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Design Thinking

(K24CSIT11)

An Approach To Creative Problem Solving

By

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Pre-requisite: Not Applicable

Course Objectives:

1. To expose the student with state of the art perspectives, ideas, concepts, and solutions related to the design and execution of projects using design thinking principles.
2. To prepare the mindset and discipline of systemic inspiration driven by a desire to identify new sources of ideas, and new models especially outside their regular working atmosphere.
3. To propose a concrete, feasible, viable and relevant innovation project/challenge.

Course Outcome:

After completion of the course, the student will be able to

1. Understand the basic requirements of a good design.
2. Empathise and ideate the solutions to problems in his environment
3. Prototype and test the developed solutions.
4. Apply the principles of design thinking on developing innovative solutions to the real world problems.

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	3	2	-	1	-	-	2	2	-	2	1	-
CO2	1	2	3	2	-	1	-	-	2	2	-	2	1	-
CO3	1	2	3	2	-	1	-	-	2	2	-	2	1	-
CO4	1	2	3	2	-	1	-	-	2	2	-	2	1	-

Syllabus

Unit 1	**FUNDAMENTALS OF DESIGN THINKING**	04 hours

Concept of Design Thinking, Need of Design Thinking, Goal of Design thinking (Desirability, feasibility and viability), Design thinking Process model, Design thinking tools.

Activities: *Identify an Opportunity, Scope of the Project, Explore the possibilities and prepare a design brief.*

Unit 2	**EMPATHIZE AND DEFINE**	04 hours

Design thinking phases, how to empathize, Role of empathy in design thinking, the purpose of empathy maps, Things to be done prior to empathy mapping, Activities during and after the session, Understanding empathy tools: Customer Journey Map, Personas. Define- Methods of Define Phase: Storytelling.

Activities: *Apply the methods of empathizing and Define Phases Finalize the problem statement.*

Unit 3	IDEATION	04 hours

Challenges in idea generation, Visualize, Empathize, and Ideate method, Importance of visualizing and empathizing before ideating, Applying the method, Create Thinking, Generating Design Ideas, Lateral Thinking, Analogies, Brainstorming, Mind mapping,

Ideation Tools: How Might We? (HMW), Storyboard, Brainstorming. What is design innovation? A mindset for innovation, and asking "What if?" asking "What wows?" and "What works?"

Activities: *Apply the methods of Ideate Phase: Generate Innovative solution ideas.*

Unit 4	PROTOTYPING AND TESTING	03 hours

What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products; Why we need prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype. Testing prototypes with users, Collect feedback; iterate and improve the ideas.

Activities:

1. Prototype: Apply the Methods of the Prototype Phase - Create prototypes for selected ideas.
2. Testing: Collect feedback; iterate and improve the ideas Present your solution using the Storytelling method.

	Total Lecture Hours	15 hours

Reference Books:

1. Design Thinking, A Beginner's Perspective, E Balaguruswamy,Bindu Vijayakumar, Mc Graw Hill,2024
2. The Design Thinking Playbook, Michael Lewrick (Author), Patrick Link (Author), Larry Leifer (Author) Publisher Wiley, Edition 2018.
3. Design Thinking For Dummies, Prof. Dr. Christian Müller- Roterberg, Wiley, 2021
4. The Design of Everyday Things, Don Norman (Author),Navol Books Trading, Edition 2022
5. Designing Experiences, James Robert Rossman and Mathew D. Duerden, Columbia Business School Pub, Edition 2019.
6. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press, Edition 2009.
7. Idris Mootee, Design Thinking for Strategic Innovation,2013, John Wiley & Sons Inc.

Additional Learning Resources:

1. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process
2. https://www.ibm.com/design/thinking/page/toolkit
3. https://www.interaction-design.org/literature/article/define-and-frame-your-designchallenge-by-creating-your-point-of-view-and-ask-how-might-we
4. https://nptel.ac.in/courses/109/104/109104109/
5. https://nptel.ac.in/courses/110106124/

