

St. Joseph's Institute of Technology St. Joseph's Group of Institutions OMR, Chennai - 119

Department of Electronics and Communication Engineering (Accredited by NBA)

LAB DETAILS

PROJECT LAB

Total Establishment Cost: Rs. 1,60,266

Area of the laboratory available (sq.m.): 50

S.No	Name of the Equipment	Description of the equipment	
1.	PIC Controller	PIC microcontrollers (Programmable Interface Controllers), are electronic circuits that can be programmed to carry out a vast range of tasks.	
2.	Sensor Package	Our sensor packages provide long-lasting protection for high-precision sensors against aggressive substances, high pressure and major temperature fluctuations etc.	1set
3.	Raspbery Pi Kit	Raspberry Pi 3 model B, microSD card with the NOOBS operating system installed, power supply, Raspberry Pi 3 case, six-foot HDMI cable, and two heat sinks.	5
4.	Arduino UNO	The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits	5
5.	Arduino promicro	The Pro Micro is an Arduino-compatible microcontroller with an ATmega32U4 on board.	
6.	HP 280 G2 MT	HP 280 G2 MT(Legacy), HP 280 G2 MT 180W aPFC Chassis(Legacy), HP 280 G2 MT Country Kit, Single Unit (MT)Packaging, Intel Core i5-6500 3.2G 6M 2133 4C CPU, 8GB DDR4-2133 DIMM (1x8GB) RAM, 1TB 7200 RPM SATA 6G 3.5 HDD, HP USB Business Slim Keyboard, HP USB Hardened Mouse, Windows 7 Pro (Pre Installed), 3/3/3 MT Warranty, HP V194 18.5-IN MNT	6
7.	HP Pro 3330 MT PC	HP Pro 3330 Series MT 300W aPFC Chassis, HP Pro33x/334x/338x Country Kit, 500GB 7200RPM SATA 1st Hard Drive, HP USB JB Keyboard,HP USB Optical BLK Mouse, Single Unit (MT) IND CH Packaging, 4GB DDR3- 1333 (1x4GB) peye RAM,HP 3/3/3 3330 MT Warranty, Intel Core i3-2120 CPU	2
8.	MATLAB 2012b	(Simulink, Communication System Toolbox, DSP System Toolbox, Signal Processing Toolbox)	5

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PROJECTS LAB

LIST OF TOOLS AND COMPONENTS IN PROJECT LAB				
S. No.	Tools / Equipment's	Details	Area of Specialisation	
1.	NS2	NS2 2.42 (Open Source)	Networking	
2.	Xilinx	Xilinx 11.1	VLSI Design	
3.	Keil	Keil µvision with 8051 ISP Programmer Kit	Embedded systems	
4.	MPLAB	Hitech Compiler with PIC ISP Programmer Kit	Embedded Systems	
5.	CommLab - T	Hardware –software platform to teach concepts of analog communication systems	Communication Systems	
6.	Rasberry Pi	Version 3	Embedded Systems	
7.	Sensor kit	Sensor Kit for Arduino Specification	Embedded Systems	
8.	PIC	PIC Controller 3	Embedded Systems	
9.	Arduino	Arduino starter kit & Arduino Uno R3, Arduinopromicro	Embedded Systems	
10.	Spartan 6	Spartan 6 XCLX9CSG 324 Package	VLSI Design	
11.	ARM cortex M4	ARM CORTEX M4 LPC4088	Embedded Systems	
12.	ZIGBEE BOARD	wireless solution built on the ARM Cortex-M4 processor for smart energy, smart metering and building control applications	Wireless Networks	
13.	MATLAB 2016a MATLAB R2012b	Numerical computing environment and proprietary programming language developed by mathworks	Image Processing, Wireless Communication, Signal Processing, Speech Processing	
14.	Tanner	Complete circuit design and analysis system	VLSI Design	

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PROJECT LAB

SAMPLE MAIN PROJECTS MAINTAINED IN PROJECT LAB

1. FOOL PROOF CENTRALIZED VOTING MACHINE USING AUTOMATION SYSTEM



(INAE AWARD WINNING PROJECT AT BACHELOR LEVEL-2017)

PROJECT DONE BY

ANJANA R (312413106007) NIVETHA S (312413106063) PRIYANKA K (312413106072)



2.VIRTUAL REALITY-HOLOGRAM BASED FOOD SUPPLY MANAGEMENT POST FLOOD

PROJECT DONE BY

AJITH KUMAR N (312415106301) & KINGSTON JACOB P (312415106302)



3.WOMEN SAFETY DEVICE USING RASPBERRY PI

PROJECT DONE BY

GOKILAVANI S P (312412106023) THILLAIKKARASI S (312412106067)



4.EMBEDDED ELECTRONIC EYEZONE

PROJECT DONE BY

MITHUNAN K (312412106040) SASIKUMAR P (312412106323)



5.SMART LED STREET LIGHT SYSTEM FOR SMART CITY

PROJECT DONE BY

MARY SWETHA V (312415106073) PRAVEENA S (312415106057)



6.WIRELESS POWER TRANSFER BASED MULTI PAIR TWO WAY RELAYING WITH MASSIVE ANTENNAS

PROJECT DONE BY

SIVARANJANI S (312415106093) VANITHA D (312415106105)



7.AUTONOMOUS ELECTRICITY METER

PROJECT DONE BY

ASHWIN S (312412106303) VIGNESH K (312412106335)



