One week Robotics Workshop Cum Championship (ROBOFIESTA)

Sept 02 – Sept 06, 2019

Organized by

Department of Electrical Engineering

&

"Parikalpana", Start-Up Cell

Rajkiya Engineering College Ambedkar Nagar

With

Technical Support

From

Robosapiens™ INDIA

Under the Aegis of

Dr. A. P. J. Abdul Kalam Technical University

Sponsored By

TEQIP-III

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Technical Education Quality Improvement Programme

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Ms. Pratibha

Mr. Sudheer Kr. Maury

Registration

Internal UG/PG students/ Lab Assistant/	NIL
School Students (High school, Intermediate)	Rs. 3500/-
External UG/PG students/ Research Scholar/	Rs. 5000/-

Fee shall be paid by Demand Draft in favour of "**Rajkiya Engineering College, Ambedkar Nagar**" payable at Akbarpur, Ambedkar Nagar or NEFT transfer in account number-**6257000100005758** (**IFSC Code-PUNB0625700**). Registration charges are non-refundable for selected candidates.

Applicants have to register by filling the form by using link:

https://tinyurl.com/y5cwqu79

on or before 25.08.2019

Hard copy of duly filled Registration form in the prescribed format approved/sponsored by competent authority along with the DD should reach to the Coordinators Dr. Sanjay Agrawal/ Dr. Puneet Joshi on or before 30.08. 2019.

Registration Form

Please complete the details below

1. Name (Mr./Ms.) _____

2. Organization: _____

3. Address:

_____

_____

4. Tel. No. (Mob): _____

5. E-mail ID:

_____

6. Highest Acad. Qualification:

_____

7. Registration Fees Detail

Draft No._____ Date_____for Rs._____in favour of Rajkiya Engineering College, Ambedkar Nagar payable at Akbarpur, Ambedkar Nagar

Signature of the Candidate

Signature of the Head of the Department/Institution (If required)

For Further Details, Contact:

+91-9012872877, +91-8470892739

Objective of the Robotics Workshop Cum Championship

This workshop mainly focuses on the students eager to learn Arduino and Robotics from Basic. They will get the chance to expand their knowledge in the field of designing, construction, operation, and application of Robot with real time hand on practical experience.

This workshop has three modules

1. Arduino
2. Autonomous Robotics
3. Bluetooth Robotics

First two days, workshop will focus on getting you up and running with Arduino quickly, so that you will understand the basic procedures for working with Arduino and can explore further on your own.

An Arduino is a small computer that you can program to control things like lights or motors along with listening to components like motion detection sensors. It can give your project interactivity without needing an expensive and large circuit. Instead, you use a computer to program the Arduino, upload your code to the Arduino, and hook up your circuit.

Third & Forth day of workshop participants will get knowledge of robotics from elementary level to higher level. HC-05 / HC-06 based Bluetooth Controlled Robot works in heeding with the commands sent from Android based Smart Phone using a Developed Android Application and Bluetooth Technology. This workshop helps participants to understand the designing concepts and use of microcontrollers, serial communication and microcontroller programming in Embedded 'C' language.

At Fifth day of this workshop, a competition will be organized among the participating students where each participating student will get Certificate of Participation and the Winners will get Certificate of Merit along with cash prizes.

Course Outline

Day 1(Session 1)

Introduction to Embedded System

- Introduction to Embedded System
- Applications & Scope of Embedded System in various industries

Introduction to Open Source platform

- An Overview of Open Hardware
- Arduino Board Description

Introduction to Microcontroller

This session would deal with the basics of Microcontroller. The focus will be on the AVR Micro controller, which is one of the most powerful and widely used 8 bit microcontroller.

- What is Microcontroller?
- Difference between Microcontroller and Microprocessor
- Microcontroller architecture and Interfacing
- Introduction to Microcontrollers & the Arduino Platform
- How can we use microcontroller in our circuits
- Introduction to Programming Language
- Programming Languages- Assembly Vs Embedded 'C'
- Microcontroller Programming using Embedded 'C'
- Introduction to software tool chain
- Software Installation
- Getting started with the Arduino IDE to start writing your first program
- Writing your First 'Embedded C' Program

Day1(Session 2)

Interfacing of I/O devices

LEDs

- Types of LEDs.
- How LEDs works?
- How LEDs will glow in sequence?
- Interfacing of LED with Arduino

Switch

- Types of switches
- Their Functions
- Interfacing of switch with Arduino

Buzzer

- Types of Buzzer
- Uses of Buzzer in Real Time
- Interfacing of Buzzer with Arduino

Display Devices

- Types of Display Devices
- What is a Seven Segment Display?
- Internal Structure of Seven Segment
- How to glow Seven Segment?
- Interfacing of Seven Segment with Arduino
- Multiplexing

Day 2(Session 1)

ADC

- What is ADC?
- Use of ADC
- What is Resolution?
- Uses of different ADC Registers
- Interfacing of Analog Devices with Digital World

Serial Communication

- Difference between Parallel and Serial Communication
- USART / UART Protocol
- RS232 Standard
- TTL Converter
- UART Programming

Day 2(Session 2)

Introduction to Basics of Robotics

- Basic Electronic Components
- Fundamental Electrical Concepts
- Sensors
- Operational Amplifier
- Integrating Circuit
- Interfacing of Sensors
- Motors and Controlling Circuit
- Interfacing of Motors

Day 3 (Session 1)

Discussion on Different Algorithms

- Line Following Robot Algorithms
- Edge Avoiding Robot Algorithm
- Obstacle Avoider Robot Algorithm
- Wall Following Robot Algorithm
- Sound Operated Robot Algorithm
- Light Searching Robot Algorithm

Installation of Software and Debugging

- Writing your First 'Embedded C' Program in AVR Studio.
- Program Compilation and Debugging.

