**Design Thinking for Industrial Innovation [2 0 4 2]**

Design Thinking for Industrial Innovation offers a human-centered approach to tackling complex challenges in organizations. It offers a dynamic framework that involves curiosity, imagination, divergent/convergent thinking, empathy, and observation. This iterative process highlights understanding user needs, fostering creative idea generation, and rigorously testing potential solutions. Through a combination of exercises, brainstorming sessions, case studies, group activities and presentations, this course will equip students with the core principles of design thinking, enabling them to develop innovative solutions that directly address user needs.

**Course Outcomes**

CO1: Understand the applications of design thinking

CO2: Understand and embody the dynamic mindset necessary for effective design thinking, e.g. non-linear thinking, empathetic thinking, ethnographic research, problem definition and framing, divergent and convergent thinking, and verbal and visual thinking and communication

CO3: Understand and be able to execute the end-to-end design thinking methodology and valuate the impact of design thinking methodologies on problem-solving and innovation

CO4: To originate and develop creative projects using design thinking methods through various digital prototyping tools and other materials

CO5: Demonstrate the ability to articulate and promote the value of design thinking within team or organizational settings.

**Course Contents**

**Section 1: Introduction to Design Thinking**

Why Design Thinking, Overview of design thinking principles and methodology, Evolution of Design Thinking and its significance in innovation

**Section 2: Problem Identification and Innovative Solution**

Discovering user needs, Idea Generation, Idea Selection, Design Thinking Steps, Design Thinking Tools: Create a Persona, Empathy Map, AEIOU, Hook Canvas, JTBD Framework, Micro & Macro Cycle, 5 WH Questions, Quick prototyping.

**Section 3: Case Studies**

IDEO, Nike, Apple, Airbnb, Ola, Zerodha, Paytm, etc.

**Section 4: Visualization and Prototyping**

Master the art of design, sketching and perspective drawing. Experiment with Colours and materials to bring creative ideas to life, Explore digital sketching and cutting-edge technologies like 3D printing etc. and other software tools for prototyping

**Section 5: Basic Design Realization techniques**

3D Printing, Reverse Engineering methods, Introduction to Integrating Mechanical, Electronic, Computer based systems, concept of creation of low-fidelity prototypes model to test and iterate on idea solutions.

**Recommended Books**

1. Christian Muller-Roterberg. Design Thinking for Dummies, Wiley, 2021
2. Koos Eissen and Roselien Steur, Sketching – The Basics, BIS Publishers, 2011
3. Tim Brown and Katz Barry. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. Harper Business, 2009.
4. Kevin Henry. Drawing for Product Designers, Laurence King Publishing, 2012
5. Alex Osterwalder, Yves Pigneur, Greg Bernarda, Alan Smith, Trish Papadakos. Value Proposition Design: How to Create Products and Services Customers Want. Wiley, 2014.
6. Michael Lewrick, Patrick Link, Larry Leifer. Design Thinking Playbk: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems, Wiley, 2018

**Hands on training**

3D Printers, 3D Scanners, CNC Millers and CNC Lathe, Vertical Machining, Arduino/Raspberry PI Electronic Boards, Figma/Adobe XD for Interface Design

**Teaching Methods**

The learning in this course will be roughly split into lecture/discussion and “in class exercises”, simulation or project work. Learning will primarily be experiential in nature through case analyses, group exercises, and a team project. Prototypes using paper or other easily accessed materials/platform will be expected of this project. Small teams of four to five students will be formed for the project/exercises.

**Evaluation**

Continuous Evaluation: Assignments (50%) to track progress and development.

Final Evaluation: Projects and Presentations (50%) to showcase innovative concepts and practical skills.