



NEW HORIZON COLLEGE OF ENGINEERING

Autonomous College, Permanently Affiliated to Visvesvaraya Technological University, Belagavi
Approved by AICTE & UGC, Accredited by NAAC with 'A' Grade, Accredited by NBA



A Report

AICTE IDEA Lab – Skill Development Program

A Six days – Skill Development Program was successfully organized at New Horizon College of Engineering under the initiative of the AICTE IDEA LAB and the Department of Research and Development.

| | |
|-------------------------------|--|
| Chief Mentor | : Dr. Manjunatha, Principal |
| Faculty Coordinator | : Dr. Revathi V, Dean R&D |
| Faculty Co Coordinator | : Dr. A. Sujin Jose, Associate Professor- R&D/Mech |
| Date | : 6 October 2025 to 11 October 2025 |
| Participants | : Students of New Horizon College Of Engineering |
| Trainers | : Dr. A. Sujin Jose, Mr. Rakesh, Mr. Thanuj Kumar, Mrs. Shweta |

Objectives

- Introduce the Fundamentals of Design Thinking, Develop Creative and Critical Thinking Skills, Enhance Problem-Solving and Innovation Capabilities.
- The objective of this program is to train the Students to acquainted with Laser printing machine, vinyl cutting machine and PCB Mat machine for making prototype of the visualized products
- Provide hands-on experience with prototyping Machines and Tools

Overview

- The program aimed to enable students to adopt design thinking not only as a problem-solving framework but also as a teaching-learning strategy to think critically and innovatively. Through interactive sessions, hands-on activities, and case studies, participants were introduced to the five stages of design thinking—Empathize, Define, Ideate, Prototype, and Test.
- The trainers provided in-depth training on the design and operation of three key prototyping machines: the PCB Mate Machine, the Heavy Duty Laser Cutting Machine, and the Vinyl Cutting Machine. Each session was carefully structured to cover both the theoretical aspects and practical applications of these advanced fabrication tools. The primary aim was to equip students with the necessary skills and knowledge to effectively operate the equipment available in the AICTE IDEA Lab

Day 1 (6 October 2025) : Design Thinking

Venue : IDEA Lab

Trainer : Mr. Rakesh

The session began with a detailed introduction to design Thinking. The Trainer elaborated on the five stages of design thinking—**Empathize, Define, Ideate, Prototype, and Test**. The participants were introduced to the concept of empathy as the starting point for innovation, emphasizing the need to understand user needs and challenges before developing solutions. Participants actively engaged in a series of interactive activities that guided them through all the stages of the Design Thinking process. Beginning with the Empathize stage, they worked in groups to understand user needs and challenges through discussions and brainstorming exercises. Empathy mapping is one of the foundational tools in the Design Thinking process, primarily used during the Empathize and Define stages. It helps designers, innovators, and researchers understand the user’s needs, feelings, motivations, and challenges. By visually representing what users say, think, do, and feel, empathy maps enable teams to develop human-centered solutions that address real problems effectively.

Components of an Empathy Map: An empathy map is generally divided into four key quadrants

1. **Says:** What the user expresses verbally during interviews or discussions.
2. **Thinks:** What the user is thinking but may not openly say.
3. **Does:** The actions or behaviours the user exhibits.
4. **Feels:** The emotional state or attitude of the user.

Some extended empathy maps also include:

- **Pains:** Challenges or problems the user faces.
- **Gains:** Desires, needs, or goals the user wants to achieve.



Day 2 (7 October 2025) : Design Thinking

Venue : IDEA Lab

Trainer : : Mr. Rakesh

The session began with a **Define stage** of Design Thinking is the second phase, where insights gathered during the Empathize stage are analyzed and synthesized to clearly articulate the core problem that needs to be solved. It focuses on turning observations and user research into meaningful problem statements, often framed as a “How might we...” question to inspire creative solutions. During this stage, designers identify user needs, pain points, and motivations, filtering out irrelevant information to concentrate on what truly matters to the user. The goal is to establish a clear, human-centered problem definition that guides the next phases of ideation and prototyping. A well-defined problem statement ensures that design efforts remain focused, relevant, and impactful, leading to innovative solutions that address real user challenges effectively.



