

Industrial Internship On Future Technologies

Applications



Industry-4.0



Advance Robotic AI Research System



Advance Drone AI Research System



EVCS



Smart Energy Meter



Energy Management System



Smart Streetlight System



Greenhouse Automation

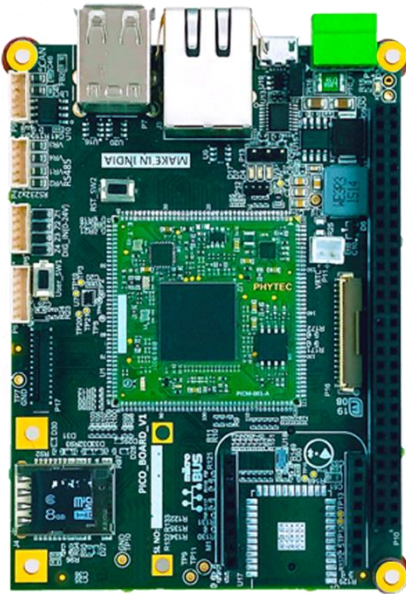
RuggedBoard is an Industrial grade IoT board developed by PHYTEC Embedded Pvt. Ltd Make In INDIA with German Quality. It is the first of its kind Industrial IoT Single Board Computer with multiple interfaces required for IIoT applications in Industry-4.0, Smart Cities, Smart Transportation, Smart Energy & Smart Agriculture. This IoT project would build big Hardware eco-system in INDIA and support Industries to develop their own IoT products & manufacture in INDIA with ease.

To promote MAKE IN INDIA & Aatmanirbhar Bharat by developing Products & Technology IP's in INDIA and bringing in University partners to hold major role in research & development.

| Module# | Module – Name | Topics to be Covered (Theory) | Topics to be Covered (Hands-on) |
|---------|-----------------------------------|--|---|
| 1 | Linux Programming with C & PYTHON | Datatypes, Functions, Arrays, Pointers, Storage Classes, Type Casting, Typesets, Enums, Type Qualifiers, Bit Fields, Function Pointers, Header Files, Command Line Arguments, Variable Arguments, Error Handling, Other C Libraries Note: 300 programs mandatory | <ul style="list-style-type: none"> • Writing C programs on Linux • Compiling and executing in Linux • Linux Executable format info & tools • Debugging C applications using GD • Understanding and writing Make files |
| 2 | Platform Programming | Rugged Board and understand the basics of IoT. Introduction to IoT, its architecture, and applications (smart homes, healthcare, industry, etc.). | <ul style="list-style-type: none"> • Set up the Rugged Board • Learn basic Linux commands • Interface Rugged Board GPIO pins • Project: Turn on an LED using GPIO |
| 3 | Sensor Integration | Interface basic sensors with Rugged Board and collect sensor data. | <ul style="list-style-type: none"> • Interface temperature (BMP-280, lsm6dsl), light (LDR), and motion (PIR) sensors • Write Python scripts to read sensor data using GPIO and libraries (LIBMRAA, LIBUPM) • Project: Build a simple temperature and humidity logger |
| 4 | Frameworks & Stack Development | Implementation of Application specific Stack & Framework | <ul style="list-style-type: none"> • Software Stack & Framework development like MODBUS, FLEDGE, EVEREST, ROS-2, WebRTC, MAVROS, MAVLink, EKF2/EKF3 |
| 5 | Cloud Integration | Learn and implement IoT communication protocols Understand MQTT (Message | <ul style="list-style-type: none"> • Set up an MQTT broker (e.g., Hivemqtt) • Write Python code for |

| | | | |
|-----|--------------------------|--|---|
| | | Queuing Telemetry Transport) and HTTP for data transmission. | <p>publishing/subscribing to sensor data</p> <ul style="list-style-type: none"> • Explore HTTP requests (Python requests library) • Project: Send sensor data to an MQTT broker and display it on a mobile app • Send sensor data from Rugged Board to a cloud platform using API keys |
| 6 | Analytics & Dashboarding | Data Analytics & Data Visualization, Dashboard design | <ul style="list-style-type: none"> • Create visual dashboards to monitor real-time sensor data & data analysis |
| 7.1 | Application-1 | Industry 4.0 Technologies | Design & Develop Industry-4.0 Application for Predictive Maintenance |
| 7.2 | Application-2 | Advanced Drone AI Research Systems | <ul style="list-style-type: none"> • Design & Develop Advance Drone AI System |
| 7.3 | Applicaion-3 | Advanced Robotic AI Research Systems | <ul style="list-style-type: none"> • Design & Develop Advance Robotic AI System |
| 7.4 | Applicaion-4 | Smart Energy Metering | <ul style="list-style-type: none"> • Design & Develop Smart Energy Meter System |
| 7.5 | Applicaion-5 | Electric Vehicle Charging Systems | <ul style="list-style-type: none"> • Design & Develop Electric Vehicle Charging Systems |
| 7.6 | Applicaion-6 | Building Automation | <ul style="list-style-type: none"> • Design & Develop Building Automation System |
| 7.7 | Applicaion-7 | Greenhouse Automation | <ul style="list-style-type: none"> • Design & Develop Greenhouse Automation System |

Complete Hands-On on INDIA's First Open Source Hardware "RuggedBOARD" Swadeshi Single Board Computer



A5D2x @500MHz
CORTEX - A5
64MB RAM
32MB FLASH



2 x USB



DC & USB POWER

RS-232



2 x RS232

RS-485



1x RS485

CAN



1 x CAN



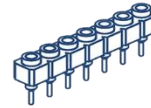
1 x ETHERNET



TFT & CAP TOUCH



1 x MICROSD SLOT



EXPANSION HEADER



mikroBUS CONN.



mPCIe CONN.



MICRO SIM SLOT

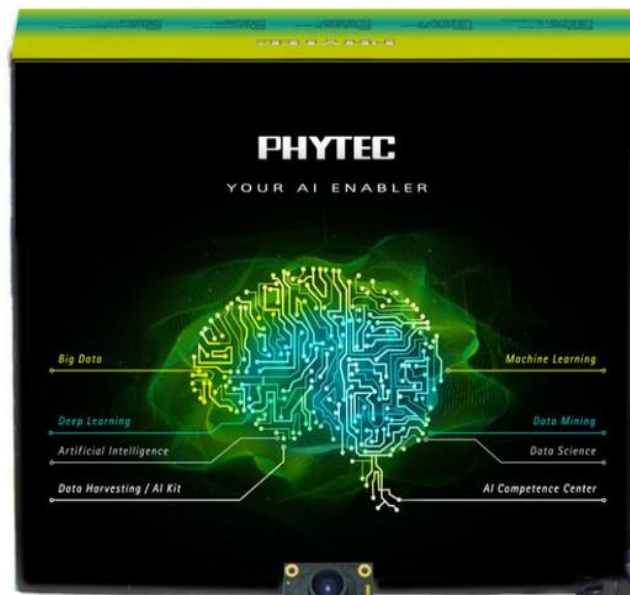
For More details visit: <https://community.ruggedboard.com>

TensorFlow Lite

PYTORCH

ONNX

eIQ™



<https://www.phytec.in/en/produkte/development-kits/phyboard-pollux-ki-kit/>

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