- Loading Compiled 'C' Program into Microcontroller using Robosapiens 'AVR BOOTFlasher v1.0 Beta'

Day 3(Session 2)

Assembling the DIY kit of Robosapiens iBOT Mini V3.0

Assembling plays a major role that deals with the mechanical section of Robotics including mounting of components and mechanical stability.

Generating different LED Patterns using Robosapiens iBOT Mini V3.0

Development of Line Following Robot using Robosapiens iBOT Mini V3.0

As the name suggests, Line Follower Robot is well programmed mobile machine that can follow a path visible like Black Line on White Surface or vice versa. A simple fuzzy logic will do the job of maneuvering the robot according to the Line Following Algorithm discussed in session 1.

Development of Edge Avoiding Robot using Robosapiens iBOT Mini V3.0

Edge Avoiding Robot is a mobile machine that senses the presence & absence of surface below it and avoids the absence of the surface using the Edge Avoiding Algorithm discussed in session 2.

Day 4 (Session 1)

Basics of Robot Electronics:

- Sensors
- Operational Amplifier
- Integrating Circuit
- Interfacing of Sensors
- Motors and Controlling Circuit Interfacing of Motors

Introduction to Wireless System

- What is Wireless System
- Working of Wireless System
- Different Wireless Modules
- Merits and Demerits of using Wireless Technology
- Introduction to Bluetooth Technology Working with Bluetooth Module (HC-05 / HC-06)
- Application of Bluetooth Technology in Robotics

Day 4 (Session 2)

Interfacing of Bluetooth Module with Microcontroller
Bluetooth Controlled Robot Algorithm

Development of Bluetooth Controlled Robot using HC-05 / HC-06 & Robosapiens iBOT Mini V3.0

Bluetooth Controlled Robot is a mobile machine that is controlled using the Bluetooth Technology of the Android Phone and the Bluetooth Module (HC-05 / HC-06) interfaced to Robosapiens iBOT Mini V3.0

Day 5 (Session 1&2)

Competition

After the hand on theory and practical experience from the workshop, Zonal Round Competition will be conducted for the participants.

Accommodation

Accommodation is available in REC, Ambedkarnagar Hostels for participants on nominal charge and first cum first serve basis. The participants will not be paid any TA/DA. Charges of institute hostels are approximately Rs.160/- per day including food and accommodation.

About Dr. A. P. J. Abdul Kalam Technical University:

Dr. A.P.J. Abdul Kalam Technical University (AKTU) (formerly UPTU) was established by the Government of Uttar Pradesh.

The University is affiliating in nature and its jurisdiction spans the entire state of U.P. in affiliating B.Tech. M.B.A., M.C.A., B.Arch., B. Pharma., B.H.M.C.T., M.Tech. and Ph.D. programmes imparting graduate, postgraduate and doctoral level training in all government and private institutions located all over U.P. in engineering, technology, architecture, pharmacy, hotel management and catering technology as well as M.B.A. and M.C.A. programmes.

Rajkiya Engineering College, Ambedkar Nagar

Government of Uttar Pradesh established Rajkiya Engineering College (R.E.C.) Ambedkar Nagar in 2010. The college has started offering B.Tech. Programme in three disciplines – Civil Engineering (CE), Electrical Engineering (EE) and Information Technology (IT) with intake of 60 seats in each branches from the session 2010-11.

The students are extensively exposed to cross-cultural environment as candidates from various other States such as Jammu & Kashmir, Madhya Pradesh, and Rajasthan etc. join REC for various undergraduate programs. REC Ambedkar Nagar is fully residential institution with four hostels for boys and one for girls.

Department of Electrical Engineering:

The department of Electrical Engineering at Rajkiya Engineering College Ambedkar Nagar offers a vibrant environment for undergraduate education in Electrical Engineering Established in 2010. The Department of Electrical Engineering is actively engaged in teaching and research with modern laboratories and excellent faculty members.
The under graduate programme provides the students with a strong background in the broad areas of Electrical Engineering namely control system, power electronics & drives, electrical machines, power system and renewable energy. A strong exposure to state-of-the-art technologies is further provided through elective courses that are carefully designed for the interested students.

Presently, the Department comprises of 09 Faculty members and also sufficient number of nonteaching staff. The Dept. has also state-of-the-art facilities like the Computer Lab, Electrical Workshop, and Seminar Hall etc. The Faculty has a team of well-qualified and experienced teaching staff. Five of them are Ph. Ds. & rests are M.Tech. from eminent institutes like IITs, NITs and Central universities. They have published large number of research papers in various journals & conferences of repute. The Faculty is equipped for meeting the challenges of the present and the need of the future.