualized and planned in such a way that it helps both job creators as well as job seekers. The main objective of the course is to acquaint the learners/students with the practical knowledge regarding conceptualization, design and development of a new product. The need of a new product, the product life cycle, the product design process, the application of Value Engineering principles in product design, various product design tools such as CAD, DFM, DFA and DFMA have been explained with relevant and specific examples/ case studies. The concept of Ergonomics in context of the product design has been explained with the help of case studies. The fundamental concept of Rapid Prototyping as well the working principles of the basic rapid prototyping techniques has also been explained.

ABOUT INSTRUCTOR :

Prof. Inderdeep Singh is currently working as Associate Professor in Department of Mechanical and Industrial Engineering at Indian Institute of Technology Roorkee. He has taught among others, the industrial engineering courses such as Production Planning and Control, Product Design and Development, Work System Design, Industrial Management and Quality Management. He has been actively involved in the National Mission Project on Education Through ICT (NME-ICT) of Government of India. He has completed three video and one web course under the National Programme on Technology Enhanced Learning (NPTEL). He has developed suitable pedagogical methods for two under-graduate courses of Mechanical Engineering.

COURSE PLAN :

Week1: Introduction to course, Product life-cycle, Product policy of an organization. Selection of a profitable product, Product design process, Product analysis.

Week 2: Value engineering in product design; Advantages, Applications in product design, Problem identification and selection, Analysis of functions, Anatomy of function. Primary versus secondary versus tertiary/unnecessary functions, Functional analysis: Functional Analysis System Technique (FAST), Case studies.

Week 3: Introduction to product design tools, QFD, Computer Aided Design, Robust design, DFX, DFM, DFA, Ergonomics in product design,.

Week 4: DFMA guidelines, Product design for manual assembly, Design guidelines for metallic and non-metallic products to be manufactured by different processes such as casting, machining, injection molding etc., Rapid prototyping, needs, advantages, working principle of SLA, LOM and SLS