IHUB DivyaSampark
IIT Roorkee

SKILL LYNC

POST GRADUATE CERTIFICATION PROGRAM IN

IOT & EMBEDDED SYSTEM DESIGN

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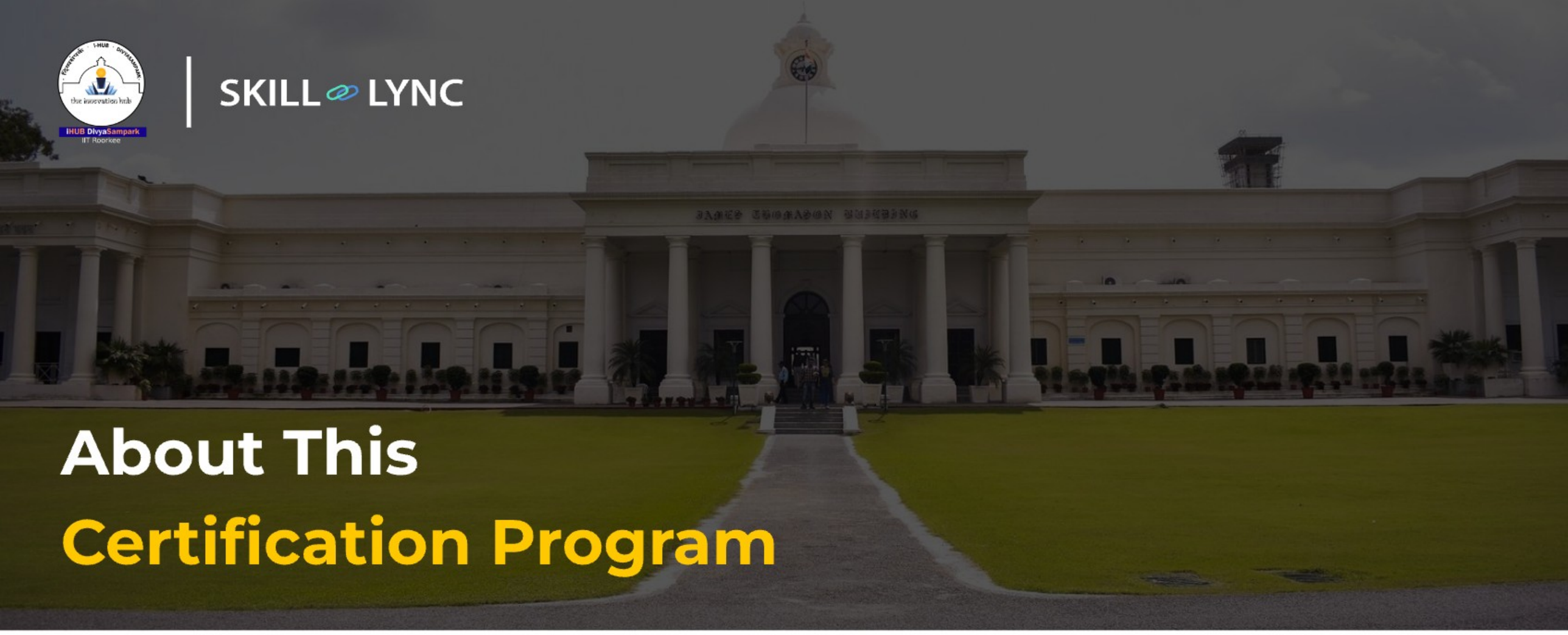
Website: https://skill-lync.com/



About This Certification Program

The Post Graduate Certification Program offered by **iHUB DivyaSampark, IIT Roorkee** in collaboration with **Skill-Lync** is designed to address the growing gap between traditional engineering education and the rapidly evolving skill requirements of the automotive software and embedded systems industry. The program delivers a comprehensive curriculum covering both foundational and advanced concepts in Embedded Systems, AUTOSAR, Real-Time Operating Systems, Embedded Linux, Model-Based Development, and Automotive Software Validation, enabling learners to develop practical, application-ready software engineering capabilities.

India's automotive and mobility sector currently supports over **19 million jobs** and is projected to generate more than **2 million** additional engineering and technical roles by **2030**. As vehicles increasingly transition toward software-defined architectures, employers seek engineers who can design, configure, integrate, and validate embedded software within real production ECUs, safety-critical environments, and automotive regulatory frameworks, rather than limiting their expertise to theoretical programming knowledge.

