BHARATHIAR UNIVERSITY:: COIMBATORE-641046
DEPARTMENT OF COMPUTER APPLICATIONS
(Effective from the academic Year 2018-2019)

Certificate Course in Internet of Things

Eligibility for admission to the course

A pass in Higher Secondary Examination (+2) conducted by the Government of Tamil Nadu or an examination accepted as equivalent there to by the syndicate.

Duration of the course

The candidates can undergo this course both in full-time (3 months) and part-time (6 months). The certificate programme consists of theory and practical courses.

Regulations

The general Regulations of the Bharathiar University Choice Based Credit System are applicable to this certificate programme.

The Medium of Instruction and Examinations

The medium of instruction and Examinations shall be in English.

Submission of Record Notebooks for Practical Examinations

Candidates taking the Practical Examinations should submit bonafide Record Note Books prescribed for the Examinations. Otherwise the candidates will not be permitted to take the Practical Examinations.

Revision of Regulations and Curriculum

The above Regulation and Scheme of Examinations will be in vogue without any change for a minimum period of three years from the date of approval of the Regulations. The University may revise /amend/ change the Regulations and Scheme of Examinations, if found necessary.

Collaboration with industry

Department of Computer Applications will conduct certificate course in Internet of Things in collaboration with Easy Design Systems Private Limited, Coimbatore as per the Memorandum of Understanding (MOU) has to be signed.

Scheme of Examinations

Year	Course Code	Subject and Paper	L	P	Credits	Max Marks
I	Paper I	Sensors and Microcontrollers	4	0	4	100
	Paper II	IoT Programming	4	0	4	100
	Practical	IoT Programming Lab	0	8	4	100
		Total			12	300

Course Title: Sensors and Microcontrollers **Credits: 4**

UNIT I

Programming in C: Program Structure in C - Basic Syntax - Data Types / Variables / Constants - Operators, Conditional Statements and Loops -Functions , Array and Pointers - Strings and I/O

UNIT II

Programming Fundamentals with C using Arduino IDE: Understanding the Arduino IDE - Installing and Setting up the Arduino IDE - Connecting the Arduino IDE with devices. - Using Arduino C Library functions for Serial, delay and other invoking functions

UNIT III

Working with Arduino for data acquisition with IOT Devices: Understanding Sensors and Devices - Understanding basic electronic components and power elements

Understanding the Inputs from Sensors: Working with Temperature Sensors -Working with Ultrasound Sensor -Working with humidity sensor - Working with Motion Sensor -

UNIT IV

Understanding the inputs from sensors (contd..): Working with IR Sensor - Working with Proximity Sensor - Working with Photo Diode - Working with Accelerometer and vibration sensor - Measuring Voltage and Current.

Understanding the Outputs: Activating LED lights – activating relays – activating buzzer – running DC motors – running stepper motors and servo motors

UNIT V

Building and Using Communication Devices to data transfer from IOT Devices: Understanding the Communication Principles to Transfer the data from IOT Devices

Local Communication between IOT Sensor: Using Bluetooth to Transfer the data from IOT Sensor to another local IOT Device - Using ZIGBEE to Transfer the data from IOT Sensor to another local IOT Device

Remote Communication to cloud/external application: Using WIFI to Transfer the data from IOT Sensor - Using GPRS/3G to Transfer the data from IOT Sensor

REFERENCES

1. Simon Monk, “Programming Arduino”, Mc Graw Hill, 2012
2. Michael Margolis, “Arduino Cookbook” 2nd Edition, O'Reilly Media, 2011

Course Title: IoT Programming **Credit: 4**

UNIT I

Introduction and definition to IOT: What is an IOT? - Explore the scenario for application of IOT Communication definitions Concepts - Capturing and Storing the data - What to do with the data…applying Expert Systems and Machine Learning;

IOT Detailed understanding of Solution Architecture: IOT Device Architecture - IOT Network/Communication Architecture with an understanding on client server and loosely coupled storage servers and message queues - IOT Application Architecture.

UNIT II

Working with Enterprise database Layer: Understanding and using RDBMS data - Working with Microsoft SQL Server - Working with connected data and disconnected data

Working with IO and File based Db for efficient and isolated data handling: Understanding the file IO with VB.NET / C#.NET- Working with CSV files - Working with file based data bases using SQLite

UNIT III

Working with Web Services for building communication and storage layer: Understanding the data capture through Web Services - Creating and Programing a rest web service with ASP.NET - Calling and accessing the Web Service in a Client - Working with message store, file and blob Storage

UNIT IV

Building and Working with WEB UI using ASP.NET and Mobile UI using Android/Open Platform: Concepts on integrating IOT Systems with Web Applications Programming Fundamentals with Web Applications for handling Data Communication from IOT Devices Creating and Programing with Bootstrap / Angular JS Creating and Programing Web Pages with ASP.NET

UNIT V

Understanding Cloud Solution Architecture for IOT: Learning about Cloud Architecture - Understanding the Cloud Web Solution - Understanding the Cloud Data Storage - Understanding the Message Queue - Understanding Notifications

Building and Working with Expert Systems: Understanding the need for Expert Systems- Knowledge and Reasoning- Basic forms of inference: abduction; deduction; induction -Understanding rule-based expert systems -Handling of uncertainties- Methodologies for building expert systems

REFERENCES

1. Cuno Pfister, ‘Getting Started with the Internet of Things’, Maker Media, 2011.
2. Chris Walker, ‘Getting Started with Netduino’, O’Reilly, 2012
3. Michael Collier, Robin Shahan, “Fundamentals of Azure”, Microsoft Press, 2015, ISBN: 978-0-7356-9722-5
4. Rick Rainey, “Azure Web Apps for Developers”, Microsoft Press, 2015, ISBN: 978-1-5093-0059-4