

**AE 421: Product design and development**

L	T	P	Credit	Area		CWS	PRS	MTE	ETE	PRE
3	0/1	2/0	4	DEC		15/25	25/-	20/25	40/50	-

**Objectives:** To familiarize the students with the process of product design and development and to enhance critical thinking and prepare him in the field of product design and development. To familiarize him with concept of product design and development

**AE 421: Product design and development**

		Contact Hours
<b>Unit-1</b>	Introduction: Classification/ Specifications of Products. Product life cycle. Product mix. Introduction to product design. Modern product development process. Innovative thinking. Morphology of design	<b>8</b>
<b>Unit-2</b>	Conceptual Design: Generation, selection & embodiment of concept. Product architecture. Industrial design: process, need. Robust Design: Taguchi Designs & DOE. Design Optimization	<b>6</b>
<b>Unit-3</b>	Design for Manufacturing.& Assembly: Methods of designing for Mfg.& Assy. Designs for Maintainability. Designs for Environment. Product costing. Legal factors and social issues. Engg ethics and issues of society related to design of products	<b>6</b>
<b>Unit-4</b>	Value Engineering / Value Analysis.: Definition. Methodology. Case studies. Economic analysis: Qualitative & Quantitative	<b>8</b>
<b>Unit-5</b>	Ergonomics / Aesthetics: Gross human autonomy. Anthropometry. Man-Machine interaction. Concepts of size and texture, colour. Comfort criteria. Psychological & Physiological considerations. Creativity Techniques: Creative thinking, conceptualization, brain storming, primary design, drawing, simulation, detail design	<b>8</b>
<b>Unit-6</b>	Concurrent Engineering, Rapid prototyping, Tools for product design – Drafting / Modeling software. CAM Interface. Patents & IP Acts. Overview, Disclosure preparation	<b>6</b>
<b>Total</b>		<b>42</b>

**Reference Books:**

1	David G Ullman, “The Mechanical Design Process.” Publisher- McGrawhillIncSingapore (ISBN-13: 9780072975741) 1992 N J M Roozenberg , J Ekels , N F M Roozenberg “Product Design Fundamentals and Methods .”Publisher- John Willey & Sons (ISBN-13: 9780471954651) 1995
2	Kevin Otto & Kristin Wood Product Design: “Techniques in Reverse Engineering and new Product Development.” 1 / e 2004 , Publisher- Pearson Education New Delhi (ISBN-13: 9780130212719)
3	L D Miles “Value Engineering.”Publisher- McGraw-Hill, 1972
4	Karl T Ulrich, Steven D Eppinger , “ Product Design &Development.”Publisher- Tata McGrawhill New Delhi (ISBN-13: 9780078029066)2003
5	Hollins B & Pugh S “Successful Product Design.” Publisher- Butter worths London (ISBN 9780408038614)

**Course Outcomes**

CO1	To understand basics of product design. modern product development process.
CO2	To discuss conceptual design, industrial design and robust design.
CO3	To explain Design for Manufacturing & Assembly with ethics and issues of society related to design of products.
CO4	To describe value engineering and value analysis with case studies.
CO5	To describe ergonomics with Psychological & Physiological considerations. Creativity Techniques
CO6	To apply knowledge of concurrent engineering, rapid prototyping and patents & IP act.

**CO-PO/PSOMatrix**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2