

Summer Camp: 3D Printing Exploration

Course Syllabus - Hands-on 3D Printing for Students & Beginners

Duration: 12 Hours total **Sessions:** 6 × 2 Hours **Level:** Beginners **Style:** Interactive & Hands-on

A hands-on summer experience where students go from "what is a 3D printer?" to actually designing and printing their own creations. Across 6 fun sessions, you'll learn to set up the printer, fix things when they go wrong, and make objects that are actually useful - all while getting a taste of one of the most exciting technologies around.

WHAT YOU'LL BE ABLE TO DO

- Take a design file and print a real 3D object from start to finish.
- Use a 3D printer safely and with confidence.
- Spot what went wrong with a print - and fix it.
- Design a simple object that actually fits and works in real life.
- Pick the right plastic and settings for whatever you want to make.
- Understand how 3D printing fits into today's world of making things.

WHAT HAPPENS EACH DAY

1 From Screen to Printer - Getting Your Design Ready

- What is a 3D design file and where to find free models online
- Introduction to slicing software (Bambu Studio / Cura)
- Key settings explained: layer height, print speed, infill density
- Generating print instructions and sending them to the printer
- Starting our first print together and understanding what to watch for

2 Setting Up the Printer - Nailing That First Layer

- Loading and unloading filament correctly
- Cleaning and preparing the build surface
- Manual vs automatic bed leveling - how and when to use each
- Adjusting nozzle height (Z-offset) for a perfect first layer
- Diagnosing and fixing a bad first layer on a live print

3 Choosing the Right Plastic for the Job

- PLA - the everyday beginner-friendly material
- PETG - stronger, more flexible, and heat-resistant
- Specialty filaments: flexible, glow-in-the-dark, wood-filled, and more
- How infill pattern and wall count affect strength and weight
- Storing filament properly to prevent moisture damage

4 When Things Go Wrong - Fixing Print Problems

- Identifying and clearing a clogged nozzle
- Fixing warping and poor bed adhesion
- Diagnosing under-extrusion and over-extrusion
- Dealing with stringing, blobs, and layer shifts
- Routine maintenance tasks and printing responsibly to reduce waste

5 Make Something Useful - Designing for the Real World

- Taking accurate measurements of real objects at home
- Introduction to Fusion 360 - professional design software, free for personal use
- Basic shapes, combining and cutting geometry
- Understanding tolerances - why parts need a little extra clearance
- Exporting your design and slicing it for print

6 The Bigger Picture - Where 3D Printing is Headed

- FDM vs resin (SLA/MSLA) vs powder (SLS) - what's the difference
- Real-world applications: medical, aerospace, education, consumer products
- How 3D printing compares to traditional manufacturing methods
- Choosing a printer for home use - what to look for and what to spend
- Communities, YouTube channels, and resources to keep learning