Six-Week Summer Internship Program

on

Advanced Internet of Things (IoT): Industry-Based Real-Time Applications for Society

(Blended Mode)

ONLINE: Theory Fundaments and Coding

OFFLINE: Implementation of Industry-Based Real-Time Applications

Venue: IOT SKILL DEVELOPMENT CENTRE

(COE-AMS Block, IGDTUW)

5th June–17th July 2023

Deadline to Apply: 03/06/2023, 5:00 PM

Organized by

Department of Information Technology, IGDTUW

In Joint Collaboration with

Telecom Sector Skill Council (TSSC)

Patron

Dr. (Mrs.) Amita Dev, Hon'ble Vice Chancellor, IGDTUW

Organizing Committee

Prof. A. K. Mohapatra, HoD (IT) IGDTUW

Prof. Brijesh Kumar, Professor (IT) IGDTUW

Dr. Nonita Sharma, Associate Professor (IT) IGDTUW

Dr. Shailesh D. Kamble, Associate Professor (IT) IGDTUW

IOT SKILL DEVELOPMENT CENTRE

JOINT INITIATIVES

IGDTUW, DELHI
&
TELECOM SECTOR SKILL COUNCIL (TSSC) INDIA

Six Week Summer Internship on "Advanced Internet of Things (IoT): Industry-Based Real-Time Applications for the Society

Registration Fee:

Registration: Rs. 499 for IGDTUW &

Rs. 999 for Outside IGDTUW,

"Once Registered No Withdraw":

DATE EXPENDED up to June 3, 2023,5:00PM

Bank Details for Registration Fee Payment

Name and Address of Beneficiary	:	Registrar, IGDTU for WOMEN
Bank Account Number	:	0900100 0018949
IFS Code	:	PSIB 000 1098
Name and Address of Bank	:	Punjab and Sind Bank, New Delhi GGSIP University, KashmereGate, Delhi 110006

About the Summer Internship Program

The IOT Skill Development Centre Joint Initiatives IGDTUW, Delhi & Telecom Sector Skill Council (TSSC) India. This Centre has facilities to implement the IOT industry-based live projects. Therefore, the technical sessions and live project implementation under this Summer Internship program on "**Advanced Internet of Things (IoT): Industry Based Real-Time Applications for Society**" will be conducted from **5th June –17th July 2023,** Organized by the Department of Information Technology at IGDTUW, Delhi. The students will be learning the following **concepts and live project implementation** in the given sub-areas of IoT:

Technical Contents along with Tentative List of Projects to be Implemented

- What does "**the Internet of Things**" means, and how it relates to **Cloud computing** concepts?
- How **open platforms allow** you to store your **sensor data** in the **Cloud**.
- The basic usage of the **Arduino, Raspberry Pi & Node-MCU environment** for low-cost creation of your own embedded projects.
- How to connect your **Arduino & Raspberry Pi with your Android phone.**
- Basic usage of **Raspberry Pi**.
- Use of **Arduino & Raspberry Pi in the Internet of Things (IoT)**
- How to create your own Android App using MIT App Inventor.
- How to send data to the **Internet and talk to the Cloud.**
- How to **update sensor readings** on **Twitter** (Social Networking Sites).
- How to **control any device from anywhere across the world.**
- How to connect to **cloud-ready IoT Server using MQTT**.

NOTE: On completion of each theory concept session, students will carry out the live project problem implementation activities.

Programming languages to be covered:

- C Language
- Python
- Embedded C
- HTML, CSS, JavaScript
- Linux scripting

Career Opportunity for IoT Engineer Internship:

IoT Internship Training provides real-time exposure for the students to the latest and emerging technologies that will help in placement as well as skill Enhancement:

- ❖ IoT Embedded System Designer
- ❖ IoT developer
- ❖ IoT creator
- ❖ IoT Infrastructure Architect
- ❖ IoT solutions Engineer
- ❖ IoT System Administrator
- ❖ Cloud engineer

Details of Technical Contents to be Covered During the Internship

Introduction to the Internet of Things

- The Internet of Things
- The Basics of Sensors & Actuators
- Introduction to Cloud Computing
- The Arduino Platform

The Arduino Open-Microcontroller Platform

- Arduino Basics
- Arduino Board Layout & Architecture
- Reading from Sensors
- Programming fundamentals (C-language)

Arduino Programming & Interface of Sensors

- Interfacing sensors with Arduino
- Programming Arduino
- Reading from Sensors
- Embedded Projects

Few Selected Lists of Projects for Implementation based on Arduino Programming & Interface of Sensors as follows:

Project 1: LED Blinking using GPIO (General Purpose Inputs/Outputs).
Project 2: Simple LED Program using Arduino Module.

