

## Hands-On Additive Manufacturing: 3D Printing at PM SHRI KV Andrews Ganj

PM SHRI Kendriya Vidyalaya Andrews Ganj is transforming theoretical STEM concepts into tangible prototypes through school-level 3D printing. Utilizing additive manufacturing technology, students fabricate physical objects layer by layer, mastering hardware operation, material behavior, and rapid prototyping.

### Featured 3D Prints

The printed artifacts highlight practical design execution across various functional categories:

- **Kinetic Spiral Track:** A multi-tier gravity run with curved ramps and elevated pillars, demonstrating critical print parameters like overhang angle limits and vertical bridge stability.
- **Component Housings & Organizers:** Multi-grid storage trays and vented electronics enclosures engineered to test wall thickness, perimeter shells, and uniform surface finishing.
- **Intricate Figurines:** High-detail miniature statuettes requiring fine layer heights and accurate nozzle extrusion control to capture complex contours.
- **Everyday Utility & Signage:** Ergonomic pieces such as custom combs, modular vessels, and outline cutout figures highlighting precise dimensional tolerances and clean bed adhesion.

### The 3D Printing Process

To bring their digital files into the physical world, students managed the complete Fused Deposition Modeling (FDM) workflow:

- **Slicing Setup:** Importing 3D files into slicing engines to configure infill density, layer resolution, print speeds, and support structures.
- **Printer Calibration:** Leveling the print bed, managing hotend temperatures, and preparing print-bed surfaces to ensure optimal first-layer adhesion.
- **Filament Extrusion:** Operating FDM printers with lightweight, biodegradable PLA filament, observing precise thermoplastic deposition in real time.
- **Post-Processing:** Carefully removing support material, cleaning stringing artifacts, and inspecting structural integrity.

This hands-on engagement with 3D printers at PM SHRI KV Andrews Ganj provides students with essential vocational exposure to rapid manufacturing, practical problem-solving, and modern industrial production methods.