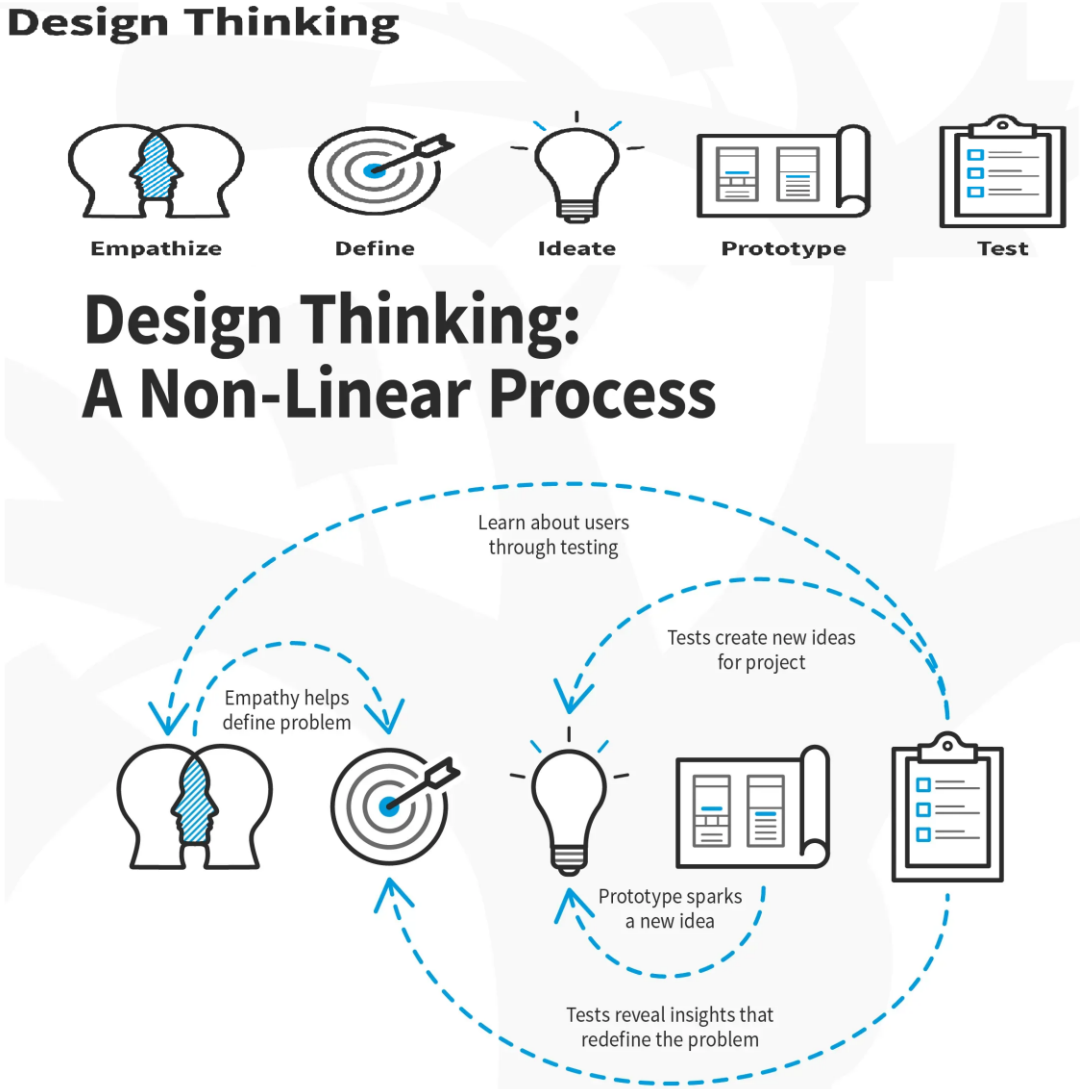
Assessment Scheme

- **Continuous Assessment: 20 marks**
  - The student shall submit 3 Assignments (on Unit 1,2 and 3 respectively) for 5 marks each. Activities are mentioned with every unit in defined syllabus.
  - Attendance: 5 Marks
  - Student shall be offered an optional badge course from IBM.
    - https://www.ibm.com/design/thinking/page/toolkit
- **MSE: 30 Marks**
- Mode of Evaluation (Activity Based):
  - The student will make a project proposal on an innovative idea in a team of 2-3 students.
  - Assessment of student shall be done based on student
    - Contribution to the Proposal [10 Marks].
    - Understanding of the Subject and innovation [10 Marks].
    - Incorporation of concept of Design Thinking in Proposed Project [10 Marks].

What is Design Thinking (DT)?

Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test.

It is most useful to tackle ill-defined or unknown problems and involves five phases: Empathize, Define, Ideate, Prototype and Test.


Design Thinking
Empathize
Define
Ideate
Prototype
Test
Design Thinking:
A Non-Linear Process
Learn about users through testing
Tests create new ideas for project
Empathy helps define problem
Prototype sparks a new idea
Tests reveal insights that redefine the problem

Concept of Design Thinking

Design thinking is a human-centered, iterative, and solution-focused process for solving problems. It's based on the idea that the best solutions are those that prioritize the needs of the people using them.

Why Is Design Thinking so Important?

"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."

