



Design Services Capabilities

Packaging and Systems Facility(PASF)

Prepared by	Reviewer	Approver	Date
SFT	TM	PASF Committee	08/12/2025

Contact List:

Designation	Facility	Contact Number	Email ID
Technology Manager	PASF	2293-3353/419	pasf.cense@iisc.ac.in

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Distribution List

1. Chair, ISO Core committee (Owner / edit access)
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Note

The management of CeNSE mandates all staff should follow all the protocols defined in this document. In case of any doubt, please contact the ISO Core Committee. Any deviation from this will be considered as violation and will result in appropriate disciplinary action based on the discretion of the ISO Core Committee.

Thank you

**For Safety concerns, please contact
BMS (Building Management System)
Extn :115 or 080-2293-3324**

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We provide end-to-end Engineering Design Services covering Embedded Systems, Electronics Hardware, Firmware Development, testing, and System Integration. Our capabilities support Industrial, Automotive, Medical, Consumer Electronics, and IoT applications.

1. PCB & Hardware Design Capabilities

PCB Type	Rigid PCB (up to 16 layers), Flex, Rigid-Flex
Design Tools	Altium Designer (Primary), OrCAD / KiCad (on request)
Capabilities	High-Speed Design, Impedance Control, Differential Pairs, HDI, Microvia
Minimum Trace / Space	3 mil / 3 mil
Minimum Drill Size	0.2 mm (Laser Microvia)
Copper Thickness	Up to 3 oz

2. Embedded Firmware Development

Supported MCU Families	STM32, ESP32, PIC, AVR, ATmega, NXP LPC, TI MSP430 / C2000
Core Skills	Driver Development, RTOS, Low-Power Systems, Bootloaders
Communication Protocols	I2C, SPI, UART, USART, RS485, CAN, Modbus, BLE, Wi-Fi
Sensor Integration	ECG, IMU, Temperature, Pressure, Industrial Sensors
Application Expertise	IoT devices, Wearables, Medical Monitoring, Industrial Controllers
Tools	Keil, STM32CubeIDE, ARDUINO IDE

3. Testing And Debugging

Debug Interfaces	SWD, JTAG, ISP
Test Equipment	Oscilloscope, Logic Analyzer, Function Generator, Power Analyzer
Validation Methods	Signal Integrity, Functional Test, Stress & Reliability Test
Protocol Testing	I2C, SPI, UART, RS485, CAN, Modbus

Documentation	Test Reports and records, Compliance Checklists
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4. Software, Automation & Simulation Tools

Automation Tools	LabVIEW for test automation & data acquisition
Algorithm Development	MATLAB for DSP, analysis & modelling
Simulation Tools	LTSpice, TINA-TI, Proteus, Multisim
Custom Tools	Python-based data logging and analysis software
Documentation	Design Files, Source Code, Release Notes

5. Additional Technical Capabilities

High-Speed Design	Expertise in designing high-speed digital boards involving DDR3/DDR4 memory interfaces, USB 2.0/3.0 data channels, PCIe differential routing, and multi-gigabit signal paths. Includes length matching, impedance tuning, skew management, and complete timing closure.
RF & Wireless Design	Advanced RF layout including antenna impedance matching, trace tuning, ground isolation techniques, and integration of 2.4 GHz, BLE, Wi-Fi, LoRa, and Sub-GHz wireless modules. PCB antenna optimization for maximum signal performance.
Real-Time Systems Engineering	Real-time embedded design using FreeRTOS and other RTOS frameworks, deterministic task execution, inter-task communication, interrupt-driven

	architectures, and timing-critical system optimization.
High Precision Systems	Use of high-precision components such as precision resistors, low-offset op-amps, precision ADCs/DACs, stable oscillators, and low-drift voltage references to achieve highly accurate, repeatable, and low-noise system performance that ensure tight tolerances, improved measurement accuracy, reduced drift, and stable operation across temperature and environmental variations.

6. PASF Mechanical Design Services:-

SolidWorks is a powerful 3D CAD software widely used in mechanical design and product development. Its capabilities include:

1. 3D Modeling

- Creation of fully parametric 3D models
- Solid, surface, and hybrid modeling
- Complex assemblies with large component management

2. Assembly Design

- Bottom-up and top-down assembly modeling
- Mates, constraints, and motion relationships
- Interference detection and collision checking

3. Sheet Metal Design

- Sheet metal part creation
- Bend allowances and K-factor support
- Flat pattern generation

4. Additive Manufacturing / 3D Printing Tools

- STL, OBJ export
- Print preparation and checking
- Orientation and support optimization

5. Design Automation

- Configurations and design tables
- Macros and API customization
- DriveWorks for rule-based design automation

6. Rendering & Visualization (SolidWorks Visualize)

- High-quality photo-realistic rendering
- Animations and exploded view videos
- Material and lighting simulation

7. PASF 3d Printing Services:-

The **Bambu Lab X1 Carbon** is a high-performance 3D printer designed for speed, precision, and multi-material printing. Its advanced automation and engineering make it suitable for professional prototyping, functional parts, and high-quality models.

1. High-Speed Printing

- Print speeds up to **500 mm/s**
- Acceleration up to **20,000 mm/s²**
- Maintains accuracy even at high speeds due to advanced motion control

2. Multi-Color and Multi-Material Printing

- Compatible with **AMS (Automatic Material System)**
- Supports up to **16 colors** with multiple AMS units
- Automatic filament switching, drying, and tangle detection

3. High Precision & Excellent Print Quality

- High dimensional accuracy
- Adaptive layer height
- Flow rate calibration for consistent extrusion
- Active vibration compensation for smooth surfaces

4. Strong Material Compatibility

- Prints standard materials: **PLA, PETG, TPU, ABS, ASA**
- Prints engineering materials: **PA, PC, PET-CF, PA-CF**
- Carbon fiber & glass fiber reinforcement supported (X1C-specific feature)

5. Advanced Sensors & AI Features

- **AI-based spaghetti/failure detection**

- Dual-core processor for real-time monitoring
- Lidar for **first-layer inspection**
- Automatic bed leveling using multiple sensors

6. Heated Enclosed Print Chamber

- Fully enclosed design
- Stable temperature for high-strength materials
- Reduced warping for ABS/ASA/PC/PA

7. Remote Monitoring & Control

- Built-in camera for live monitoring
- Bambu Handy mobile app
- Cloud file transfer and remote print management

8. Dual Cooling & Superior Thermal Management

- Auxiliary part cooling fan for high-speed bridging
- Hotend up to **300°C**
- Heated bed up to **110°C**

9. Advanced Slicing Integration

- **Bambu Studio** with optimized profiles
- Auto-support generation
- Real-time slicing speed and efficiency
- Seam painting and texture mapping features