Project 3: LED Interfacing to Display Characters and Strings Using IOT Setup.
Project 4: Seven-Segment Display Implementation.
Project 5: Boom Barrier Unit for Security, Traffic and Enter-Exit Applications in the University and outside University in Manual and Auto Mode.
Project 6: Implementation and Analysis of the Data Collected from the Use of Various Sensors like Humanity Sensors, Gas Sensors, Rain Sensor, Wind Speed & Wind Direction Sensors, Solar Radiation Sensor, Biometric Pressure Sensor, Soil Monitor, Pollution, Temperature, PH Sensors.
Project 7: Drip Irrigation: Demonstration and Analysis for Future Applications.

Connecting Arduino with Mobile Device

- The Android Mobile OS.
- Using the Bluetooth Module

Project Implementation based on Connecting Arduino with Mobile Devices

Project 11: Creating Android Apps using MIT App Inventor & Sensor Data on the App.

Project 12: Voice Controlled Mini Home Automation using Android Smartphone.

Project 13: Creating Android Apps using MIT App Inventor & Controlling Devices Connected to Controller.

Project 14: Control Devices using Local Host Web Server for Home Automation.

Make Electronics Gadget Talk to the Internet

- ❖ Integrating Ethernet Module
- ❖ Creating App on Twitter

Project 16: Send Voltage & Analog Data on Cloud Server.

Cloud Computing

- Communicating with the Cloud using Web Services.
- Cloud Computing & IoT.
- Popular Cloud Computing Services for Sensor Management.

Project 17: Use Arduino to upload free data from Environmental Sensors to Cloud Server.

Project 18: Automatically update the status on Twitter based on Sensor Data.

Project 19: Control Electronic Devices from anywhere across the world using the Internet & Mobile App.

Understanding and Introduction to RPi

What is SOC?, Versions of Raspberry Pi & Their Difference, Raspberry Pi 3, Basics of Electronics, Hardware Description, Pin Configuration, OS Installation on SD Card, Downloading Image, Study Various Operating Systems Available, Making SD Card: Formatting and Partitions, Raspberry Pi SD Installer, OS Configuration

Booting Into Desktop

GUI Version, CLI Desktop, Changing Time zone, Other Options, Raspi-Config, Test Network Setup, Setting Up Using GUI, Setting Up Using Command Line, Finding Pi's IP Address, connecting with Wi-Fi/ LAN/ Data card, GPIO, Study GPIO Pins, Libraries Using Git, Configuring GPIO Pins, Pi using SSH, Enabling SSH, Logging in using Putty, Basic Commands, Use GPIO and Linux.

Understanding Linux

File Structure, Linux Commands, Permissions.

Understanding Python

Condition Statement, Loops, Importing Libraries, Functions

Project 20: LED Program with Raspberry Pi

Project 21: Controlling LED with a Switch using Raspberry Pi

Project 22: Integrating IR Sensor with Raspberry Pi.

Project 23: Integrating DHT11 with Raspberry Pi.

Project 24: Sending Sensor Data to Cloud using Raspberry Pi.

Introduction to MQTT & Communication Protocol for IoT

Understanding MQTT, the Difference between HTTP & MQTT, Understanding MQTT Broker, understanding Publish & Subscribe Methods, Introduction about Node-MCU, Connecting to Local Wi-fi, Getting Static IP, Pinging a Particular Site for Results.

IoT Kits and Components for Live Project Implementation:

The details of more required IOT Kits and Components and the tentative cost for live project implementation during the summer internship program will be approved separately if required further.

IoT Resource Persons from Industry and Academia

The list of required experts from academic institutions and Industry with vast experience in the area of IoT for smooth conduction of the internship and their honorarium will be put up for approval after the registration of students separately.

Who can Apply

An internship is open to B.Tech., M.Tech., and MCA inside and outside students. Students have knowledge of Basic Electronics.

How to Apply

Interested candidates should fill out the online registration formlatestby30.05.2023 by05:00pm at the following link: https://forms.gle/AgEXgHqcNYN7tSXy9

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Certificate

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On successful completion of the Internship, the certificate shall be awarded.

Contact Us

For any Queries, please write to brijeshkr@igdtuw.ac.in.