IIES Indian Institute of Embedded Systems



PGD DIPLOMA IN EMBEDDED SYSTEMS AND ARTIFICIAL INTELLIGENCE

Offline
Online

6 Months

Gain Real Project Experience & Placement

Modules

Programming in c
- Learn C Programming from Scratch
- Hands-on Coding with Real Examples
- Build Strong Foundation for Embedded Systems

Data Structures & Algorithms
- Fundamentals & Data Structures
- Algorithm Design & Problem Solving
- Practical Implementation & Projects

Basic Electronics
- Digital
- Analog
- Communication

Embedded C with 8051 Microcontroller
- Introduction to Embedded Systems
- Embedded Hardware
- Embedded Tools & Design

ARM Cortex - M3 (LPC1768)
- ARM Evaluation & Interfacing
- Mini Projects & Protocol Implementation

Automotive
- Introduction to Embedded Systems
- Embedded Hardware
- Embedded Tools & Design

Artificial Intelligence in Embedded Systems Using ESP32
- Foundations of AI & Embedded Systems
- AI Model Development & Deployment
- Applications & Real-Time Implementation

Unix / Linux Shell Programming
- Unix/Linux Basics & File Management
- Shell Programming & Scripting
- Advanced Unix Concepts & System Administration

Networking
- Network Fundamentals & Architecture
- Routing, Protocols & Security
- Practical Networking & Client-Server Models

100% Placement Assistance

Placement Assistance
- Resume Building & Profile Preparation
- Mock Interviews & Technical Interview Training
- Job Referrals with Embedded Companies
- Dedicated Placement **till 2 Years**

Program Takeway

Program Takeaway
- Strong Foundation in Embedded Systems & Programming
- Hands-on Experience with Real-Time Projects
- Industry-Ready Skills with Placement Assistance

Project Based Training

Project Based Training
- Work on Real-Time Embedded Projects
- Hands-on Hardware & Programming Practice
- Practical Industry-Oriented Learning

Hiring Domains

Hiring Domains
- Aerospace & Automotive
- IOT & Defence
- Semiconductor & EV Vehicles
- Wireless
- IT Services

1 C Programming

prerequisite

•Basic knowledge of Computer Fundamental.

module outline

- Environment Setup
- Program Structure
- Basic Syntax
- Data Types
- Variables
- Constants
- Storage Classes
- Operators
- Decision Making
- Loops
- Functions
- Scope Rules
- Arrays
- Pointers
- Strings
- Structures
- Unions
- Bit Fields
- Typedef
- Input & Output
- File I/O
- Preprocessors
- Header Files
- Type Casting
- Error Handling
- Recursion
- Variable Arguments
- Memory Management
- Command Line
- Arguments
- Multi-dimensional array
- Enum

projects

- Mini project

2 Data Structures & Algorithms

prerequisite

•Basic understanding of C programming language, text editor, and execution of programs

module outline

Overview

Environment Setup

Algorithm

- Algorithms Basics
- Asymptotic Analysis
- Greedy Algorithms
- Divide and Conquer
- Dynamic Programming

Data Structures

- Data Structure Basics
- Array Data Structure

Stack & Queue

- Stack
- Expression Parsing
- Queue

Searching Techniques

- Linear Search
- Binary Search
- Interpolation Search
- Hash Table

Linked Lists

- Linked List Basics
- Doubly Linked List
- Circular Linked List

Sorting Techniques

- Sorting Algorithms
- Bubble Sort
- Insertion Sort
- Selection Sort
- Merge Sort
- Shell Sort
- Quick Sort

Graph Data Structure

- Depth First Traversal
- Breadth First Traversal

Tree Data Structure

- Tree Data Structure
- Tree Traversal
- Binary Search Tree
- AVL Tree
- Spanning Tree
- Heap

Recursion

- Recursion Basics
- Tower of Hanoi
- Fibonacci Series

3 Basic Electronics

prerequisite

•Basic knowledge of Electronics fundamental.

module outline

Digital

- Number conversion Addition and subtraction Logic gates
- Combinational design Encoder Decoder Multiplexer De multiplexer
- Sequential design Flip-flops Shift register Counters

Analog

- Semi-conductors
- Diodes
- Transistors and subtraction
- Logic gates
- BJT Basic theorems { kvl, kcl, thevenin and Norton's theorem}
- Op-amp
- ADC,DAC

Communication

- Amplitude modulation Frequency
- modulation
- Phase modulation
- ASK and FSK modulators
- GPS
- Bluetooth ZIG-BEE
- WIFI

4 EMBEDDED SYSTEMS

prerequisite

- Should have a good understanding of the concepts of basic electronics such as circuits, logic gates, etc.

module outline

- Embedded Systems
- •Introduction to Embedded Systems
- •What is Embedded Systems
- •Characteristic of Embedded Systems
- •Deigning of an Embedded Systems
- •Embedded Systems Processors
- Microprocessor
- Microcontroller
- •MP vs MC
- •Type of Micro Controller
- •Embedded Systems Tools
- Overview

