

SOFTWARE LIST FOR 3D PRINTING LABORATORY

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
Ultimaker Cura	Convert models to G-code
PrusaSlicer	Professional slicing
MeshLab	Fix STL files
Blender	Modify 3D models
OctoPrint	Web-based printer control
Netfabb Basic (old OSS)	Repair models
OpenSCAD	Code-based modeling

SOFTWARE LIST FOR IoT LABORATORY

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
Arduino IDE	Code upload & testing
Thonny	Beginner-friendly Python IDE
PlatformIO	Advanced embedded development
Raspberry Pi OS	Linux OS for Pi
Mosquitto	IoT communication
Node-RED	Visual IoT programming
ThingsBoard (Community)	IoT visualization
Home Assistant	Automation platform
MQTT Explorer	Debug MQTT messages
Wokwi (Offline support tools)	Arduino simulation support

SOFTWARE IS INSTALLED AS REQUIRED BY THE IDEA TEAM OR TRAINING TEAM. ANY OPEN-SOURCE SOFTWARE APPROVED BY AICTE IS USED

SOFTWARE LIST FOR LABORATORY MANAGEMENT AND TEACHING TOOLS

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
Version Control	Git + GitHub/GitLab CE
Documentation	MkDocs
LMS	Moodle
Containerization	Docker
Virtualization	VirtualBox
Collaboration	JupyterHub

SOFTWARE LIST FOR MECHANICAL DESIGN

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
FreeCAD	Parametric modelling for mechanical parts
OpenSees	Structural simulation
CalculiX	Stress, strain, thermal analysis
OpenFOAM	Fluid flow simulation
LibreCAD	Technical drawings
QGIS	Civil surveying, mapping
Blender (Open Source)	Visualization & modelling
Gmsh	Mesh generation for simulations

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SOFTWARE LIST FOR PCB DESIGN LABORATORY

SPECIFICATIONS	
SOFTWARE	PURPOSE AND USAGE
KiCad	Industry-standard open PCB design
Ngspice	Circuit simulation
Gerbv	Gerber file viewer
FreeRouting	Automatic PCB routing
gEDA	Schematic capture
KiCost	Automatic BOM generation

SOFTWARE LIST FOR LASER CUTTING MACHINE & CNC LABORATORY

SPECIFICATIONS	
SOFTWARE	PURPOSE AND USAGE
Inkscape	Vector Design - Create cutting designs
LaserGRBL	Laser Control - Send jobs to laser engravers
K40 Whisperer	CAM Software - Control K40 lasers
Boxes.py	Layout - Parametric box generator
LightBurn (Alt OSS tools)	CNC Integration
LinuxCNC	CNC Control - Machine controller
FreeCAD Path Workbench	CAM Software - Toolpath generation
Universal Gcode Sender	G-Code Sender - Control CNC machine
CAMotics	Simulation - Toolpath simulation
PyCAM	2D CAM - CNC milling toolpaths
bCNC	Engraving - CNC control and probing

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SOFTWARE LIST FOR AI-ML LAB

(SPEECH RECOGNITION & IMAGE PROCESSING)

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
OpenCV	Image processing
TensorFlow	Neural networks
PyTorch	Research framework
NumPy	Matrix operations
Matplotlib	Plotting
scikit-image	Image algorithms
Labellmg	Dataset labeling
Jupyter Notebook	Interactive coding
Mozilla DeepSpeech	Speech-to-text
Kaldi	Research speech recognition
NLTK	Text processing
Librosa	Feature extraction
ESPnet	Speech models
Vosk	Lightweight speech recognition
Festival	Text-to-speech

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