MECHANICAL ENGINEERING

MANUFACTURING GUIDELINES FOR PRODUCT DESIGN

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TYPE OF COURSE : New | Elective | UG/PG
INTENDED AUDIENCE : B. E./M. E/Ph. D/Mech
COURSE DURATION : 8 weeks (25 feb'19 - 19 Apr'19)
EXAM DATE : 27 Apr 2019

INDUSTRIES APPLICABLE TO : All the industries involved in product conceptualization, design and development

COURSE OUTLINE :

Competition in the key word in today's business environment. The major objective of the companies worldwide is to conceptualize, design and develop products that not only satisfy the customer's needs and wants but also are competitive from cost as well as quality point of view. But it has been observed that our product design and development cycle usually follows a traditional/conventional approach that leads to a lot of non-value added features in the product. Moreover, these features also increase the manufacturing cost of the product. Therefore, there is an imminent need to acquaint the engineers and managers with the concept of design thinking that involves an integrated approach of combining the functions of design and manufacturing (including assembly).

ABOUT INSTRUCTOR :

Dr. Inderdeep Singh is currently working as Associate Professor in the 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.

COURSE PLAN :

Week 01 : Product Design: Basics, Introduction of Manufacturing Processes, Manufacturing Processes Advantages and Limitations-I, Manufacturing Processes Advantages and Limitations-II, Process Capabilities: Basics.

Week 02 : Engineering Materials, Properties of Materials, Selection of Materials – I, Selection of Materials – II, Applications of Engineering Material.

Week 03 : Robust Design, Design for X, Product Design for Manual Assembly, DFMA Guidelines, Ergonomics in Product Design.

Week 04 : Selection of Processes-I, Selection of Processes-II, Process Capabilities, Design Guidelines for Sand Casting, Design Guidelines for Die Casting Process.

Week 05 : Product Design Guidelines: Compression Molding and Extrusion, Design Guidelines for Extrusion and Injection Molding, Design Guidelines for Sheet Metal Working, Design Guidelines for Machining, Design Guidelines for Powder Metal Processing

Week 06 : Assembly Processes: Introduction, Adhesive Joining: Guidelines, Design Guidelines for Mechanical Fasteners, Design Guidelines for Welding, Design Guidelines: Brazing and Soldering.

Week 07 : Induction Welding: Plastics, Ultrasonic Welding: Plastics, Vibration and Spin Welding: Plastics, Microwave Joining, Hole Making in Polymer and Polymer Matrix Composites.

Week 08 : Design for Environment, Design for Environment Process, Product Architecture, Rapid Prototyping, Product Design - Manufacturing Perspective.