The program delivers an integrated learning experience that combines strong technical foundations in C++ and embedded architecture with applied, industry-aligned automotive workflows. Through structured, project-based learning, exposure to modern automotive software tools, AUTOSAR configuration environments, real-time operating systems, model-based design platforms, and verification & validation practices, learners develop industry-ready competencies aligned with real automotive embedded software development lifecycles. Successful completion is supported by **iHUB DivyaSampark, IIT Roorkee certification and 100% placement assistance provided by Skill-Lync**.

iHUB DivyaSampark, Official Website: https://tih.iitr.ac.in/

IHub Divyasampark, IIT Roorkee Certificate

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The iHUB DivyaSampark, IIT Roorkee certification, awarded as part of the **Post Graduate Certification Program in IoT & Embedded System Design** represents successful completion of a structured, academically guided learning journey aligned with institutional Standards.

Certificate issued by iHUB DivyaSampark, IIT Roorkee in collaboration with Skill-Lync. The certification validates that the learner has met defined academic requirements and demonstrated applied competence in Automotive Embedded Systems, AUTOSAR, Real-Time Operating Systems, Embedded Linux, Model-Based Development, and Software Verification & Validation through evaluated coursework and industry-aligned projects. It adds formal academic weight to the program outcomes and enhances the credibility of a candidate's profile for core automotive software, embedded systems, and ECU development roles within OEMs and Tier-1 organizations.

What This Certification Represents

- Academic recognition from an Institute of National Importance
- Industry-relevant learning evaluated through structured assessment
- Strong theoretical grounding aligned with institutional standards
- Enhanced credibility during resume screening and interviews

Program Highlights

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Career-Oriented Curriculum

Designed for engineers at different experience levels, aligned with real automotive embedded systems roles.

12-Month Industry-Focused Program

A structured 12-month learning journey mapped to OEM and Tier-1 engineering requirements.

Industry-Grade Projects

Build hands-on expertise with 20+ real-world automotive embedded systems and ECU software development projects.

Practical Challenges

Strengthen applied skills through 135 structured challenges covering core automotive embedded systems and software concepts.

Automotive Embedded Engineering Tool Proficiency

Build hands-on expertise using industry-standard tools across embedded C++, AUTOSAR, RTOS, Embedded Linux, model-based development, and software validation.

Career Readiness & Interview Support

Sessions delivered by IIT faculty and experienced industry professionals, supported by live and recorded learning.

Learn From IIT Faculty & Industry Experts

Access career counselling, mock interviews, and interview opportunities, provided by Skill-Lync, subject to eligibility.

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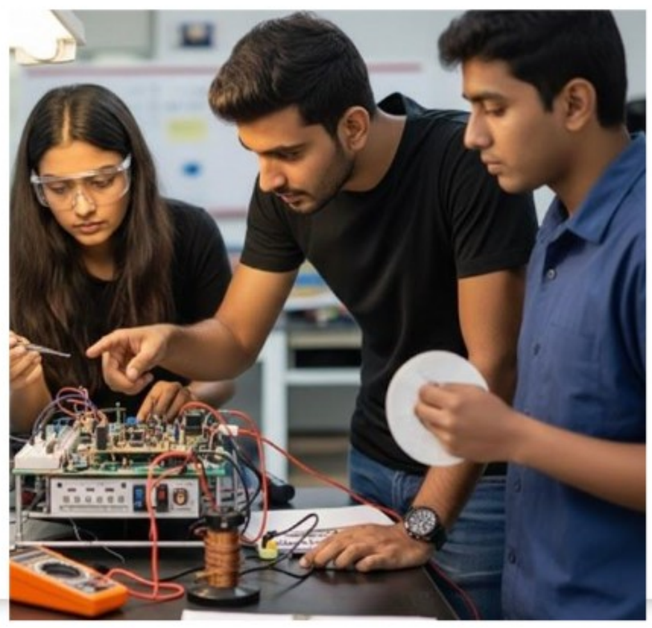
Who This Program Is Designed For

The automotive embedded ecosystem spans multiple domains - including embedded hardware architecture, firmware development, real-time operating systems, Autosar architecture, model-based development, and software verification & validation. This Post Graduate Certification Program in IoT & Embedded System Design is structured to support engineers at different career stages who aim to build or advance careers in automotive embedded and software-defined vehicle domains.

Who Can Benefit From This Program

ECE / EEE / CSE Graduates & Freshers

Ideal for graduates looking to enter the automotive embedded domain with a strong foundation in embedded systems architecture, C++ programming, communication protocols (CAN, SPI, I2C, UART), and real-time systems, supported by hands-on firmware development and hardware interfacing exposure.



Early-Career Engineers (0–2 Years Experience)

Suitable for engineers from automotive, electronics, embedded, or software backgrounds who want to transition into automotive embedded roles involving ECU development, Autosar architecture, RTOS-based applications, embedded Linux porting, or model-based development workflows.

