

Advanced Robotics Syllabus

Duration: 2 Months [5 days a week, 2 Hours a day, total 80 hours]

Introduction to Microcontrollers

ATmega 16 microcontroller

- Introduction to AVR architecture, Comparison of AVR with other CISC & RISC based systems and Microprocessors, AVR family Categories and importance (AT tiny/ ATmega/ Xmega), Atmega 16 pin details and specifications (with package detail), Instruction set / Bus architecture, RAM, FLASH, UART and other peripherals, Interrupts, timer, Counters,.

Software: Introduction to AVR studio, Writing C programs in AVR studio, Compiling, Linking and Simulating these programs, AVR bootloader, burning the hex file in to the flash memory of AVR Microcontroller.

1. Interfacing discrete LEDs
2. Interfacing switch and LEDs
3. Interfacing seven segment
4. Interfacing LCD
5. Hex keypad Interfacing
6. Timer with polling mode
7. Timer with interrupt mode
8. Serial communication with interrupt mode
9. DC motor interfacing

Module V

C Programming on Spark V:

USB port for programming and control of Spark V.

Study of algorithms & C programs for Spark V. obstacle avoidance, direction control, cruise control, white line follower, etc. Use of Spark V as a platform for ZigBee wireless control. Using a wireless camera with Spark V & capturing the video.

List of Experiments:

1. Buzzer Bip
2. LCD Interfacing
3. Motion Control Simple & using PWM
4. White line & Black line following
5. Serial Communication using Zigbee
6. Position Control Meter & degree

Module VI:

Presentation on Swarm Robotics, Fire detector, Alcohol detector sensor & Accelerometer.

- Light detector Spark V Robot
- Gesture controlled Robot
- Alcohol detector Robot
- Fire detector Robot
- Maze solver Robot
- Robotics motion planning algorithm
- Swarm Robotics
- Android phone based robot control via Bluetooth.