Day 3 (8 October 2025) : Design Thinking

Venue : IDEA Lab

Trainer : : Mr. Rakesh

The session began with a **Ideate phase** in Design Thinking is the stage where creativity flourishes, and teams work together to generate a wide range of innovative solutions to the defined problem. It builds on the insights gained during the Empathize and Define stages, encouraging participants to think freely and explore multiple possibilities. The main goal of this phase is to move beyond obvious ideas and uncover fresh, user-centered solutions. Common activities conducted during the Ideate phase include brainstorming sessions, where participants rapidly share ideas without criticism; mind mapping, to visually connect related thoughts; SCAMPER (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse), which helps reframe existing ideas; and brainwriting, where individuals write down ideas that others can build upon. Other creative exercises like storyboarding, role-playing, and sketching are also used to visualize potential solutions. By the end of the Ideate phase, teams typically narrow down their ideas using techniques such as dot voting or feasibility-impact analysis to identify the most promising concepts to develop further in the Prototype stage.



Day 4 (9 October 2025) : Design Thinking

Venue : IDEA Lab

Trainer : : Mr. Rakesh

The session began with a **Prototype phase** in Design Thinking is the fourth stage, where abstract ideas are transformed into tangible forms that can be tested and refined. It involves creating simple, low-cost, and scaled-down versions of potential solutions to explore how they might work in the real world. The main goal of this phase is to bring ideas to life, identify design flaws early, and gather user feedback before developing a final product. Activities in the Prototype phase include sketching, storyboarding, creating physical models, developing wireframes or mock-ups, and using digital prototyping tools to simulate user interactions. Teams often build multiple prototypes to test different aspects of a solution, such as functionality, usability, or design appeal. These prototypes are then presented to users and stakeholders for feedback, which helps refine the design and guide future iterations. By the end of this phase, teams gain valuable insights into what works, what doesn't, and how the concept can be improved—laying a strong foundation for the next stage, the Test phase, where real user validation occurs.



Day 5 (10 October 2025) : Design Thinking

Venue : IDEA Lab

Trainer : : Mr. Rakesh

The session began with a **Test phase** of Design Thinking is the final stage, where the developed prototypes are evaluated by real users to gather feedback and insights. This phase focuses on observing how users interact with the prototype, understanding their experiences, and identifying areas for improvement. Testing is not just about validation—it's an opportunity to learn, refine, and iterate based on user reactions and suggestions. Activities in the Test phase include user testing sessions, interviews, surveys, and

observation to collect both qualitative and quantitative feedback. Designers pay close attention to user behavior, emotional responses, and verbal comments to uncover hidden needs or pain points. The feedback gathered helps determine whether the solution effectively meets user expectations and solves the defined problem. If necessary, teams return to earlier stages—such as Ideate or Prototype—to make improvements and test again. Ultimately, the Test phase ensures that the final solution is user-centred, practical, and effective, aligning perfectly with the goals of the Design Thinking process.



Introduction to Patent applying Process

Trainer: Dr. A. Sujin Jose

After completion of the Design Thinking phases and activities, participants were introduced to the **patent applying process** to help them understand how innovative ideas can be legally protected and transformed into intellectual property. This session highlighted the importance of safeguarding creative solutions developed during the ideation and prototyping stages. Participants learned about the various steps involved in filing a patent, including conducting a prior art search to verify the novelty of their ideas, preparing a detailed patent specification with claims and drawings, and submitting the application to the appropriate patent office. They were also guided through the examination, publication, and grant procedures, emphasizing how patents not only protect an inventor's rights but also encourage further innovation and commercialization. This introduction aimed to equip participants with practical knowledge about the value of patents and motivate them to think beyond design solutions—toward innovation ownership and real-world implementation. The patent filing process begins with an idea or invention that must be new, useful, and non-obvious. The first step involves performing a patent search to ensure that the invention has not been previously patented or disclosed. Once confirmed, the inventor prepares a patent application, which includes a detailed specification, claims, abstract, and drawings that describe the invention clearly.