Working Professionals (2–5 Years Experience)

Designed for professionals seeking structured upskilling in embedded C++ development, FreeRTOS implementation, AUTOSAR stack integration, ECU software configuration, model-based control development, and automotive software verification using industry-standard tools and workflows.

Professionals Aiming For System & Product Roles

Relevant for engineers aspiring to work on ECU architecture, AUTOSAR-compliant systems, real-time firmware, embedded Linux system bring-up, communication stack integration, and software validation aligned with OEM and Tier-1 automotive development practices.

Course Curriculum

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Embedded Core Mandatory Courses (7 Courses)

1. Fundamentals Of Embedded Systems

This module introduces the core principles of embedded system architecture, focusing on microcontrollers, peripherals, hardware interfacing, and communication protocols. It builds a strong foundation for understanding how embedded hardware and software interact in real-world automotive and industrial systems.

Module Details:

- Embedded System Architecture (MCU, MPU, Peripherals)
- Sensors & Actuators Interfacing
- ADC & DAC Fundamental
- Communication Protocols - UART, SPI, I2C, CAN
- Power Circuits & NTC Thermistor Basics
- System Design Methodology
- Mini Hardware Implementation Projects

2. Introduction To C++ Programming

This module introduces the fundamentals of C++ programming, focusing on structured programming, object-oriented concepts, and coding best practices essential for embedded systems development.

Module Details:

- C++ Syntax & Control Structures
- Functions & Modular Programming
- Object-Oriented Programming Basics
- Memory Concepts
- STL Fundamentals
- Coding Standards & Debugging Techniques

Course Curriculum

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3. Embedded Programming Essentials

This module advances C++ knowledge into embedded-focused programming concepts, emphasizing safe memory handling, scalable firmware architecture, and modern C++ features used in production systems.

Module Details:

- Pointers & References
- Dynamic Memory Management
- Classes & Objects
- Templates
- Exception Handling
- Modern C++11 Features
- Multithreading Basics

4. Hands-On FreeRTOS

This module provides practical exposure to real-time operating systems, focusing on multitasking, synchronization mechanisms, and deterministic application behavior for embedded applications.

Module Details:

- Task Creation & Scheduling
- Queues, Semaphores & Mutexes
- Timers & Event Groups
- ISR Integration
- Priority Management
- Debugging Tools
- Safety Best Practices

5. Embedded Linux Porting (IMX6ULL)

This module focuses on embedded Linux system bring-up and customization, covering kernel configuration, bootloader setup, and driver porting for production-grade embedded platforms.

Module Details:

- Cross Compilation
- Kernel Configuration
- Bootloader (U-Boot)
- BSP Customization
- Device Tree Configuration
- Driver Porting
- System Bring-Up Process

6. Introduction To Model-Based Development Using MATLAB/Simulink

This module introduces system-level modeling and control development using MATLAB and Simulink, focusing on simulation, validation, and auto-code generation workflows.

Module Details:

- System Modeling Fundamentals
- Control Algorithm Development
- Simulation Workflows
- Auto Code Generation
- SIL & HIL Testing
- Plant Modeling
- Requirements Traceability

Course Curriculum

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7. Programming The Internet Of Things (IOT)

Get familiar with fundamental concepts of IoT and understand how IoT converges with data science, cloud computing, and other domains. Learn how to use HTTP and MQTT as communications protocols.

Module Details:

- Internet Protocol for Embedded Systems
- MQTT Standard for IoT
- IoT Hardware Platforms – ESP8266 and Raspberry Pi
- API Programming
- Cloud Computing
- IoT Application Demo

Advanced Optional Courses (3 Courses)

8. Software Verification & Validation For Hand Code

This module focuses on ensuring software reliability through structured testing, static analysis, and coverage-based validation techniques used in automotive software development.

Module Details:

- Static Code Analysis
- Unit Testing
- Integration Testing
- Code Reviews
- Traceability Management
- Coverage Metrics (Statement, Branch, MC/DC)
- Debug Strategies

Course Curriculum

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9. Introduction To Automotive Embedded Systems & AUTOSAR

This module introduces automotive ECU architecture and the AUTOSAR layered software model, helping learners understand how automotive software stacks are structured and configured.

Module Details:

- ECU Architecture
- AUTOSAR Layered Model
- Virtual Functional Bus (VFB)
- Basic Software (BSW) Overview
- Communication Stack
- Diagnostics Fundamentals

10. Software Verification & Validation For Model-Based Development

This module focuses on validating models through structured testing workflows and compliance-oriented validation techniques used in automotive safety environments.

