Rugged Board

CENTER OF EXCELLENCE PROGRAM

INDUSTRIAL IOT TRAINING PROGRAM FOR AI & ML

RUGGED BOARD GROUP

Sector 2, HSR Layout,
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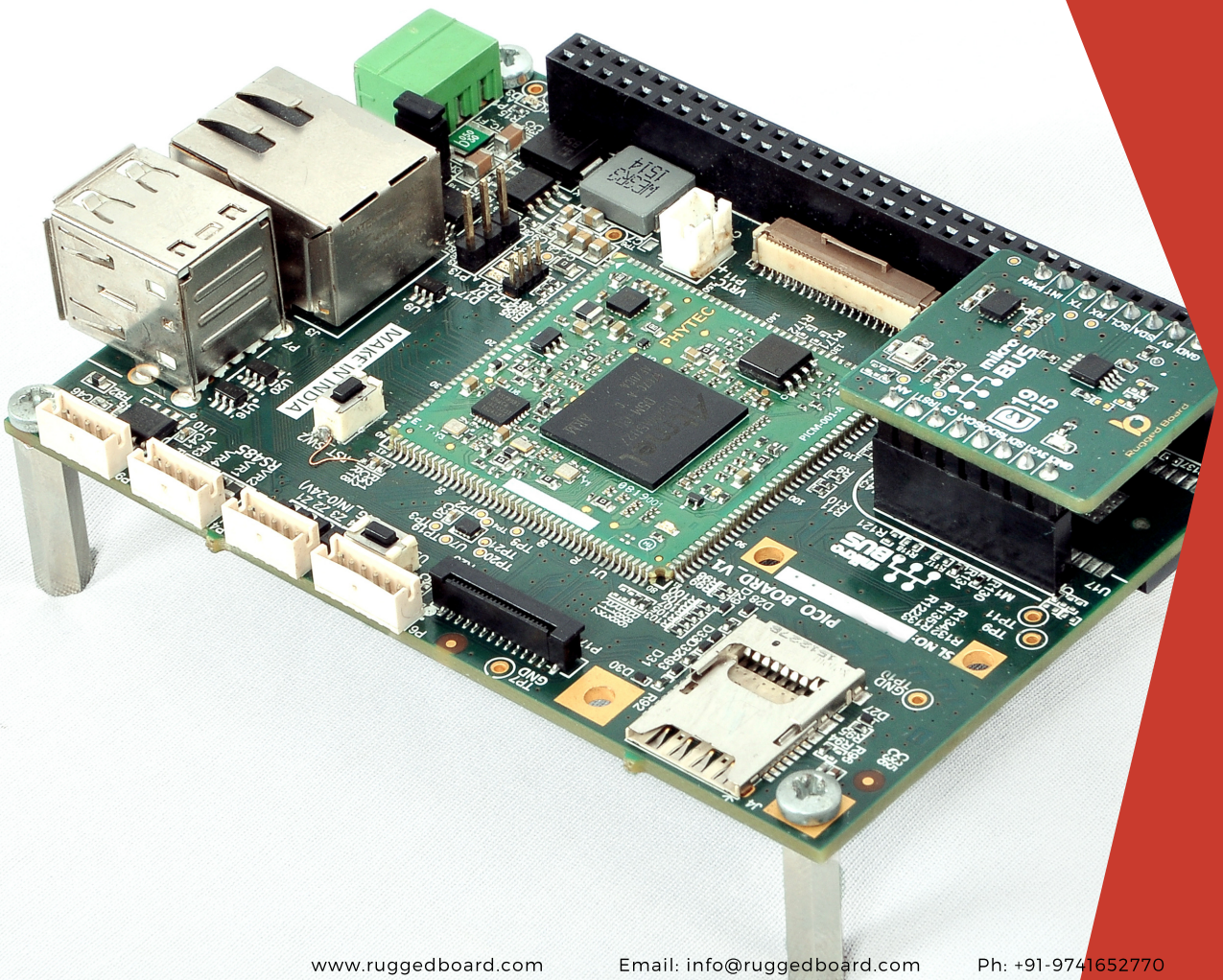
PROPOSED BY
RUGGED BOARD COMMUNITY



