

Embedded System (Job Oriented Training)

(2 Months)

Note: Anyone without programming background can learn this course.

No cost repeat session | Life Long Doubt Clarification | 100% Practical Training

Ideal for students looking for job in core Electronics and IOT.

Topics	Subtopics	Assignments / Projects
Embedded C Programming		
C Programming	Introduction to C,	Program Debugging
	Software Description, Compilation Stages, C Program Structure,	Mini Project based on C Programming
	C I/O, C Format Specifiers, C Token, Identifiers, Keyword, Data Type	
Arrays, Strings, Storage	Arrays, Strings, Storage Classes, C Constant	
	C Operators, C variables, Storage Classes.	
Conditional Statement	Pre-Processor, Type Casting. Conditional Branching Control statements.	
	Conditional looping control statements	
	C programming Assignment	
Error Handling	Error Handling Function	
	Functions arguments, Data Structure, Variable Scope.	
Pointers, Memory	Pointers, Memory management, GNU GCC compiler, Make files	
AVR Microcontroller		
Introduction to AVR architecture	, AVR studio IDE, AVR family categories and importance, Atmega16 pin details and specifications, Register on	Bluetooth Based Home Automation System using AVR
	AVR, Different ports and DDR register.	
External hardware interfacing with ATmega16:	LED interfacing, LED To and FRO method,	
	Traffic light controller, Seven segment display	
	interfacing, LCD interfacing, relay interfacing.	
	Timers/counters, Interrupts, Interrupt registers and Programming.	
Interfacing	4*4 Keypad interfacing, Motor interfacing (DC, Stepper, servo)	
	ADC interfacing, Serial communication using USART.	
	Wireless protocols: GSM, GPS, RFID, Bluetooth	
Communication	Serial communication protocols: SPI, I2C	
	Serial communication protocol: Inter Integrated Circuit (I2C),	
	I2C: Initialization procedure, Data transmission and reception.	

SPI	SPI (Serial Peripheral Interface), Need of SPI, I2C Vs SPI.	
	Introduction of SPI, Initialization Procedure.	
CAN Protocol	CAN (Controller Area Network): Need of CAN, Introduction of CAN.	
	Frame format, Modes of	
PIC18F4550 Microcontroller		
Architecture	Architecture overview of PIC18F4550, Registers of PIC18F4550,	MINI PROJECT: Temperature Sensing
	MPLAB IDE & C18compiler. Different ports and TRIS registers.	Program Debugging
	External hardware interfacing: LED interfacing, Traffic light controller, Sevensegment display interfacing, LCD interfacing, 4*4 keypad	Mini Project3(Based on PIC18f4550)
	Timer/Counters, Interrupts, Serial communication using EUSART.	
Interfacing	Relay interfacing, Motor interfacing (DC, Stepper, Servo), ADC	
Protocols	Serial communication protocols: SPI, I2C.	
	Wireless protocol: RFID, Bluetooth.	
	Wireless protocol: GSM, GPS	
ARM7 Microcontroller		
Introduction of ARM as RISC machine	Overview of ARM family	Mini Project : Digital Clock using inbuilt RTC
	Features of ARMLPC2148, Processor operating modes, Thumb	Task1 : Program Debugging
	architecture-16 bit, 3 stages ARM pipeline.	Task2 : Mock Interview
	Load/store architecture, ARM operating modes, GPIO Registers and	Mini Project4(Based on LPC2148)
	External hardware interfacing: LED interfacing,	
	Timers and counters, PLL configuration, Power control, VPB.	
Interrupt	Vectored interrupted controller (VIC), External interrupt and	
	Analog to Digital converter (ADC), RTC programming.	
	Serial communication using UART, UART Programming	
Protocols	I2C Protocol interfacing with LPC2148	
	SPI protocol interfacing with LPC2148	
	Implementation of CAN protocol with LPC2148	
Interfacing	Wireless protocol: RFID, Xbee,	
	Wireless protocol: GPS, GSM, Bluetooth.	
PCB Design (Hardware)		
Fundamentals	Libraries ,Environmental Setup,Capture Introduction,Capture tool, Schematic tool bar,Setting Up the Schematic Page Preferences, Color visibility, Setting Up the Auto Backup, Working with Schematic,Placing the parts, Connecting the parts,Placing the Net alias, Placing the Power and Ground symbol, Creating a bus, Placing the No connection,Editing the Schematic Design	Create a BJT Amplifier ,AC Regulator Circuit and do the design processing

