LESSON PLAN

Subject : Embedded Full Stack IoT

Duration : 2 Months

Sl No	Content	Theory (Hrs)	Practical (Hrs)
1	Introduction of Embedded System, Block Diagram of Microcontroller & Microprocessor, Difference between controller & processor, applications, types of sensors & actuators. Introduction of IoT, block diagram & 4-layer architecture of IoT, OSI model, gateways, IoT protocols, communication models, APIs, REST API, IoT enabling Technologies. User Interface, frontend, backend	22	2
2	**HTML:** introduction, HTML page structure, tags, elements, attributes, template design using headings, paragraphs, formatting, quotations, colours, images, links, tables, lists, inline & block line, class & id, iframes. **CSS:** introduction, syntax, selectors, inline css, internal css, external css, style the web page using, backgrounds, border, margin, padding, text, font, icon, colours, opacity & etc. **Bootstrap-5 framework:** introduction, advantages, responsive WebPages designed using containers, grid, typography, jumbotron, buttons, inputs, table, navigation & etc	8	24
3	**Python 3:** Introduction, syntax, variables, data types, strings, lists, tuple, sets, dictionaries, condition statements, loops, functions, arrays, object, class, inheritance, polymorphism, file handling.Python3 and Pycharm IDE installation, PIP and other python libraries installation. Executed the more than 20 programs. **Flask:** Introduction, Environment creation, Application, Routing, Variable rules, URL Building, HTTP Methods, Templates, Static files, Request object, sending form data to template. **Sqlite:** Introduction to RDBMS, SQL introduction, commands, create db and tables, following operations completed successfully INSERT, UPDATE, DELETE, DROP, TRUNCATE	10	30

4	**Embedded C/C++ Programming:** introduction, syntax,Multiline Comments ,Single Line Comments,Preprocessor Directives,Global Variables,Function Declarations,Main Function, Local Variables,Function Calls, Infinite Loop, Statements, Function Definitions Local Variables, Statements **Arduino IDE:** installation, introduction, project creation, board and library installation, compiling, uploading Explanation of Arduino uno & ESP8266 Block diagram, pin configuration, specifications	**8**	**2**
5	ESP8266 interface with IR sensor, its block diagram, coding & its applications, ESP8266 interface with Ultrasonic sensor(HC-05), its block diagram, coding & its applications, ESP8266 interface with Photo sensor, its block diagram, coding & its applications, ESP8266 interface with magnetic sensors(floating & door), its block diagram, coding & its applications, ESP8266 interface with relay module, its block diagram, coding & its applications, ESP8266 interface with Temp & Humidity sensor(DHT11), its block diagram, coding & its applications ESP8266 interface with LCD & I2C module, its block diagram, coding & its applications, ESP8266 interface with Bluetooth module & android app, its block diagram, coding & its applications, ESP8266 interface with GSM module, its block diagram, coding & its applications, ESP8266 interface with RFID(MFRC522), its block diagram, coding & its applications	**4**	**44**
6	Real time project on Weather Monitoring , Smart Irrigation, Home Automation, Smart Street Light	**2**	**8**
7	Introduction to ARM Controller, Introduction of Raspberry pi, Block diagram, Specifications, raspbian Operating System installation & configuration, explanation about terminal commands, Introduction to thonny python IDE, project create, python library installation, Programing	**7**	**3**

8	Raspberry pi interface with Ultrasonic sensor(HC-05), Raspberry pi interface with DHT11, Raspberry pi interface with I2C & LCD module, Raspberry pi interface with Relay Module, Raspberry pi interface with Oled Display, Raspberry pi interface with Accelerometer, Raspberry pi interface with BME 280, Raspberry pi interface with USB web Cam.	**2**	**14**
9	Real time project on Ultrasonic Distance Monitoring System , Smart Traffic Light System, Home Automation	**2**	**8**
10	Introduction to IoT and LPWAN, Overview of IoT (Internet of Things), Types of IoT Networks, Understanding LoRa Technology, History and Evolution of LoRa, LoRaWAN Architecture and Components, LoRa vs. Other Wireless Technologies (e.g., WiFi, Bluetooth), LoRa Network Architecture, Gateways and End Devices, LoRa Network Server (LNS), Application Server and Backend Integration, LoRa Devices and Sensors, Types of LoRa Devices (Modules, Sensors, etc.), Connecting Sensors to LoRa Modules, Data Transmission and Payload Formats, LoRaWAN Security, Security in IoT and LoRaWAN, Encryption and Authentication, Best Practices for Securing LoRa Networks, LoRa Network Deployment, Setting Up a LoRa Network, Programming LoRa Modules	**12**	**12**
11	Building IoT Applications with LoRa: Agri IoT and Irregation System, Smart Dustbin	**4**	**20**
12	Softskill Training, Methods of Training, How to use the digital platforms for Interview preparations and for industry exposure like Google, ChatGPT other AI tools	**10**	**2**
TOTAL HOURS		**91**	**169**
		260	