

## Elective Module for Normal (Technical) students

Module Title                      **Smart Home**

Duration: **8T 22P hour**

Pre-requisite :                      NIL

---

### Aim of Module

- (1) To expose students to the state of art technology in betterment of our living environment by introducing them to a basic skills and knowledge of using the home automation system.
- (2) To foster an innovative spirit amongst the students.

### Learning Outcomes

At the end of the module, students will be able to:

1. understand the basic requirement for a **smart home** using home automation system
2. Plan and design the smart home using home automation system
3. Install and test the installation of the smart home.

### Module Outline

Students will be trained to plan and design the **smart home** using home automation system. They will be trained to perform the programming of the input devices, such as intelligent switches, scene master and touch screen in the control of lightings.

### Outline of Module Syllabus

| <u>Item</u> | <u>Technical Skills / Knowledge</u>  | <u>Instructional Hours</u> |           |
|-------------|--|----------------------------|-----------|
|             |  | Theory                     | Practical |
| 1           | <b>Basic Electrical Quantities and Units</b> <ul style="list-style-type: none"><li>➤ Understand the basic terms used in electrics circuit, - current, resistance and voltage.</li><li>➤ Describe the differences between a direct current (DC) supply and an alternating current (AC) supply.</li></ul>  | 1                          |           |
| 2           | <b>Electrical Safety in The Home</b> <ul style="list-style-type: none"><li>➤ Identify the hazards that can arise from the use of electricity</li><li>➤ Describe the safety precautions that must be taken when working with electricity.</li><li>➤ Describe the function and operation of electrical protective devices found in homes.</li><li>➤ Explain the basic purpose of earthing electrical appliances and installations.</li></ul> | 2                          |           |

|          |  |          |          |
|----------|--|----------|----------|
| <b>3</b> | <b>Conventional Control Systems and Home Automation Control Systems</b>  | <b>1</b> | <b>1</b> |
|          | <ul style="list-style-type: none"> <li>➤ Describe the conventional method for control of lighting circuits.</li> <li>➤ Explain the benefits and advantages of using a home automation system.</li> <li>➤ Describe the control devices used in home automation systems.</li> <li>➤ Describe the control of lighting circuits using a smart home automation system.</li> </ul>                               |          |          |
| <b>4</b> | <b>Use of Intelligent switches</b>   | <b>1</b> | <b>2</b> |
|          | <ul style="list-style-type: none"> <li>➤ Describe the function of intelligent switches.</li> <li>➤ Describe the techniques for programming intelligent switches for control of lighting and electrical devices.</li> </ul>   |          |          |
| <b>5</b> | <b>Use of Scene Master.</b>  | <b>1</b> | <b>3</b> |
|          | <ul style="list-style-type: none"> <li>➤ Describe the function of the scene master of a home automation system</li> <li>➤ Describe the technique of programming the scene master for complex lighting scenes (switching, dimming).</li> <li>➤ Describe the technique of programming a button as a master-off scene.</li> <li>➤ Describe the use of remote control for accessing complex scenes.</li> </ul> |          |          |
| <b>6</b> | <b>Use of Motion Sensor.</b>   | <b>1</b> | <b>3</b> |
|          | <ul style="list-style-type: none"> <li>➤ Describe the principles of energy conservation and management.</li> <li>➤ Describe the types of occupancy sensors used with home automation systems.</li> <li>➤ Describe the technique of programming sensors for control of lighting level, sunset switching and security modes.</li> </ul>  |          |          |
| <b>7</b> | <b>Use of Touch Screen.</b>  | <b>1</b> | <b>5</b> |
|          | <ul style="list-style-type: none"> <li>➤ Describe the function and application of a touch screen in a home automation system</li> <li>➤ Describe the commonly used features of the touch screen.</li> <li>➤ Describe the techniques of programming a touch</li> </ul>  |          |          |

screen for intelligent switch function, scene pattern settings and scheduled operations.

## 8 Smart Home System Project

8

Plan, design, set up and test a home automation system:

- Establish features required
- Define the lighting patterns
- Programming of intelligent switches, scene master and touch screen
- Testing and commissioning

### Teaching and Learning Approaches

This elective is a practical orientated module. Students' will be learned how to use one of the recommended industries home automation system in the classroom.

During the final project, the teacher will facilitate the group discussion and project definition stage. Thereafter, the students will work in independently in their respective team to complete their smart home. Teachers will assist them to complete the commission of their smart home.

### Completion Criterion

Students will be deemed to have successfully completed the module if they pass all the assessments. The guidelines for the assessments are given below.

| S/N | Assessment Component   | Assessment Guidelines   | Weighting   |
|-----|------------------------|---|-------------|
| 1   | Theory Test            | 20 multiple-choice questions to test the understanding of the students on the topics. | 20%         |
| 2   | Practical Assignment 1 | Students able to program and control lighting using sensor switch correctly.          | 20%         |
| 3   | Practical Assignment 2 | Students able to program and control applications using motion sensor correctly.      | 20%         |
| 4   | Practical Test         | Students able to design, wire-up and test a simple home automation project correctly. | 40%         |
|     |                        | <b>Total</b>  | <b>100%</b> |

### Target Audience

Sec 3 / 4 Normal (Technical) students

**Class Size**

20 students per class

**Duration**

30 instructional hours

**Certification**

ITE Certification of Attendance will be issued upon successful completion of the course. ITE Certificate of Achievement will be issued upon students meeting the assessment criteria.