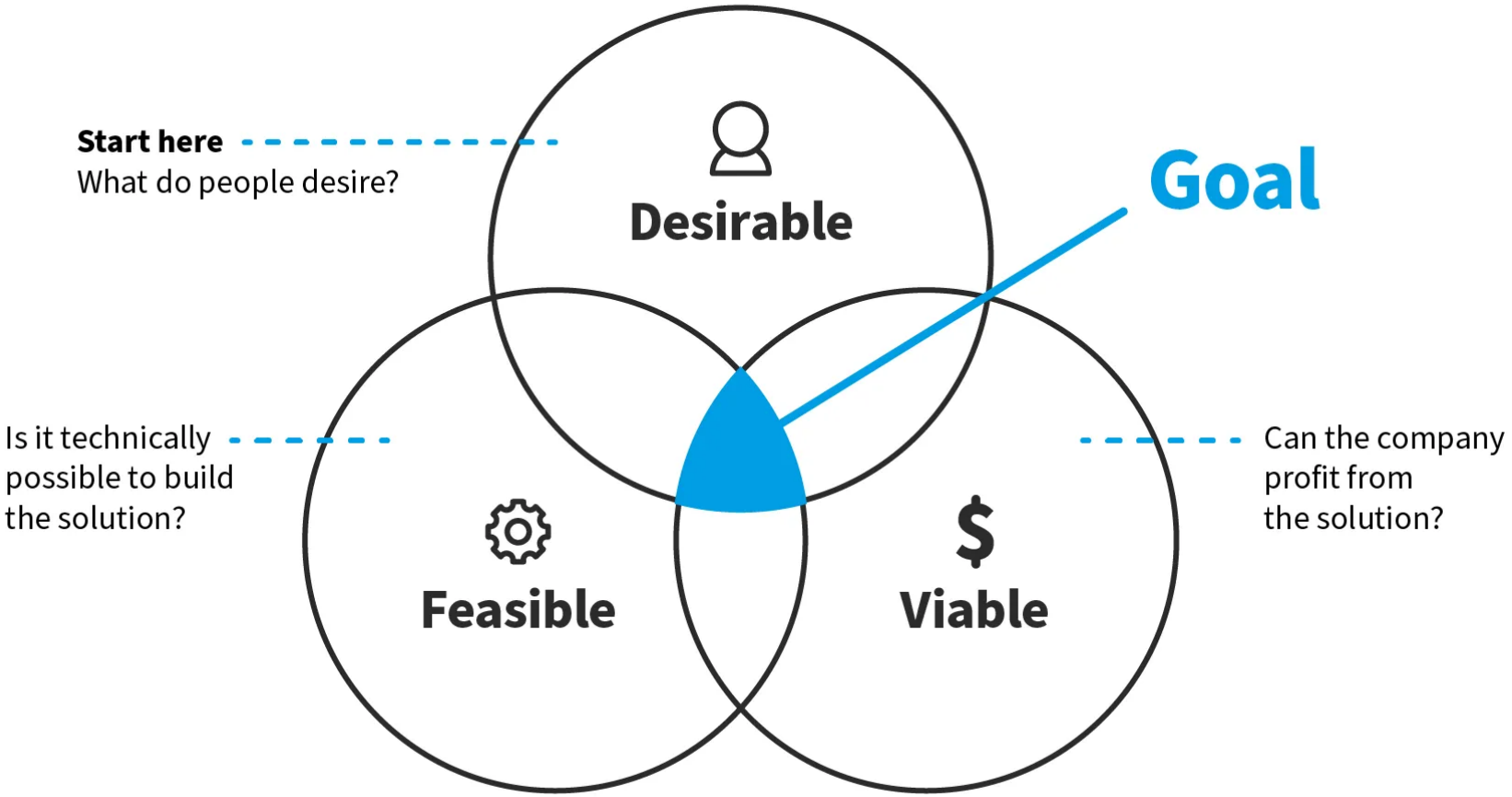
— Tim Brown, CEO of IDEO.

Design thinking **fosters innovation**. Companies must innovate to survive and remain competitive in a rapidly changing environment. In design thinking, cross-functional teams work together to understand user needs and create solutions that address those needs. Moreover, the design thinking process helps unearth creative solutions.

Goal of Design thinking (Desirability, feasibility and viability)

Design thinking offers **practical methods and tools** that major companies like Google, Apple and Airbnb use to drive innovation. From architecture and engineering to technology and services, companies across industries have embraced the methodology to drive innovation and address complex problems.

Three Lenses of Design Thinking



Desirability: Meet People's Needs

The design thinking process starts by looking at the needs, dreams and behaviors of people—the end users. The team listens with empathy to understand what people want, not what the organization thinks they want or need. The team then thinks about solutions to satisfy these needs from the end user's point of view.

Feasibility: Be Technologically Possible

- Once the team identifies one or more solutions, they determine whether the organization can implement them. In theory, any solution is feasible if the organization has infinite resources and time to develop the solution. However, given the team's current (or future resources), the team evaluates if the solution is worth pursuing. The team may iterate on the solution to make it more feasible or plan to increase its resources (say, hire more people or acquire specialized machinery).
- At the beginning of the design thinking process, teams should not get too caught up in the technical implementation. If teams begin with technical constraints, they might restrict innovation.

Viability: Generate Profits

- A desirable and technically feasible product isn't enough. The organization must be able to generate revenues and profits from the solution. The viability lens is essential not only for commercial organizations but also for non-profits.
- Traditionally, companies begin with feasibility or viability and then try to find a problem to fit the solution and push it to the market. Design thinking reverses this process and advocates that teams **begin with desirability** and bring in the other two lenses later.

Design thinking Process Model