Module Details:

- Model Testing Techniques
- MIL / SIL / HIL Testing
- Back-to-Back Testing
- Requirements Validation
- Test Automation
- Toolchain Integration

Projects

1. Embedded Systems Fundamentals Projects

In these projects, learners apply core embedded systems concepts including microcontroller interfacing, communication protocols, sensor integration, and signal processing. The projects focus on hardware-software integration, real-time data acquisition, and validation of system outputs through practical implementation.

Embedded Systems Hardware & Communication Projects

- 16×2 LCD Interfacing Using I2C Communication Protocol
- Ultrasonic Distance Measurement with Signal Filtering

2. Embedded Programming & System Design Projects

In these projects, learners apply core C++ programming, dynamic memory management, and object-oriented design principles to solve structured system-level problems. The projects focus on algorithm development, data handling, modular architecture design, and runtime system implementation aligned with embedded software development practices.

Embedded Software Development Projects

- IT Inventory Management System
- Automobile Maintenance System (Object-Oriented Library Development)

3. Embedded Systems & Firmware Development Projects

In these projects, learners apply core C programming, data structures, finite state machine logic, and object-oriented design principles to solve structured embedded and system-level problems. The projects focus on algorithm implementation, state-based control logic, memory management, and modular software architecture aligned with embedded firmware development practices.

Embedded Programming & System Logic Projects

- User Interfaces for Mathematical Set Operations (Linked List Implementation)
- Finite State Machine for Aircraft Landing Gear Control System
- Automobile Maintenance System (Object-Oriented Library Development)

4.Model-Based Development Projects

In these projects, learners apply Model-Based Development (MBD) principles using MATLAB and Simulink to design, simulate, and validate advanced automotive control features. The projects focus on system modeling, requirement traceability, algorithm development, and guideline-based implementation aligned with industry-standard MBD workflows.

Automotive Control Feature Development Projects

- Traffic Jam Assist Feature Development (MATLAB/Simulink)
- Highway Assist – Lane Change Assist Algorithm Development (MBD Workflow)

Projects

5. Advanced Model-Based Development Projects

In these projects, learners apply Model-Based Development (MBD) principles using MATLAB and Simulink to design, simulate, and validate automotive control systems based on defined requirements. The projects emphasize requirement traceability, simulation accuracy, model compliance, and code generation aligned with industry-grade automotive development workflows.

Automotive Control System Development Projects

- Vehicle Direction Detection (MBD-Compliant Simulink Model Development)
- Adaptive Cruise Control Feature Development (Requirement-Based MBD Workflow)

6. Software Verification & Validation Projects

In these projects, learners apply structured software quality assurance methodologies aligned with automotive coding and safety standards. The projects focus on static code analysis, compliance validation, dynamic testing strategies, coverage metrics evaluation, and report generation consistent with industry-grade verification workflows.

Automotive Software Quality & Testing Projects

- Static Code Review & MISRA-C 2012 Compliance Analysis
- Dynamic Analysis – White Box Testing with Coverage Validation (Statement, Branch, MC/DC)

What Our Learners Say

“The structured learning and continuous guidance helped me strengthen my technical skills and prepare confidently for industry roles.”

Kannaiah Yangala - Post Graduate Trainee, Tata Technologies

“The EV Design & Development program gave me hands-on exposure to automotive technologies and the confidence to start my career in core EV roles.”

Venkata Naga Sandeep Bolisetty - Associate Engineer, BlueBinaries

“I’m grateful for the opportunity to start my career at Tata Technologies. Skill-Lync played a key role in enabling this transition by connecting learning with real industry opportunities.”

Mohammed Maheen - Graduate Engineer Trainee (ER&D), Tata Technologies

“Skill-Lync’s structured courses and strong career support were instrumental in securing my placement. The certification validated my skills and prepared me for real-world engineering roles.”

Praveen Kumar - Engineer, Intelizign Engineering Services Pvt. Ltd.

“Skill-Lync’s comprehensive training and expert guidance helped me build strong industry-relevant skills. The certification played an important role in achieving my placement.”

Tejavath Vijay - Electrical & Electronics Engineer, Adrasti Technologies

Take The Next Step In Your Engineering Career

Join a community of engineers building the future of **Embedded System Design**. Our admissions team is here to guide you in choosing the right pathway aligned with your career goals.

Admissions Open

Note: To ensure high-quality faculty interaction and personalized project mentorship, intake is strictly limited to 50 participants per batch.

Call Us: +91 93426 91281 **Email:** info@skill-lync.com **Visit:** https://skill-lync.com/

Why Choose This Program?

- Certificate from iHUB DivyaSampark, IIT Roorkee
- 25+ examples and IOT projects
- Cloud & Edge Integration Experience
- Career Support & Interview Preparation
- Industry-Standard Tools Exposure

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