5 8051 Microcontroller

prerequisite

•Prerequisite: C programming and Embedded C

module outline

•Embedded System
•Microprocessors Vs Microcontrollers
•8051 Architecture
•Features And Specifications
•Memory Organization
•Register Banks And Stack
•Assembly Language and Addressing Modes
•I/O Ports
•I/O Programming
•Bit Manipulation
•Interfacing LED, Switch, LCD, Keypad, Buzzer,
7-Segment,Motors
•Timers/Counters Programming
•Interrupts
•Serial Communication /UART
•Interfacing Bluetooth

projects

• Industry-Level Project using 8051 Microcontroller

6 ARM Cortex - M3 (LPC1768)

prerequisite

•C programming and Embedded C

module outline

ARM-7 Processor Architecture
•ARM Cortex-M3 Architecture
•Assembly Language and Addressing Modes
•I/O Pins Configuration
•Interfacing LED, Switch, LCD, Buzzer
•Interfacing Motors ,Digital Sensors
•Interfacing Keyboard
•PLL (Phase-Locked Loop) configuration
•Configure the Interrupts
•Configure the ADC
•Configure the DAC
•Configure the WDT
•Configure the RTC
•Configure the PWM
•communication protocols
•UART
•SPI/SSP
• I2C/I2S
•Interfacing Temperature Sensor (ADC)
•Interfacing Potentiometer (ADC)
•Interfacing MAX7219 (SPI)
•Interfacing EEPROM (I2C)

projects

• Industry-Level Project using ARM Cortex - M3

7 Automotive

prerequisite

- Introduction to Automotive Embedded Systems

module outline

- Introduction
- Automotive Systems Overview
- Embedded Technology in Automotive Industry
- Automotive Microcontroller
- Introduction to CAN Protocol
  - •Features of CAN
  - •CAN nodes and states
  - •CAN Controller ;CAN Transceiver; CAN Bus levels;
  - •NRZ Coding; Twisted Pair wiring with termination
  - •CAN Communication Principle, CSMA-CD
  - •CAN Standard and Extended
  - •Characteristics of CAN Protocol
  - •CAN from OSI Perspective
  - •Physical Layer; Data Link Layer; Application Layer
  - •CAN Frame Formats: Data Frame; Remote Frame; Error Frame
  - •Error Detection Mechanisms
  - •CAN Time Quanta; Relation of Baud rate and Length of CAN bus
  - •CRC and Acknowledge
- CAN Programming
  - •Related Registers
  - •Implementing CAN Messaging systeme
  - •Communication between two nodes using CAN protocol

8 Artificial Intelligence in Embedded Systems Using ESP32

prerequisite

- Basic knowledge of C/C++ programming and familiarity with microcontrollers is recommended.

module outline

- Introduction to Embedded AI & ESP32 Architecture
- Overview of Embedded Systems
- Introduction to Artificial Intelligence in Embedded Devices
- Embedded AI vs Traditional AI
- Edge AI vs Cloud AI
- Introduction to TinyML
- ESP32 Architecture
- ESP32 Development Environment Setup
- Sensor Data Acquisition for AI Systems
- Machine Learning Algorithms
- Introduction to Machine Learning
- Types of Machine Learning, Supervised Learning, Unsupervised Learning
- Classification Algorithms, Decision Tree,KNN, Support Vector Machine
- Regression Algorithms, Model Training Process, Model Testing and Validation
- Accuracy and Performance Metrics
- TinyML and TensorFlow Lite
- Introduction to TinyML
- TinyML Hardware Platforms
- Microcontroller Constraints
- TensorFlow Lite Overview
- TensorFlow Lite for Microcontrollers
- Model Conversion Process
- Model Quantization
- Model Size Optimization
- Memory Optimization Techniques
- AI Model Deployment on ESP32
- Exporting ML Models
- Converting Models to TensorFlow Lite Format
- Integrating ML Model with ESP32 Firmware
- Running Inference on ESP32
- Real-time Prediction using Sensor Data
- Serial Output Visualization
- Model Debugging and Testing

projects

- Industry-Level Embedded ai project with ESP32

9 Unix / Linux Shell Programming

prerequisite

•Programming in C and data Structure

module outline

- For Beginners
- Home
- Getting Started
- File Management
- Directories
- File Permission
- Environment
- Basic Utilities
- Pipes & Filters
- Processes
- Communication
- The vi Editor
- Shell Programming
- Shell Scripting
- What is Shell?
- Using Variables
- Special Variables
- Using Arrays
- Basic Operators
- Decision Making
- Shell Loops
- Loop Control
- Shell Substitutions
- Quoting Mechanisms
- IO Redirections
- Shell Substitutions
- Shell Functions
- Manpage Help
- Advanced Unix / Linux
- Regular Expressions
- File System Basics
- User Administration
- System Performance
- System Logging
- Signals and Traps
- Threads
- Multi Threads
- Threads vs Process

