3D Printing with Design Software - One Month Course Syllabus

Course Overview

Duration: 1 Month (4 Weeks)

Total Sessions: 16 (4 sessions/week, 1.5-2 hours each)

Level: Beginner to Intermediate

Course Objectives:

- Understand the basics of 3D printing and design software.
- Learn to create 3D models using CAD software.
- Set up and calibrate a 3D printer.
- Slice models and prepare them for printing.
- Troubleshoot common 3D printing issues.

Week 1: Introduction to 3D Printing and Design

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Session 1:

- Introduction to 3D printing technology
- Types of 3D printers and materials

Session 2:

- Introduction to CAD software (Fusion 360, SolidWorks, Tinkercad)
- Basic tools and interface

Session 3:

- Creating simple 3D models (cube, cylinder, sphere)
- Exporting models to STL format

Session 4:

- Practical Exercise: Design and print a keychain

Week 2: Advanced 3D Modeling Techniques

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Session 5:

- Sketching and Extrusion

- Revolve, Sweep, and Loft

Session 6:

- Combining objects (Boolean operations)

- Fillets, chamfers, and patterns

Session 7:

- Adding textures and material properties

- Hollowing and shelling models

Session 8:

- Practical Exercise: Design and print a small gear or bracket

Week 3: 3D Printer Setup and Troubleshooting

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Session 9:

- Setting up and calibrating the 3D printer

- Bed leveling and nozzle calibration

Session 10:

- Slicing software (Cura, PrusaSlicer)

- Setting print parameters (layer height, infill, support)

Session 11:

- Troubleshooting common issues (warping, stringing, under-extrusion)

- Adjusting print speed and temperature

Session 12:

- Practical Exercise: Print a complex part with supports

Week 4: Final Project and Optimization

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Session 13:

- Design for manufacturability

- Reducing material use and print time

Session 14:

- Post-processing techniques (sanding, painting, polishing)

- Quality testing and stress testing

Session 15:

- Final Project Planning

- Start working on a functional design

Session 16:

- Final Project Presentation and Feedback

Final Project

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- Design and print a functional part (e.g., phone holder, hinge, tool organizer)

- Submit 3D model, print settings, and post-processing details

Deliverables

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- 3D Models (STL/OBJ files)

- Sliced G-code files

- Printed objects

- Design report with troubleshooting steps