	Off-Page Connector, Design Validation and Processing, Annotating the design, Design rules check, Cross reference parts, Bill of materials, Net list creation	
PCB Analysis	Introduction, Modifying Schematic for Simulation, Introduction to creating of simulation profiles, Bias Point Analysis, Probe placement in Schematic window, Transient Analysis, DC Sweep Analysis, AC Sweep Analysis	Do the bias, AC, DC, Transient analysis on BJT and AC Regulator circuit
	Parametric Analysis, Temperature Analysis, Monte Carlo Analysis	Do the Parametric and Temperature on Battery voltage monitor and inverting amplifier circuit
	Stimulus Editor, Digital simulation	Do the simulation on digital gates and half adder
PCB Editor- pad Creation	Introduction, PCB Editor Design Environment, Design window, The view log, The tool bar, The status bar, Pad stacks, Pad stack types - Circle, Square, Hexagonal, Pad designer, Parts of pads- Regular pad, anti-Pad, Thermal relief and their dimensions	Create a circle pad, rectangle pad
Footprint Creation	Creating a new symbol using Package Symbol, Placing the new drawing origin, calculating co-ordinates of assembly top, silk screen top, pad location, Introduction to Control panel, Working with PCB Editor Design Environment, Classes and sub classes, Dock Windows - Options, Find & Visibility windows	Create a resistor, transistor and 14 pin Footprint
Package Symbol Wizard	Creating a new symbol using Package Symbol wizard	Create a 14 pin Footprint from psw
Netlisting	Importing the Net list from Capture to PCB Editor, Applying foot print to the component, replacing the sources with Connector	Do the netlist on BJT circuit
Placement methods	Types of placement, manual placement, room placement, edge placement, net placement, Draw the board outline	Place component by all methods
Package keepin, Route Keepin, Color 192	Assign the package keep in area and route keep in area, Creating a New Mechanical Symbol, To create a new mechanical symbol, Save the mechanical symbol, Place the Mechanical symbol, Creating a New Design File, To create a new design file, Adding the format symbols, Adding the mounting hole, Assigning the layer cross section, Setting design parameters, Saving the board template, Use of Color192 option	apply route and package keep in and place mechanical symbol in layout
Routing	Manual routing, Auto routing for single layer, Constraint Manager, Setting up the Design Constraints, Assigning the default physical constraint, Checking the Status of the Design, DRC error	Do the manual routing on layout
Multilayer Routing	Introduction to Multi layer board designing, Cross section to add layers, Color192, applying different colors to different layers, Multi-layer routing, Types of Vias, 3D view, Adding the Copper for plain layers, applying copper to double layer and multi layer Apply Shapes, Assigning nets	Do the multilayer routing on layout, add 6 layers

Gerber Creation	Manufacturing File Generation, Creating the artwork file, Viewing the artwork file, Generating the drill files, Creating manufacturing file in PDF	Create a gerber for layout
Python Programming		
Introduction to Python	Difference between High level and low level language	Python as a Calculator.
	Environmental Setup, IDE, 3 Types of Windows.	
	Basic Input Output.	
	Variables, Data Types	
	Typecast and identify the types of data.	
Control Flow Structure	If Else Statement: While Loop: Forloop	Rock, Paper and Scissor Game in Python
	Jumping Statements: Break, Continue	
	Random Library: Random Functions	
Functions	User Defined Functions	Password Generator for Web Application
	Built In Functions	
	Arbitrary Functions	
Data Structures	List, Tuple	
	Dictionary Set & String	
Modules& Package	How to create packages	
	Usage of Module	
Object Oriented Programming	Concepts of class, object and instances	Bike Rental System
	Constructor, class attributes	
	Inheritance	
	Encapsulation	
	Polymorphism	
File Handling	Where we using File handling concept nowadays	
	Method	
	Reading the data from File	
	Writing the content in it	
	Appending File	
Errors and Exception Handling	What are Errors?	API Integration Assignment:
	Different types of errors	Sending SMS using Twilio API
	What is Exception Handling? Try, Except and Finally	
Database connectivity using python	What is Database	
	Python Database Interaction	
	SQL Database connection using python	
	Creating and searching tables	
	Reading and storing config information on database	

	Programming using database connections	
Python Multithreading	Understanding threads	
	Synchronizing the threads Programming using multithreading	
Networking-Client and server program	What is Network?	Chat Server Application
	Why we use Network in Python?	
	Client and Server Program	
Standard Template Library	What is Standard Template Library	
	Programs using Standard Library	
Python GUI Introduction	What is GUI?	GUI with Data Connectivity
	Creating Textbox, Listbox, Option Button, Menu, Canvas.	
	Writing python program for GUI applications	
	Converting py files to EXE file.	
Project Submission		