Term Project – "IoT for Smart Living"

A. Problem Statement

In this project you will implement a **Smart Network based on Internet of Things (IoT)** that will enhance our daily living hence titled as "**Smart Living**". You have to develop idea, analyse the requirements and create your own topology, which should use **Things** that can be controlled from anywhere in the Internet.

Guidelines are given as follows. Failure to follow the **required guidelines** will penalize every member of a team. There will be at least **10% deduction** in your project grade if a required guideline is not followed. Some Requirements:

i. Every group must participate in the "**CSE Project Show"** (date & time will be announced later) to **demonstrate** their project and submit a **project report (Hardcopy)**.
ii. **Top 3 (Three) projects' members** will be **awarded certificates from Center for Emerging Networks and Technologies Research (CENTeR)**.
iii. If a **group member is absent** during project show, he or she will get only the report marks.
iv. If a **group is absent** during project show, they will get **0 (zero)** in the project.
v. **No extension or re-scheduling** of showcasing is possible.

B. Required Components (H/W, S/W)

Hardware: MCU With Wi-Fi Module (i.e. NodeMCU, ESP 8266)
Software: Android Studio or MIT App Inventor-2
Database: Local Database (Any platform), Global Database (i.e. Google Firebase)

C. Project Requirements

1. Need to have **clear concepts of networking protocols** used in the project.
2. Project device/MCU must be **connected to the Intranet/Internet** through proper mechanisms.
3. A **local or global database** must be used in your project to store and analyze data.
4. Develop a **web or software interface** to display data/user input necessary for the project.

D. Phases/Specifications

Based on the idea to solve a **real-life problem**, each team should **propose the idea** in a formal way (**block diagram / system architecture**) and implement a **working prototype** that fits into the context of the **Internet-of-Things**.

D.1 Phase 1: Device Connection and Connectivity

In the first phase, prepare the **block diagram of the proposed system** and decide on the **working environment** (IoT devices, IoT connectivity among **sensors, actuators and controllers**).

D.2 Phase 2: Data Sensing and Collecting

In the second phase, capture **data from the sensors** and **store and process sensed data** (store data, send to the controller and process, display output).

D.3 Phase 3: Communication (IoT)

In the third phase, focus on **access networks (LAN)**, **connectivity to the cloud (WAN)** (store data, process and display output) so that the system can be used from anywhere anytime through Internet, and **data transport** (how data will be transmitted from LAN devices to the Server in the Internet).

D.4 Phase 4: Human value (Utility of the developed system)

In the fourth phase, focus on **smart applications** to the stakeholders (users/people/environment), specify the **tangible benefits** for the users (impact to the society/environment).

E. Report & Marks Distribution

1. **Idea Presentation [Idea-Prototype (Proposed System Architechture) + Hardcopy Report]** **[20%]**
    a. **Project Week-1 during lab time.**
    b. **Report (Hardcopy) should contain:**
        i. **Idea and Framework of the proposed Smart Network**
        ii. **System architecture (H/W & S/W) with details.**

2. **Progress Demonstration I [Idea-Prototype (H/W + S/W) + Hardcopy Report]** **[20%]**
    a. **Project Week-2 during lab time.**
    b. **Report (Hardcopy)** should contain:
        i. **Idea** and **Framework** of the proposed **Smart Network**
        ii. **System architecture (H/W & S/W)** with **implementation details**
        iii. **Contribution** of each group member (**if any member's content is absent in this part, he or she will receive zero**)

3. **Progress Demonstration II [Implementation + Hardcopy Report]** **[30%]**
    a. **Project Week-3 during lab time.**
    a. **Report (Hardcopy)** should contain:
        i. **Implementation** of the proposed **Smart Network**
        ii. **Applications** with **implementation details**
        iii. **Contribution** of each group member (**if any member's content is absent in this part, he or she will receive zero**)

4. **Final Project Demonstration – CSE Project Show** (Date and time to be announced). **[30%]**
    a. Project **demo**
    b. Report (**Hardcopy**) with **implementation details** and **individual contribution**.

F. Judging Criteria

- ✓ **Originality and innovation** – How original (new, inventive) and innovative (novel idea, more effective) is the IoT solution ?
- ✓ **Usefulness/Practicality** – How useful (able to be used advantageously, beneficially) and practical (capable, suitable) is the IoT solution?
- ✓ **Business Potential** – What is the potential of the IoT solution to go to the market, to go to commercialization?
- ✓ **Design and interface** – How practical, intuitive and novel is the design and interface of the proposed IoT application?
- ✓ **Technical implementation** – How elegant and effective is the technical approach and the implementation of the IoT solution?

G. Possible Project Areas (List of possible projects or Similar)

Agriculture System

1. Soil Moisture Monitoring with an online database system
2. Automatic Gardening System Monitoring
3. Temperature & pH Sensor to Monitoring Hydroponics system monitoring
4. Water Level Indicator using Ultrasonic Sensor and monitor over internet
5. Monitoring Temperature & Humidity in indoor Greenhouse.
6. An Urban Plant Watering Solution
7. Greenhouse Monitoring and control System
8. Automatic Watering System for Plants with Arduino

Weather Station

9. IoT Weather Station with an online Monitoring.
10. Collect environmental data and show weather forecast for upcoming week.
11. Home Weather Station with Web Monitoring.
12. City Air Quality Report collection over internet.

Smart City

13. Garbage Monitoring System for Smart Cities
14. Smart city Parking System monitoring over internet.
15. Water Tank Supervisory control.
16. Online Car Location Tracing system.
17. Online Traffic monitoring system.
18. Home Security System.
19. Vehicles to Vehicles communication through Network for safety.
20. Smart Office Attendance System.
21. Smart School Students Attendance System.

Biomedical System

22. Online Heart Rate Monitor.
23. Patient Health Monitoring system.
24. Smart Health Care Monitoring System Based on IoT.

For More IoT Topic and Idea:

https://www.hackster.io/

https://create.arduino.cc/projecthub