CSE2501	Internet of Things	L	T	P	C
Version 1.1		3	0	0	3
Pre-requisites/Exposure	--				
Co-requisites					

Course Objectives

1. To understand the configuration of Internet of Things (IoT) based architecture.
2. To identify an IoT device.
3. To understand working of IoT devices.

Course Outcomes

On completion of this course, the students will be able to

CO1. To identify an IoT device
CO2. To enable a device for IoT configurations
CO3. To fabricate IoT devices

Catalog Description

IoT devices are increasingly being used in various engineering as well as day-to-day applications. When devices are inter-connected, they can send as well as receive data in order to perform most efficiently and add functionality to their basic usage. IoT is a budding technology which is sought after in young engineers by companies. In this way, students will gain knowledge of latest technology in their domain as well as knowledge to create state-of-the-art devices for their future work.

Course Content

Unit I: Introduction to IoT **5 lecture hours**

Introduction to internet and computing devices, Introduction to concept of IoT devices, IoT devices versus computers, IoT configurations, basic components, networking, introduction to embedded systems,

Unit II: Arduino microprocessor usage **5 lecture hours**

Introduction to Arduino, types of Arduino, Arduino toolchain, Arduino programming structure, Sketches, Pins, Input-output from pins using skches, Introduction to Arduino shields. Project.

Unit III: Adding shields to Arduino **5 lecture hours**

Introduction to Arduino shields, Types of shields- for driving motors, for interacting with ultra-sonic sensor, Ethernet Shields, Wi-Fi shields, Usage of multiple shields at same time, Data rate restrictions, Energy considerations, Project.

Unit IV: Raspberry Pi (R-Pi) Microcomputer **5 lecture hours**

Introduction to R-Pi microcomputer, A brief introduction to linux, A brief introduction to python, Accessing GPIO pins, Sending and receiving signals using GPIO pins, Data rate restrictions, Energy considerations, Project

Unit V: IoT device fabrication project **7 lecture hours**

Planning a project, fabricating list of requirements and functionality - network requirements - data storage requirements - Power requirements, fabrication, performance evaluation, reporting in LATEX document, Project presentation.

Text Books

1. Adrian McEwen, Hakim Cassimally "Designing the Internet of Things", John Wiley & Sons (2013), ISBN - 9781118430620

Reference Books

1. Wolfram Donat "Learn Raspberry Pi programming in python", Apress (2014), ISBN – 9781430264255
2. Richard Grimmett, "Raspberry Pi Robotics Essentials", Packt Publishing Ltd (2015), ISBN – 9781785285646
3. Tero Karvinen, Kimmo Karvinen, Ville Valtokari, "Make: Sensors: A Hands-On Primer for Monitoring the Real World with Arduino and Raspberry Pi", Maker Media, Inc., (2014), ISBN – 9781449368067
4. Massimo Banzi, "Getting Started with Arduino", O'Reilly Media, Inc." (2011), ISBN - 9781449309879

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination
Examination Scheme:

Components	Seminar I	Seminar II	Assignments	Project
Weightage (%)	10	10	20	60

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Programme Outcomes
CO1	To identify an IoT device	PO1
CO2	To enable a device for IoT configurations	PO3,PO5
CO3	To fabricate IoT devices	PO3, PO4,PO5

		Engineering Knowledge	Problem analysis	Design/development of	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and	Ethics	Individual or team work	Communication	Project management and finance	Life-long Learning

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CSE2501	Internet of Things	1		3	2	2							

1=weakly mapped
2= moderately mapped
3=strongly mapped

Course Outcomes Assessment

This course strongly contributes towards the program outcome, '**Design/development of solutions (PO3)**'. This will help students to design their experiments using easy to use and easily available open source tools. The outcome will be measured by the performance of students in various projects which students will make to demonstrate their understanding.

Evaluation scheme for Project

Total marks = 60

Marking criteria	Evaluation of project	Evaluation of project report	Evaluation of user manual
Marks	40	10	10

For details about marking scheme subdivision, please check the model evaluation scheme

[redacted]

Name: **Enrolment No:**	G D GOENKA UNIVERSITY FROM FOUNDATION TO FLIGHT

Course: CSE2501- Internet of Things

Programme: Open Elective. **Semester: IV/VI**

Time: 03 hrs. **Max. Marks:60**

Instructions:

Present all of the following:

1. **Working model of IoT project**
2. **Project report**
3. **User manual**

SECTION A

1.	I. Evaluation of project (10 X 4 = **40**) a. Whether the model is presented in working condition (2.5 X 4 = 10) i. Does it reads data correctly? ii. Does it stores and/or transmits data using internet correctly? iii. Does it satisfy the theme of the project? iv. Is the project miniaturized to appropriate dimensions? b. Whether the model studies the physical problem correctly (2.5 X 4 = 10) i. Is the design of instrument appropriate to evaluate the physical problem? ii. Does the measurement reading corresponds to desired accuracy and precision to derive meaningful results? iii. Is the design modular? iv. Are design aesthetics appropriate? c. Innovations (2.5 X 4 = 10) i. Has the candidate shown some innovative solutions in design? ii. Has the candidate shown some innovative solutions in measurements? iii. Has the candidate shown some innovative solution in solving the physical measurement problem? iv. What is the merit in innovation produced for the project? d. Workmanship (2.5 X 4 = 10) i. Neatness of mechanical work. ii. Neatness of electrical work. iii. Neatness of overall arrangement of components. iv. Aesthetics of presentation of project. II. Evaluation of project report (2.5 X 4 = **10**) a. Is the flow of information appropriate? b. Is the content plagiarised? c. Is the content properly and appropriately referenced? d. Is the content sufficient? III. Evaluation of user manual (2.5 X 4 = **10**) a. Is the flow of information appropriate? b. Is the content plagiarised? c. Is the content properly and appropriately referenced? d. Is the content sufficient?	**60**