AMPUSH

AMPUSHWORKS ENTERPRISES PRIVATE LIMITED

Technical Training Programmes 2026–27

SYLLABUS

3D Printing and Additive Manufacturing

Course information	
Programme	7. 3D Printing and Additive Manufacturing
Duration	One month
Total hours	102 hours (theory 32, practical 64, examinations 6)
Course fee	₹3,000 per candidate
Batch size	Minimum 10 candidates; batches scheduled after sufficient registrations
Eligibility	B.Tech, Diploma, ITI, B.Sc and BCA students, engineering graduates, working professionals and college faculty
Prerequisites	Basic computer skills. No prior design experience is required.

1. Course Introduction

Additive manufacturing turns a digital design into a physical part, layer by layer. This course covers the full workflow, from 3D design and slicing to printing, finishing and prototype development.

2. Course Objectives

On completing this course, candidates will be able to:

- Explain additive manufacturing technologies
- Create 3D models suitable for printing
- Prepare files using slicing software
- Operate and maintain a 3D printer
- Produce and finish functional prototypes

3. Hours Distribution

Component	Hours
Theory classes (8 units × 4 hours)	32
Practical sessions (14 labs × 4 hours)	56
Mini project (practical)	8
Theory examination	2
Practical examination	4
Total programme hours	**102**

Practical sessions including the mini project total 64 hours (56 + 8). The examinations (6 hours) are held after completion of the training.

4. Theory Syllabus (32 hours)

Unit	Topics covered	Hours
Unit 1	INTRODUCTION TO ADDITIVE MANUFACTURING • What additive manufacturing is • Technologies: FDM, resin and others • Applications in prototyping and production	4
Unit 2	3D DESIGN FUNDAMENTALS • 2D sketches and 3D features • Dimensions and tolerances • Design for printability	4
Unit 3	3D CAD MODELLING • Modelling simple parts • Assemblies and fits • Exporting STL files	4
Unit 4	SLICING SOFTWARE • Layer height, infill and walls • Supports and adhesion • Estimating time and material	4
Unit 5	MATERIALS • PLA, PETG, ABS and others • Material properties and selection • Storage and handling	4
Unit 6	PRINTER OPERATION • Printer parts and set-up • Bed levelling and first layer • Monitoring a print	4
Unit 7	MAINTENANCE AND TROUBLESHOOTING • Routine maintenance • Common print defects and causes • Nozzle and extruder care	4
Unit 8	POST-PROCESSING AND PROTOTYPING • Support removal and finishing • Assembly of printed parts • Prototype testing and iteration	4

5. Practical Sessions (64 hours)

Lab	Practical assignment	Hours
1	Printer familiarisation and safety	4
2	Bed levelling and first-layer test	4
3	Print a calibration model	4
4	Model a simple bracket in CAD	4
5	Model a part with holes and fits	4
6	Export STL and slice with default settings	4
7	Compare layer heights and infill	4
8	Supports and overhang test	4
9	Print with a second material	4

Lab	Practical assignment	Hours
10	Diagnose and correct a print defect	4
11	Routine maintenance and nozzle cleaning	4
12	Design a two-part assembly	4
13	Post-processing and finishing	4
14	Measure a printed part and correct the design	4
MP	Mini project: Design and print a functional enclosure or bracket for an electronic device, including fit testing and finishing.	8
	Total practical hours	**64**

6. Mini Project

Project: Design and print a functional enclosure or bracket for an electronic device, including fit testing and finishing.

Each candidate (or small group) plans, builds, tests and documents the project during the final practical sessions, and presents it during the practical examination.

7. Hardware, Tools and Software

- FDM 3D printers
- PLA and PETG filaments
- CAD and slicing software on laptops
- Measuring tools (vernier caliper) and finishing tools

8. Learning Outcomes

By the end of the course, candidates will be able to:

- Design printable 3D models
- Slice and print parts with suitable settings
- Maintain a printer and fix common defects
- Develop and finish a functional prototype

9. Assessment and Certification

Examination	What is assessed	Duration
Theory examination	Understanding of concepts, components and principles covered in the 8 units	2 hours
Practical examination	Ability to build, wire, program, test and fault-find; presentation of the mini project	4 hours

Practical assignments completed during the course are also reviewed as part of the practical assessment.

A **training completion certificate** will be issued subject to successful completion of the programme and assessment requirements.

10. Enrolment and Contact

To enrol, send your name, mobile number, college or organisation, course and year, and the name of this programme to Ampushworks. You will be informed when your batch is scheduled.

Contact	Details
Address	Priyadarshi Nagar, Bhagwat Nagar, Patna, Bihar – 800026
Website	https://ampushworks.com
Registration form	https://www.ampushworks.com/training.html#register
Email	support@ampushworks.com
Phone	+91 94702 13936
WhatsApp	+91 94702 13937

Note: This syllabus may be updated by Ampushworks to reflect new technology and equipment. The syllabus issued at the start of a batch applies to that batch.