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DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Re-Accredited with 'A' Grade by NAAC, Accredited by TCS.
Accredited by NBA (AERO, BME, CSE, ECE, EEE, IT & MECH)
PERAMBALUR - 621 212. TAMIL NADU

COURSE PLAN (2025-2026 EVEN SEMESTER)

Name of the Faculty				
Designation/Department	Associate Professor / Mechanical Engineering			
Course Code/Name	**U23MEO11/ Applied Design Thinking**			
Year/Section/Department	III/C/ECE			
Credits Details	L:3	T:0	P: 0	C:3
Total Contact Hours Required	45			

Syllabus: U23MEO11/ Applied Design Thinking

UNIT I/ DESIGN THINKING PRINCIPLES	**No.of Periods :9**
Exploring Human-centered Design - Understanding the Innovation process, discovering areas of opportunity, Interviewing & empathy-building techniques, Mitigate validation risk with FIR [Forge Innovation rubric] - Case studies.	
UNIT II/ ENDUSER-CENTRIC INNOVATION	**No.of Periods : 9**
Importance of customer-centric innovation - Problem Validation and Customer Discovery - Understanding problem significance and problem incidence - Customer Validation. Target user, User persona & user stories. Activity: Customer development process - Customer interviews and field visit.	
UNIT III/ APPLIED DESIGN THINKING TOOLS	**No.of Periods:9**
Concept of Minimum Usable Prototype [MUP] - MUP challenge brief - Designing & Crafting the value proposition - Designing and Testing Value Proposition; Design a compelling value proposition; Process, tools and techniques of Value Proposition Design.	
UNIT IV/ CONCEPT GENERATION	**No.of Periods:9**
Solution Exploration, Concepts Generation and MUP design- Conceptualize the solution concept; explore, iterate and learn; build the right prototype; Assess capability, usability and feasibility. Systematic concept generation; evaluation of technology alternatives and the solution concepts.	
UNIT V/ SYSTEM THINKING	**No.of Periods:9**
System Thinking, Understanding Systems, Examples and Understandings, Complex Systems	

Objectives:

The main learning objectives of this course are to prepare students to:

- Introduce tools & techniques of design thinking for innovative product development
- Illustrate customer-centric product innovation using simple use cases
- Demonstrate the development of minimum usable prototypes.
- Outline the principles of solution concepts and their evaluation.
- Describe systems thinking principles as applied to complex systems

Text Books:

T1: Steve Blank, (2013), The four steps to epiphany: Successful strategies for products that win,Wiley.
T2: Alexander Osterwalder, Yves Pigneur, Gregory Bernarda, Alan Smith, Trish Papadakos, (2014), Value Proposition Design: How to Create Products and Services Customers Want, Wiley
T3: Donella H. Meadows, (2015), "Thinking in Systems -A Primer", Sustainability Institute
T4: Tim Brown,(2012) "Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation", Harper Business**.**

Reference Books:

R1: https://www.ideou.com/pages/design-thinking#process
R2: https://blog.forgeforward.in/valuation-risk-versus-validation-risk-in-product-innovations-49f253ca 8624
R3: https://blog.forgefor ward.in/product-innovation-rubric-adf5ebdfd356
R4: https://blog.forgefor ward.in/evaluating-product-innovations-e8178e58b86e
R5: https://blog.forgefor ward.in/user-guide-for-product-innovation-rubric-857181b253dd
R6: https://blog.forgefor ward.in/star tup-failure-is-like-true-lie-7812cdfe9b85
R*: Learning Materials: Applied Design Thinking

WEB RESOURCE

❖ https://www.edx.org/course/design-thinking-for-innovation

- https://nptel.ac.in/courses/100106116

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I : DESIGN THINKING PRINCIPLES						**(9)**
1	Exploring Human-centered Design	R*	1-7	BB	1	1
2	Understanding the Innovation process	R*	7-11	BB	1	2
3	Discovering areas of opportunity	R*	11-17	BB	1	3
4	Interviewing techniques	R*	17-23	BB	1	4
5	Empathy-building techniques	R*	24- 27	BB	1	5
6	Mitigate validation risk with FIR [Forge Innovation Rubric]	R*	27- 31	BB	1	6
7	FIR – components and application	R*	31-34	BB	1	7
8	Case studies – Part I	R*	34-38	BB	1	8
9	Case studies – Part II	R*	38-42	BB	1	9
Outcome of Unit I: **CO1:** At the end of this unit, students will be able to: Define & test various hypotheses to mitigate the inherent risks in product innovations.						
UNIT II/ ENDUSER-CENTRIC INNOVATION						**(9)**
10	Importance of customer-centric innovation	R*	42-45	BB	1	10
11	Problem Validation	R*	45-48	BB	1	11
12	Customer Discovery	R*	48-51	BB	1	12
13	Understanding problem significance	R*	51-55	BB	1	13
14	Understanding problem incidence	R*	55-58	BB	1	14