OVERVIEW OF THE PROGRAM

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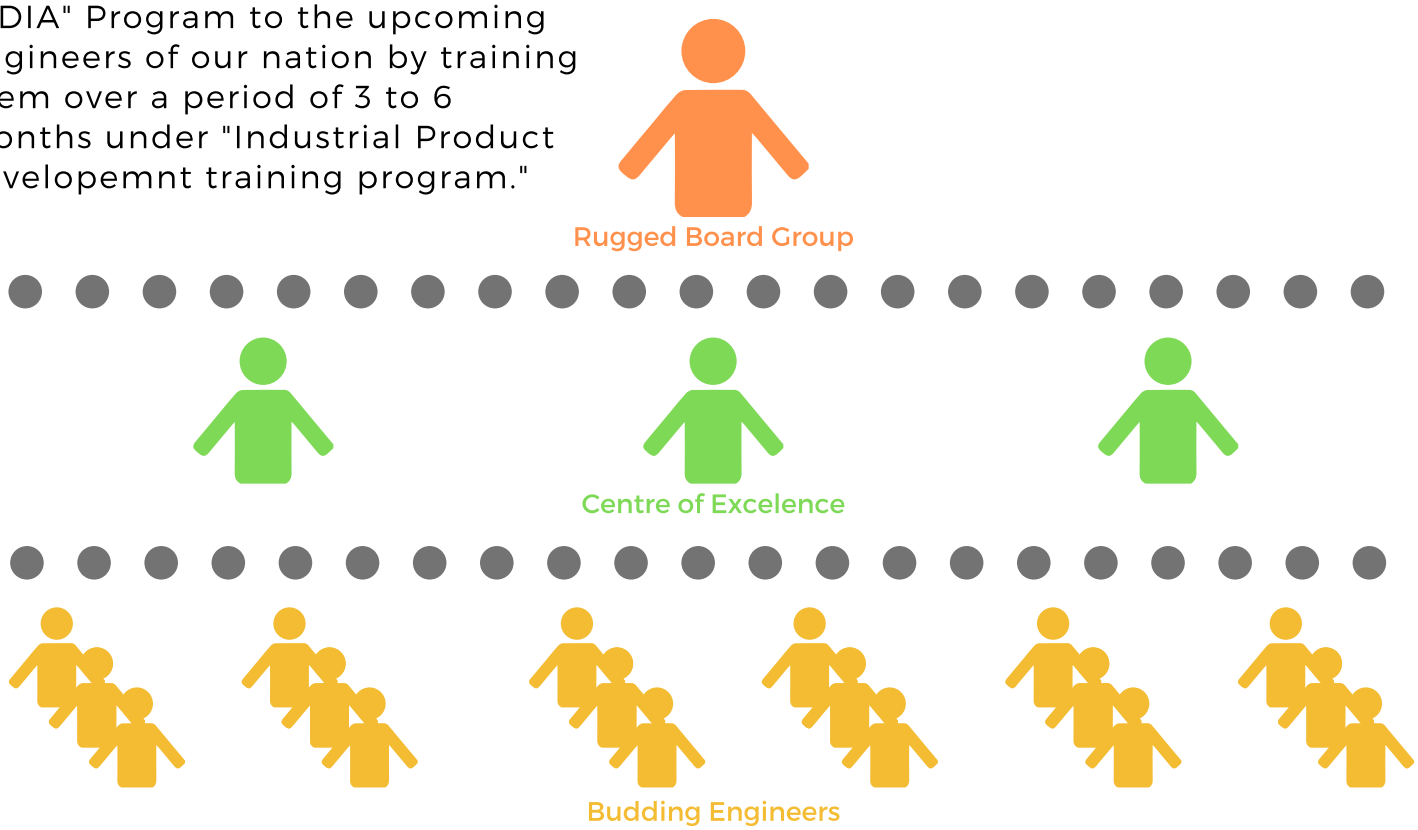
Universities & Training Institutes are the building centers for Skill INDIA Program by training their Faculties & Trainers. With the dawn of a new era, Smarter and Efficient companies need access to real-time operational data via connected machines. To be competitive in the world market, the manufacturing sector needs Industry 4.0 ready solutions, and move towards additive manufacturing. For automating, manufacturing segment requires end-to-end knowledge of embedded systems, mobile applications and cloud computing.

"Center of Excellence" training program Introduces "Skill INDIA" Program to the upcoming Engineers of our nation by training them over a period of 3 to 6 months under "Industrial Product developemnt training program."

