CENTRE OF EXCELLENCE

Maharana Pratap Institute of Technology

Approved by AICTE New Delhi, and affiliated to Dr. A.P.J. Abdul Kalam Technical University Lucknow

Lachhipur, Sonauli Road, Gorakhnath, Gorakhpur, UP-273015

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Certificate Program in Computer Aided Design & 3D Printing (Foundation Level)

Course Duration	6 Weeks	**Date of start of the first batch: 05 May 2026**
Days per Week	5	
Learning hrs. per day	3 – 4 Hrs.	
Total Learning Hrs.	90 Hours	
Intended Audience	Students/ faculties/ researchers with any of the below mentioned academic qualification and having intreset in the area of CAD/CAM/Additive Manufacturing • Passed 10+2 • Pursuing ITI/Diploma in any trade • Students pursuing/passed graduation in any descipline	

Course Description

This program is designed to introduce learners from diverse academic backgrounds to the fundamentals of manufacturing, computer-aided design (CAD), and additive manufacturing (3D printing). The course provides a structured learning pathway from basic design concepts to hands-on prototyping using FDM-based 3D printing. It emphasizes practical exposure, design thinking, and innovation, enabling participants to transform ideas into tangible prototypes. The program is interdisciplinary and suitable for students from non-engineering backgrounds.

Learning Outcomes

By the end of this course, participants will be able to:

- Understand basic concepts of manufacturing and emerging technologies
- Create 2D drawings and basic 3D models using CAD tools
- Explain different additive manufacturing technologies and their applications
- Prepare 3D models for printing using slicing software
- Operate FDM-based 3D printers and execute print jobs
- Perform basic troubleshooting during printing processes
- Develop simple prototypes from conceptual ideas
- Demonstrate awareness of innovation and startup opportunities in 3D printing

Industry Partner: Phillips Machine Tools India Pvt. Ltd. Is the industry partner, supporting training and skill development for students in this program.

Certification: Training Certificates will be provided to students upon completeion of the course subject to fulfilment of following conditions: (i) fulfilment of at least 80% attendance in the course (ii) Satisfactory performance in the end test/assessment (iii) Submission of the project and presentation in Week 6.

Registration Process: Students are required to complete the initial registration by submitting the Google Form**.** **https://forms.gle/6CGcExEq4yy9qxgm9**

Note: After registration, please visit the Centre of Excellence, MPIT Gorakhpur, for fee submission and final enrolment.

MODULE WISE COURSE PLAN

Module 1: Manufacturing & Design Thinking (Week 1)

S.No	Lesson Title	Topics Covered	Hours
1	Introduction to Manufacturing	Traditional vs modern manufacturing, production systems, examples, industry overview	3
2	Emerging Technologies	AI, robotics, IoT, 3D printing overview, digital manufacturing ecosystem	3
3	Design Thinking	Problem identification, ideation, user-centric design, creativity tools	3
4	Case Studies	Real-world applications, product examples, innovation stories	3
5	Workshop & Activity	Idea generation, problem-solving activity, group discussion	4

Module 2: CAD Fundamentals (Week 2)

S.No	Lesson Title	Topics Covered	Hours
1	CAD Introduction	Software overview (SolidWorks/AutoCAD), UI, coordinate system	3
2	2D Sketching	Lines, arcs, constraints, dimensioning, drafting standards	4
3	3D Modeling Basics	Extrude, revolve, basic features, primitives	4
4	Feature Tools	Fillet, chamfer, patterns, simple assemblies	3
5	Practice Session	Design exercises, assignments, troubleshooting	4

Module 3: CAD Practice & Product Design (Week 3)

S.No	Lesson Title	Topics Covered	Hours
1	Advanced Sketching	Complex geometries, constraints, parametric design	3
2	Assembly Basics	Mating, alignment, simple mechanisms	3
3	Product Design	Simple product modeling, real-life components	4
4	Design Validation	Model checking, dimensions, corrections	3
5	Mini Project	Individual design project, evaluation	5

Module 4: Additive Manufacturing Basics (Week 4)

S.No	Lesson Title	Topics Covered	Hours
1	AM Introduction	Types: FDM, SLA, SLS, differences, advantages	3
2	Materials	PLA, ABS, resins, powders, properties	3
3	Process Flow	CAD → STL → slicing → printing workflow	3
4	Applications	Industrial, medical, aerospace applications	3
5	Demo Session	Machine demonstration (FDM + overview SLA/SLS)	4

Module 5: 3D Printing Hands-on (Week 5)

S.No	Lesson Title	Topics Covered	Hours
1	Slicing Basics	STL, slicing software, parameters, infill, supports	3
2	Printer Setup	Calibration, bed leveling, filament loading	4
3	Printing Practice	Hands-on printing, monitoring process	4
4	Troubleshooting	Common errors, quality issues, fixes	3
5	Advanced Practice	Multiple prints, optimization, evaluation	5

Module 6: Project & Innovation (Week 6)

S.No	Lesson Title	Topics Covered	Hours
1	Idea Development	Problem selection, concept building	3
2	Prototype Design	CAD + printing integration	4
3	Innovation Basics	Startup concepts, product thinking	3
4	Project Development	Prototype completion, refinement	4
5	Final Presentation	Demo, evaluation, feedback	5

With Best Regards

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