15	Customer Validation	R*	58-62	BB	1	15
16	Target user, User persona	R*	62-66	BB	1	16
17	User stories	R*	66-68	BB	1	17
18	Activity: Customer development process – Customer interviews and field visit	R*	69-72	BB	1	18
Outcome of Unit II: **CO2:** At the end of the course, Students will be able to: Design the solution concept based on the proposed value by exploring alternate solutions to achieve value-price fit						
UNIT III/ APPLIED DESIGN THINKING TOOLS						**(9)**
19	Concept of Minimum Usable Prototype [MUP]	R*	72-76	BB	1	19
20	MUP challenge brief	R*	76-79	BB	1	20
21	Designing & Crafting the value proposition	R*	79-83	BB	1	21
22	Designing the Value Proposition	R*	83-86	BB	1	22
23	Testing the Value Proposition	R*	86-90	BB	1	23
24	Design a compelling value proposition	R*	90-93	BB	1	24
25	Process of Value Proposition Design	R*	93-97	BB	1	25
26	Tools of Value Proposition Design	R*	97-101	BB	1	26
27	Techniques of Value Proposition Design	R*	101-105	BB	1	27
Outcome of Unit III: **CO3:** At the end of the unit, students will be able to: Develop skills in empathizing, critical thinking, analyzing, storytelling & pitching						
UNIT IV CONCEPT GENERATION						**(9)**
28	Solution Exploration	R*	105-108	BB	1	28
29	Concepts Generation	R*	109-113	BB	1	29

30	MUP design	R*	113-117	BB	1	30
31	Conceptualize the solution concept	R*	117-122	BB	1	31
32	Explore, iterate and learn	R*	122-126	BB	1	32
33	Build the right prototype	R*	126-130	BB	1	33
34	Assess capability	R*	130-134	BB	1	35
35	Assess usability and feasibility	R*	135-139	BB	1	35
36	Systematic concept generation; evaluation of technology alternatives and the solution concepts	R*	139-143	BB	1	36

Outcome of Unit IV:

CO4: At the end of the unit Students will be able to:

Design and develop Minimum Usable Prototypes (MUPs) for solution concepts, evaluating their capabilities, usability, and feasibility

UNIT V/ SYSTEM THINKING						**(9)**
37	System Thinking	R*	143-147	BB	1	37
38	Understanding Systems	R*	148-152	BB	1	38
39	Examples of Systems	R*	152-156	BB	1	39
40	Understandings of Systems	R*	156-160	BB	1	40
41	Complex Systems – introduction	R*	160-164	BB	1	41
42	Characteristics of Complex Systems	R*	164-169	BB	1	42
43	Examples of Complex Systems	R*	169-173	BB	1	43
44	Applications of System Thinking	R*	173-176	BB	1	44
45	Case-based understanding of Complex Systems	R*	177-180	BB	1	45

Outcome of Unit V:

CO5: At t he course end of this unit students will be able to:

Assess technology alternatives for the proposed solution concepts to ensure effective product development.

CO6: At t he course end of this unit students will be able to:

Apply system thinking in a real-world scenario

Course Outcome:

At the end of course, Students will able to :

CO1: Define & test various hypotheses to mitigate the inherent risks in product innovations.

CO2 Design the solution concept based on the proposed value by exploring alternate solutions to achieve value-price fit

CO3 Develop skills in empathizing, critical thinking, analyzing, storytelling & pitching

CO4 Design and develop Minimum Usable Prototypes (MUPs) for solution concepts, evaluating their capabilities, usability, and feasibility.

CO5 Assess technology alternatives for the proposed solution concepts to ensure effective product development

CO6 Apply system thinking in a real-world scenario

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1		3	3	3					2	1		2		
CO 2		3	3	3	3				1			3		
CO 3		3	3	3	3				1			3		
CO 4		3	3	3	3				2			3		
CO 5		3	3	3	2				1			2		
CO 6		3	3	3	2				1			2		

Content beyond Syllabus:

- Design Thinking for Sustainability, Ethics & Emerging Technologies

Internal Evaluation Components

Web Portal	**Assignment**	**Components**	**Topic Number with Topic/Unit Details**
Web Portal 1	1	Assignment- Handwritten (20)	1-18 / I & II
	2	Poster/PPT Presentation (20)	1-18/ I & II
Web Portal 2	3	Seminar (20)	19-36/ III &IV
	4	Case Study Report/ Mini Project/ Model Making (20)	19-36/ III &IV
Web Portal 3	5	MCQ (15)	--
		Attendance (Course attendance-10)	--

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Before AT 3)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

Prepared By **Verified By**

Approved By

[PRINCIPAL]