BENEFITS

- Training Faculties and Trainers to train the students.
- One year of support to conduct and run training.
- Lab Setup with 20 hardware Kits.
- Conducting 40 Hours x 4 i.e. 160 Hours onsite training and workshops with industry applications covering Industry-4.0, Smart Transportation, Smart Energy, Smart Agriculture, Smart Healthcare & Smart Retail



MODULE 1

IOT ARCH, LINUX INTRO & PYTHON PROGRAMMING

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Detail discussion on Training structure and TID process

- Walk through entire training plan.
- The objective of each phase of TID process (Training, Integration & Development, Deployment & Maintenance)
- Define IoT,
- IoT Applications and Use cases w.r.t Verticals

Basics of IoT & Detailed Arch

- Big Picture of IoT Architecture
- How data flows from Sensor to Cloud to DA/ML to User
- All about sensors and their types
- MCU and MPU Hardware Boards as Sensor Nodes, IoT Gateways & Edge Computing devices
- Different programming Languages used in IoT
- Wireless technologies overview (RF, ZigBee, 6LoWPAN, BLE, WiFi, Sub-1GHz, LoRA, SigFox, Cellular 2G, 3G, 4G LTE, Cat-M, NbIoT)
- Cloud Server, communication protocols and Frameworks
- User Applications and Frameworks

A quick refresh of Basic Electronics

- Define and understand the usage of basic electronic components
- Some DIY projects references

Linux Basics

- Introduction to Linux and shell commands
- Basic commands for Network and Disk Management
- Compiling C program and executing in Linux

PYTHON Programming

- Working with Variables in Python
- Numeric Operations in Python
- Python Compound Statements
- Python String Types
- Python's Tuples
- Python's Lists
- Creating Python Functions
- Classes and Objects
- Networking Programming
- Multi-threaded Programming
- Modules and Packages
- Popular Python libraries and their usage
- Database access (MySQL/SQLite)
- Handling JSON and XML data formats

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CONTENTS

MODULE 2

DEVICE & CLOUD PROGRAMMING

Introduction to Embedded Linux System Architecture

- Embedded Linux System Arch
- Building blocks of Embedded Systems
- Hardware Intro (ARM Arc, Cores, SOCs, SOMs & SBCs)
- HW Interfacing protocols (GPIO, UART-RS232/RS485, I2C, SPI, SDIO, USB, Ethernet, CAN, Display: RGB, LVDS, MIPI
- Details of RB

Board Bring-up

- Powering up RB
- Playing around with Toolchain
- Writing Python and C program on RB.
- Using TFTP and NFS Server

GPIO programming

- GPIO Subsystem of Linux
- Programming LED & Relays
- Sensor Interfacing
- Proximity Sensor, PIR Sensor, LDR Sensor and other Digital Sensors

Gateway & Cloud Programming

- Basic methods of Cloud communication protocols Pub/Sub, Client-Server
- Application layer protocols HTTP/MQTT/XMPP/CoAP
- Cloud communication protocols (HTTP, MQTT, CoAP)Use of these protocols for Cloud communication
- Control device from Cloud using MQTT
- Basics of pairing device to an Access point

Field Device Interfacing

- How to get data from Filed Machinery / Devices like Energy Meter, CNC, PLC, etc
- RS232, RS485
- Mod-Bus protocol
- Programming Filed devices over Ethernet, WiFi and CAN
- PLC interfacing with ruggedBOARD using OPC-UA

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MODULE 3

IOT WIRELESS COMMUNICATION PROGRAMMING

BLE (Bluetooth Low Energy)

- Basics of BLE
- Designing BLE based Sensor and BLE Beacons
- Designing BLE device Controllers
- BLE Gateway Programming
- Android App

Zig-Bee & LoRA

- Understanding ZigBee and programming
- Understanding LoRA and programming

Cellular Connectivity & GPS

- How to use 2G/3G/4G-LTE/NbIoT/Cat-M for data connection
- How to programming GPS

Home/ Industrial Automation Project

- Hardware programming of the Kit
- Cloud & Mobile App development
- Use-case Home Automation & Plant watering

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CONTENTS

MODULE 4

INDUSTRIAL PRODUCT DEVELOPMENT

- Project Design and basic Sensor Programming
- Business Logic development and Modules Programming
- Complete System Integration
- Unit Testing and System Testing
- Mechanical and Deployment
- Installation and Testing
- Filed Testing
- Bug Fixing and System Stability

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LIVE PROJECT VERTICALS DURING TRAINING

Industry-4.0

Smart Energy

Smart Transportation

Smart Agriculture

Smart Cities

Smart Retail

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TRAINING SCHEDULE & LOCATION

Schedule

- Date: Follow "Upcoming Events" page in RB Community site.
- Duration: 1 Year
- Time: 4 to 5 Hours daily

Location

- Location: On your premises

SUPPORT

- Lifetime Support will be provided through ruggedBOARD official forum page.
- ***Visit:*** *www.community.ruggedboard.com*

REGISTER TODAY TO GET IN TOUCH WITH RUGGED BOARD GROUP

REGISTER HERE

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