DESIGN THINKING & PRODUCT INNOVATION

Course code	19ES1302	**Year**	II	**semester**	I
Course category	Engineering science	**Branch**	Mechanical	**Course Type**	Theory
credits	2	**L-T-P**	2-0-0	**prerequisites**	nil
Continuous Internal evaluation	30	**Semester End Evaluation**	70	**Total marks**	100

Course outcomes	
Upon successful completion of the course the student will able to	
CO1	Explain the principles of design thinking and its approaches
CO2	Identify the empathy, define phases in human centred design problems
CO3	Understand the idea generation, prototype and testing in design thinking context
CO4	Apply design thinking techniques for product innovation
CO5	Use design thinking in business process models

Contribution of course outcomes towards achievement of program outcomes & strength of correlation

1:Slight (low), 2: Moderate (medium) 3: Substantial (High)

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

syllabus		
Unit no	**contents**	**Mapped CO**
1	**INTRODUCTION TO DESIGN THINKING:** An insight into Design, origin of Design thinking, Design thinking Vs Engineering thinking, importance of Design thinking, Design Vs Design thinking, understanding Design thinking and its process models, application of Design thinking	CO1
2	**EMPATHIZE IN DESIGN THINKING:** Human-Centred Design (HCD) process - Empathize, Define, Ideate, Prototype and Test and Iterate. Role of Empathy in design thinking, methods and tools of empathy, understanding empathy tools. Explore define phase state users' needs and problems using empathy methods	CO2

3	**IDEATION, PROTOTYPING AND TESTING :** Ideation methods, brain storming, advantages of brain storming, methods and tools of ideations, prototyping and methods of prototyping, user testing methods, Advantages and disadvantages of user Testing/ Validation	CO3
4	**PRODUCT INNOVATION:** Design thinking for strategic innovation , Definition of innovation, art of innovation, teams for innovation, materials and innovation in materials, definition of product and its classification. Innovation towards product design Case studies	CO4
5	**DESIGN THINKING IN BUSINESS PROCESSES:** Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs.	CO5

Learning Resources
Text Books:
1. Idris Mootee, "Design Thinking for Strategic Innovation", John Wiley & Sons (2013).
2. "Change by design", Tim Brown, Harper Collins, 2009
3. "Design Thinking- The Guide Book" – Facilitated by the Royal Civil service Commission, Bhutan
4. Engineering design by George E Dieter
REFERENCE BOOKS
1. 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization by Vijay Kumar
2. Human-Centered Design Toolkit: An Open-Source Toolkit To Inspire New Solutions in the Developing World by IDEO
ADDITIONAL LEARNING RESOURCES
https://www.interaction-design.org/literature/topics/design-thinking
https://www.interaction-design.org/literature/article/how-to-develop-an-empathy-approach-in-design-thinking