

Subject Code: 1ET2010302	Subject Title: Product Design and Development
Pre-requisite Subject	UG level subjects on Design, Material and Industrial Engineering.

Course Objective:

This course provides

1. Competence with a set of tools and methods for product design and development.
2. Confidence in your own abilities to create a new product.
3. Confidence in selecting proper material and/or process.
4. Ability to design the product for fixed criteria(s) and making its models/prototypes accordingly.
5. Ability to coordinate multiple, interdisciplinary tasks in order to achieve a common objective.
6. Enhanced team working skills.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total (T+P)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	5	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
01	Introduction: Characteristics of successful product development, Design and development of products, duration and cost of product development, the challenges of product development, product development cycle.	05	11
02	Development Processes: The front-end process, generic concept development process including Identifying Customer Needs, Concept Generation, Concept Selection, Concept Testing and Product Specifications.	14	25
03	Material selection: Importance, classification material performance characteristics, selection criteria, Ashby Material selection chart.	09	16
04	Process selection: Importance types of manufacturing process and their classification, Sources of information, selection criteria, Material and Process selection Methods, Expert systems. Computer Database Approach, performance indices decision matrix, AHP and fuzzy approach, introduction to material and process selection software.	09	16
05	Design for Manufacturing: Definition, estimation of manufacturing cost, reducing the cost of components, assembly, supporting production, impact of DFM on other factors. DFM, DFA, DFX, supplier involvement robust design, QFD and concurrent engineering.	09	16
06	Managing Projects: Understanding and representing task, baseline project	09	16

	planning, accelerating projects, project execution, postmortem project evaluation.		
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Course Outcome:

The students shall be able to

1. Describe an engineering design and development process
2. Employ engineering, scientific, and mathematical principles to execute a design from concept to finished product
3. Effectively communicate the results of projects and other assignments in a written and oral format
4. Fabricate an electromechanical assembly from engineering drawings
5. Work collaboratively on a team to successfully complete a design project

List of References:

1. Ulrich, Karl, and Steven Eppinger, "Product Design and Development", New York, McGraw-Hill, 2003. ISBN: 9780072471465
2. Geoffrey Boothroyd, Peter Dewhurst, Winston A. Knight, "Product Design for Manufacture and Assembly", 3rd edition, CRC press.
3. A C Chitale and R C Gupta, "Product Design and Manufacturing", PHI, - 3rd Edition, 2003.
4. Tim Jones. Butterworth Heinemann, "New Product Development", -Oxford. UCI -1997
5. Dieter George E., "Mechanical Metallurgy", 3rd Edition, McGraw Hill.
6. O. Molloy, E.A. Warman, S. Tilley, "Design for Manufacturing and Assembly: Concepts, architectures and implementation", Springer Publications
7. William D. Callister, Jr., David G. Rethwisch, "Fundamentals of Material Science and Engineering", 4th Edition, John Wiley & Sons.

Practical Work:

- Students shall exercise some case studies and perform hands-on practice on new/existing product concept based on the topics of syllabus and submit report of the same.