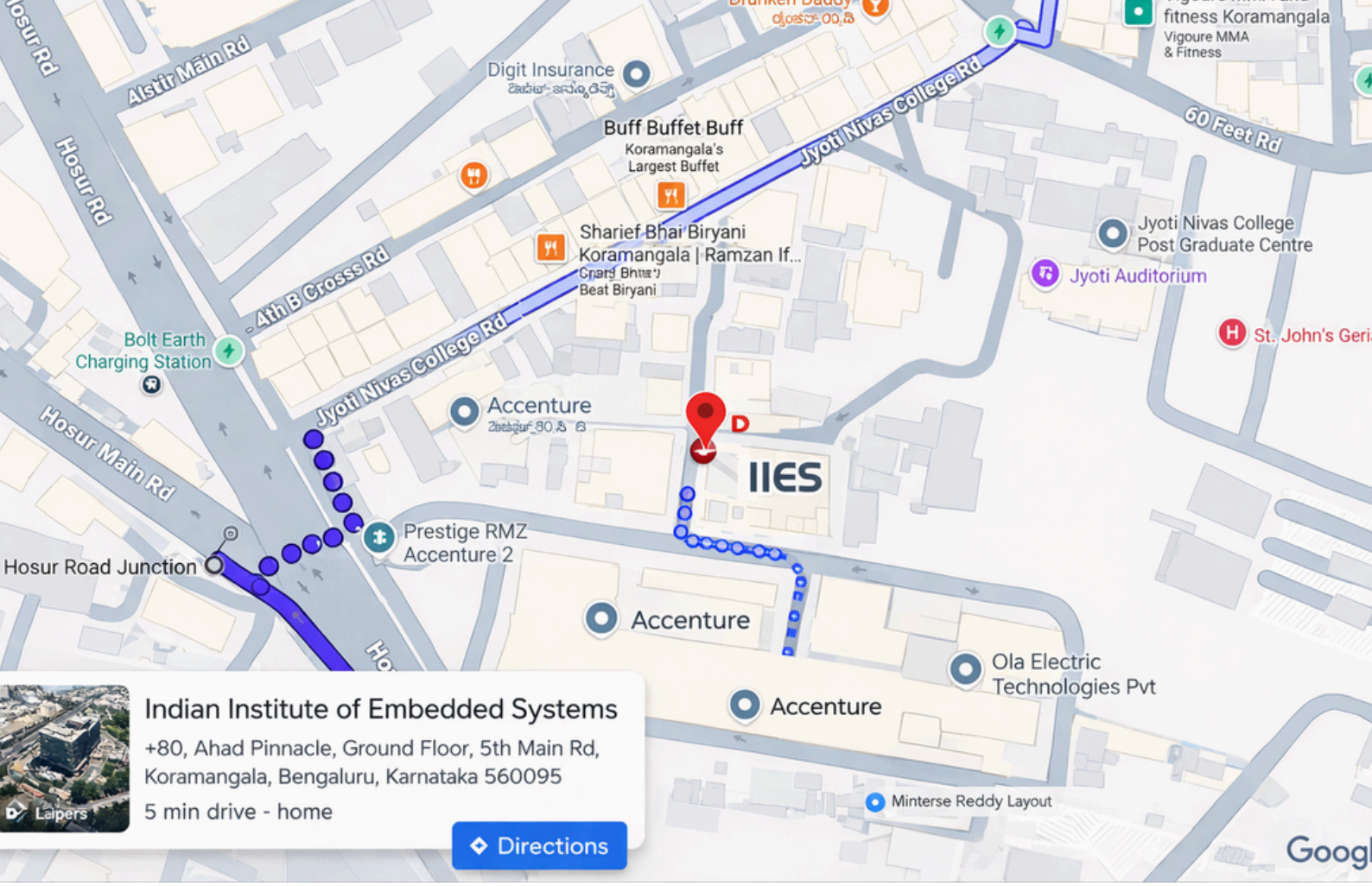
10 Networking

prerequisite

•Knowledge of Linux

module outline

- Introduction
- Features
- Architecture
- Components
- Computer Network
- Types
- Topologies
- Transmission Modes
- Models
- Models
- OSI Model
- TCP/IP Model
- Physical Layer
- Digital Transmission
- Transmission Media
- Guided Media
- UnGuided Media
- Multiplexing
- Switching
- Switching Modes
- Switching Techniques
- Data Link layer
- Data Link layer
- Error Detection
- Error Correction
- Data Link Controls
- Network Layer
- Network Layer
- Network Addressing
- Routing
- Network Layer Protocols
- Routing Algorithm
- Distance Vector
- Link State Routing
- Transport Layer
- Transport Layer Protocols
- Application Layer
- Client & Server Model
- Application Protocols
- DNS
- FTP
- Telnet
- SMTP
- SNMP
- HTTP
- Network Security
- Security
- Privacy
- Digital Signature
- PGP



Check Our Reviews, See How Many Students Got Placed & Find Our Institute Location – Scan the QR Code!

Indian Institute of Embedded Systems

Indian Institute of Embedded Systems

Reg. Office: 2nd Floor, 84, Koramangala Industrial Layout, 3rd Cross, 5th Block, Koramangala, Bengaluru, Karnataka 560095

Phone: +91 98 8692 0008
Email: enquiry@iies.in
Landline: +91 80 4121 6422
Website: www.iies.in