Day 6 (11 October 2025) : Introduction and Hands-on Training of Machine

Venue : IDEA Lab

Introduction to PCB Designing and Prototype of PCB

Trainer : Mrs. Shweta

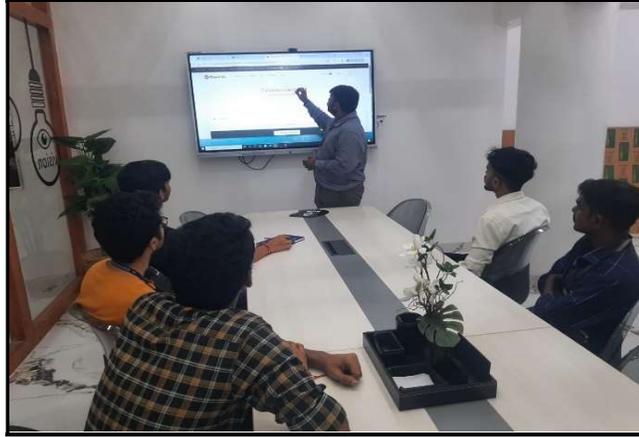
The session began with a detailed introduction to the PCB Mat Machine and its associated software tools, including Eager, Copper Cam, Auto Leveller, and Mach3 Mill. The trainer provided an overview of the machine's components, working principles, and safety guidelines. Following the introduction, participants were guided through the PCB design process using Eager software, where they learned how to create schematic layouts and convert them into board designs. These designs were then exported and processed through Copper Cam software to generate the corresponding G-Code files, which are essential for driving the milling machine. Once the G-Code was prepared, participants were introduced to the Auto Leveller software, which is used to adjust the depth of the milling tool according to surface variations, ensuring precise engraving. Finally, the Mach3 Mill software was used to operate the PCB Mate Machine and execute the milling process. Under the trainer's supervision, participants successfully created functional PCB prototypes, gaining valuable hands-on experience in every stage of the prototyping workflow—from design to fabrication.



Introduction to Heavy Duty Laser Printing Machine

Trainer : Mr. Thanuj Kumar

The trainers began the session by providing a thorough introduction to the operation of the Heavy Duty Laser Printing Machine along with the RD Works software, which is integral to controlling the laser cutting and engraving process. Participants were familiarized with the machine's hardware components, safety protocols, and maintenance procedures to ensure smooth and safe operation. Following the demonstration, participants were encouraged to create their own unique designs using the RD Works software, applying the skills they had learned to customize shapes, texts, and patterns suited to their projects. Once the designs were finalized, the lab instructors took turns operating the laser machine, learning to correctly position the materials and execute the cutting or engraving processes. Through this hands-on experience, participants successfully produced precise physical models of their digital designs, reinforcing their understanding of the entire workflow from concept to prototype.



Outcomes

- Enhanced Understanding of Design Thinking Process.
- Practical Application through Hands-on Activities. Improved Problem-Solving and Innovation Skills. Collaboration and Teamwork.
- Development of Prototypes and Implementation Ideas.
- Participants gained hands-on experience in operating advanced prototyping machines such as the PCB Mat Machine, Heavy Duty Laser Cutting Machine.
- Lab instructors became familiar with industry-relevant software tools including Eager, Copper Cam, Mach3 Mill, RD Works enhancing their technical proficiency

Conclusion

The Faculty Development Program on Design Thinking proved to be an insightful and enriching experience for all participants. The sessions effectively bridged theoretical understanding with practical application, enabling faculty members to explore innovative problem-solving approaches through empathy, ideation, prototyping, and testing. It provided valuable technical training to lab instructors, equipping them with the knowledge and skills to operate key prototyping equipment. Such programs play a vital role in bridging the gap between academic infrastructure and practical application, thereby fostering innovation and technical excellence within the institution.

