MAR BASELIOS CHRISTIAN COLLEGE OF ENGINEERING & TECHNOLOGY

PEERMADE

A Report

On

FIVE DAYS TRAINING WORKSHOP ON PROTEUS SIMULATION TOOL AND ARDUINO MICROCONTROLLER

Date and Venue:

The training workshop took place on 11 -15 July 2016 at Electrical Circuits Lab, Electrical and Electronics Engineering department, MBC, Peermade.

Training Team:

The members of the training team were Mr.Vinu Sankar, Assistant Professor, Musaliar College of Engineering and Technology, Pathanamthitta and Mr.Jibin Jose, Senior Design Engineer, Revera Infotech, Thodupuzha.

Agenda:

The training team agreed a draft agenda prior to the training Workshop which was approved by the participants.

Day 1

- Opening and introduction
- Concept of different platforms of proteus design
- Concept of high voltage and low voltage
- Concept of voltage division rule
- Concept of digital circuits

Day 2

- Concept of Microcontrollers and Microprocessors
- Concept of Arduino Uno Board
- Developing of circuits using Arduino Software
- Concept and developing led blinking circuits based on Arduino Software
- Concept of Analog to Digital Converter
- Designing and developing the circuits using the circuits using ADC

Day 3

- Concept and designing of circuits to measure temperature using Arduino Software

- Concept and designing & developing of circuits using Arduino Software based on LCD programming
- Concept and developing circuits based on pulse width modulation
- Concept and developing of circuits using analog sensor
- Concept and developing of circuits using DC motor interfacing

Day 4

- Concept and designing of circuits to measure AC voltage and current
- Concept and designing of circuits for measuring DC current measurement
- Concept and developing circuits using Servomotor Interfacing
- Concept and developing of circuits using ultrasonic sensor & PIR sensor
- Concept and designing of circuits for developing wireless Communication by using RF module
- Concept and developing & interfacing of 7 segment display circuit
- Concept and developing of Dual tone Multiple Frequency Circuit

Day 5

- Final Task - Group project session

Participants

The training workshop was attended by S5 EEE (2014-2018) students of MBCCET,Peermade. On the first day of the workshop at 10:00 A.M, Mr.Ajith John Thomas, Assistant Professor of EEE department of MBCCET, Peermade addressed the training workshop.

Training Workshop

The overall objective of the workshop was to build the knowledge of Microcontrollers and Microprocessors to the students of Electrical & Electronics Department and better promotions of innovative projects. The training gave insight in doing the innovating projects that are useful to our society.

The objective was achieved through lectures, practical demonstrations using Arduino Uno board; computer programming based on Arduino software, laboratory exercise, and proteus simulations. The training workshop consisted of 33 students and they joined to form 9 groups.

The first day classes started at 10:00 am .Firstly the instructor discussed about the concept of microcontrollers. Microcontrollers are a small computer on a single chip containing a processor,

memory and input &output. It is typically embedded inside some device that they control. Microcontroller is often small and low cost. The circuit simulation was done by using proteus software. The proteus software consists of three different platforms. They are ISIS (Intelligent Schematic Input System) for drawing schematic diagram, ARES(Advanced Routing and Editing Software)for designing circuits and VSM(Virtual System Modeling) for simulation of circuits. Circuits are of two types; digital and analog circuits. Analog circuits are those in which voltage & current vary continuously over a range. They can take any value within the specified range. The digital circuits are those in which the voltage level assumes a finite number of distinct values. Modern digital electronics have two distinct voltage levels '1' & '0'. Digital circuits are also known as switching circuits. Each group developed the circuit using proteus simulation. Using proteus software, we designed the circuits using logic gates. The classes completed at 5:00 pm.

The second day classes started at 9:30 am. We discussed about the developing of circuits using Arduino Uno board and Arduino software. Arduino Uno board has a USB cable. That cable is connected to the laptop to get the 5v supply from Arduino Uno board. We also studied that how to develop a circuit using Arduino software. So that each group developed a led blinking circuit using Arduino Uno board based on a program uploaded in Arduino software. In the afternoon session we discussed about the analog to digital converter. In that device 0v is considered as 0v digital value.5v is considered as 1023v in digital circuits. In this, one of the important parameter is scaling factor. It is the ratio of source voltage to the voltage drop across the corresponding resistor. We also designed the values of resistors connected in the circuit. After that we developed the circuit using ADC in hardware and proteus software. The classes completed at 5:00 pm.

The third day classes started at 9:30 am. We discussed about how to measure the temperature using the IC LM35. In that IC 10mV is assigned as one degree. Firstly each group prepared the proteus simulation and developed the hardware based on the program uploaded in Arduino software. Through this experiment each student achieved the knowledge about relay and studied about the connections of relay. Next we discussed about the LCD display. After that each group was ready to develop the circuit using LCD display based on program uploaded in Arduino Uno board. In afternoon session we discussed about the pulse width modulation and DC motor interfacing. For designing of circuit, we used the IC L293D. We uploaded the program based on the clockwise or anti-clockwise movement. Then we developed the circuit using DC motor. The classes completed at 5:00 pm.

The fourth day classes started at 9:00 am. We discussed how to measure ac voltage and current. Then we discussed about the DC current measurement based on Hall Effect Sensors. We developed the circuit based on the program uploaded in Arduino Uno board. After that we discussed about the interfacing of servomotor. We developed a hardware using servomotor and pot of 10 k. Afternoon session we discussed about PIR sensor and ultrasonic sensor. We also studied how to develop practical circuits using these sensors. PIR sensor sends infra red signals and does not detect black bodies. Ultrasonic sensor sends signals and they strike the obstacle and sent back to the sensor. Then this sensor detects that obstacle based on its distance. We also discussed about the wireless communication using transmitter and receiver. We designed that circuit based on the program uploaded in Arduino Uno board. We developed the circuit based on dual tone multiple frequency. Then we

developed a circuit based on 7 segment display. The classes completed at 5:00 pm.

The last day classes started at 8:30 am. It was task – Project Competition session for each group. A project has to be done based on the knowledge that we had achieved through these 5 days. Each project has its own significations and social impact. Each group developed their innovative projects along with its hardware demonstrations and proteus simulation on 12:00 pm. Then each group presented their project description and evaluation was done by the resource persons. From the evaluation two project groups were selected as best projects (based on social relevance, sensors used, software coding etc.). Prizes were distributed to these two groups by the EEE Department. A special prize given to a group by the resource persons for their project group excellence.

A thanksgiving session was there by the students from each group. Feedback was taken and on behalf of all, EEE association and MBC Family, Mr. Ajith John Thomas, Asst. Prof., expressed his sincere thanks to the resource persons.

Outcomes

- Students are now capable of developing various projects using Arduino Microcontroller.
- Students have the caliber and logic to design circuits.

Recommendations

- Various training workshop will conduct to prove the students caliber
- Enhancement of interaction between students and various electrical engineering experts
- To have at least one period per week for project training.

Photo Sessions