

DESIGN THINKING AND INNOVATION

(Common to all Branches)

Course Code: 22ME11D1

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Course Outcomes: After successful completion of this activity the student will be able to

CO1: outline a problem, apply methods of Empathy on user groups

CO2: describe and Define the problem specific to the user group

CO3: apply Ideation tools to generate Ideas to solve the problem

CO4: develop prototype

CO5: test the ideas and demonstrate Storytelling ability to present the Ideas

Students shall form into groups and Identify a problem (preferably societal problem with engineering orientation to solve) suitable for the design thinking and go through the process week-wise. At the end of each phase, brief documentation shall be submitted and a final report covering all phases has to be submitted at the end of the semester.

Weeks 1-3:

Introduction to Design Thinking: A primer on design thinking - Traditional approach, The new design thinking approach. Stages in Design Thinking: Empathize, Define, Ideate, Prototype, Test. Mindset for design thinking, Design thinking for product and process innovation, Difference between engineering design and design thinking.

Case Studies: General, Engineering and Service applications.

Activities: Identify an Opportunity and Scope of the Project
Explore the possibilities and Prepare design brief

Weeks 4-6:

Methods and Tools for Empathize and Define phases:

Empathize - Methods of Empathize Phase: Ask 5 Why / 5W+H questions, Stakeholder map, Empathy Map, Peer observation, Trend analysis

Define - Methods of Define Phase: Storytelling, Critical items diagram, Define success

Activities: Apply the methods of empathize and Define Phases
Finalize the problem statement

Weeks 7-8:

Methods and Tools for Ideate phase:

Ideate - Brainstorming, 2X2 matrix, 6-3-5 method, NABC method;

Activities: Apply the methods of Ideate Phase: Generate lots of Ideas

Weeks 9-11:

Methods and Tools for Prototype Phase:

Prototype - Types of prototypes - Methods of prototyping - Focused experiments, Exploration map, Minimum Viable Product;

Activities: Apply the methods of Prototype Phase: Create prototypes for selected ideas

Weeks 12-13:

Methods and Tools for Test Phase:

Test - Methods of Testing: Feedback capture grid, A/B testing

Activities: Collect feedback; iterate and improve the ideas

Weeks 14-15:

Solution Overview - Create a Pitch - Plan for scaling up - Road map for implementation

Activities: Present your solution using Storytelling method

Week 16:

Project Submission: Fine tuning and submission of project report

Reference Books:

1. Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, HarperCollins e-books, 2009.
2. Michael Lewrick, Patrick Link, Larry Leifer, *The Design Thinking Toolbox*, John Wiley & Sons, 2020.
3. Michael Lewrick, Patrick Link, Larry Leifer, *The Design Thinking Playbook*, John Wiley & Sons, 2018.
4. Kristin Fontichiaro, *Design Thinking*, Cherry Lake Publishing, USA, 2015.
5. Walter Brenner, Falk Uebernickel, *Design Thinking for Innovation - Research and Practice*, Springer Series, 2016.
6. Gavin Ambrose, Paul Harris, *Design Thinking*, AVA Publishing, 2010.
7. Muhammad Mashhood Alam, *Transforming an Idea into Business with Design Thinking*, First Edition, Taylor and Francis Group, 2019.
8. S.Balaram, *Thinking Design*, Sage Publications, 2011.

Web References:

1. <https://designthinking.ideo.com/>
2. <https://thinkibility.com/2018/12/01/engineering-vs-design-thinking/>
3. <https://www.coursera.org/learn/design-thinking-innovation>
4. https://swayam.gov.in/nd1_noc20_mg38/preview