8.A NOVEL TROLLEY FOR SHOPPING, BILLING AND GUIDANCE IN SUPERMARKET ENHANCED WITH IOT TECHNOLOGY

PROJECT DONE BY

ALVIN ISSAC MATHEW (312415106007) SHEIK ABDUL KATHHER K(312415106087)



9.NON-INVASIVE BLOOD GLUCOSE MONITORING

PROJECT DONE BY

JANANI L (312415106034) SARANYA L (312415106083)



10.PASSWORD BASED DOOR LOCK SYSTEM

PROJECT DONE BY

M.PRABHA (312412106046) D.RAJALAKSHMI (312412106052) D.C.PRIYADHARSHINI (312412106050)



11.DESIGN OF AUTOMATIC DUAL AXIS SOLAR TRACKER USING MICROCONTROLLER

PROJECT DONE BY

ASHWATH V (312412106012) MADHAN J (312412106314)



12.AGRO SMART SYSTEM

PROJECT DONE BY

AKASHYA K (312415106004) ANGEL L (312415106009)



13.DESIGN OF ULTRA WIDEBAND 4*4 ANTENNA ARRAY FOR CANCER

PROJECT DONE BY GAYATHRI P (312413106024) GAYATHRI V (312413106025)



14.DECOMPOSITION OF ECG SIGNAL WITH APPLICATION

PROJECT DONE BY

GOMATHY R (312412106024) PRIYADHARSHINI D C (312412106050)



15.DESIGN AND DEVELOPMENT OF A SMART MIRROR USING RASPBERRY PI

PROJECT DONE BY

AJITH KUMAR N (312415106301) & KINGSTON JACOB P (312415106302)



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Department of Electronics and Communication Engineering (Accredited by NBA) yeas of Excellence Since 1994

PROJECTS LAB

SAMPLE MINI PROJECTS MAINTAINED IN PROJECT LAB

1.LED CUBE

PROJECT DONE BY II YEAR ECE

ANDREA PAULIN D (312418106006) GLORY ANGEL J (312418106038) DENISHA JEMI D (312418106026) ELAKKIYA P (312418106032)



SNAPSHOT OF THE PROJECT

ABSTRACT

This 4x4x4 LED cube for use in science laboratories is very easy to assemble. Its LEDs light up in different patterns, creating mesmerizing lighting effect. This cube has 64 green LEDs which make up it's 4 layers(positives) and 16 columns(negatives). These are all wired to a Arduino nano. An Arduino is a single-board microcontroller, intended to make the application of interactive objects or environments more accessible. The programming code(sketches) for the Arduino nano to control the individual LEDs to display patterns for this captivating desktop light show.

CONCLUSION

It is used for decorative purposes. It can be used as an decoration piece or used with other equipment's like microphones or motion sensor for other applications. Here we have used blue color making this cube and it can emit lights in various patterns.

APPLICATIONS

This led cube can be used for the decorative purposes.
Useful in creating mesmerizing effects of light.

2. XCAFE ROBOT

THIS PROJECT IS DONE BY A TEAM OF 25 STUDENTS FROM II YEAR ECE & III YEAR ECE

312418106046 HARINI G 312418106001 ABIRAMI H **312418106008 APARNA DEVADAS** 312418106019 BHARATHI R 312418106025 DEEPIKA G S 312418106030 DIVYADHARSHINI J 312418106043 GRAHAM STAINES SMITH J 312418106097 NIRANJANA R 312418106106 PRIYA L 312418106111 RAKSHANA R 312418106115 RATHNAMALA S **312418106114 RANJITH KUMAR M** 312418106116 REEMA K SHERIN WILFRED 312417106022 DEEPAK A **312417106004 ADLIN JENIFER T** 312417106006 AISHWARYA B 312417106035 ISAIYAMUTHU S 312417106055 MEGHNA P 312417106009 AMALIN ASHA E 312417106025 DEVISHREE S 312417106056 MIRA G 312417106080 SHALINI S 312417106091 SIVAPRIYA M 312417106096 SRIRAM V 312417106113 VINOTH N

ABSTRACT

This is the basic xcafe robot used for restaurant purpose. It as a height of 4ft and width of 1.5 which is constructed using foam board and LED lights are fixed on the face of the robot to give the effect of humanoid robot. The weight of the robot is 15kg and the pay load of the robot is 5kg and max. upto 8.3kg. It can work continuously for 5 hours. The main concept of this robot is to receive and give the foods to the customers. It is accessed using bluetooth modules which is controlled by bluetooth DC controller mobile app.



SCREEN SHOT OF THE PROJECT

CONCLUSION

Thus we have built the basic xcafe robot used for restaurant purposes. The program is uploaded in arduino uno board. Using the program the robot can be accessed by bluetooth through the mobile app. So that the robot reacts to the command executed in the app. It can move forward, backward, left and right wards. Even it as a facility of U-turning. It can also be used as welcoming purposes also.

APPLICATIONS

- Hotel Robot is used for delivering food, drinks, to the respective tables and rooms.
- It is also used for room service.
- It reduces the customers waiting time.

3.EMERGENCY GAS DETECTOR

PROJECT DONE BY II YEAR ECE

HARCHANA.S (312418106044) JEYALALITHA.K.H (312418106061) RISHIKA SRIVASTAVA (312418106120)



SNAPSHOT OF THE PROJECT

ABSTRACT

The present paper reviewed the different stage of gas sensor development for detection and identification of gasses including the historical background of various types of gas sensors. The development of sensing technology in terms of sensing mechanism, sensing elements, signal processing, pattern recognition methods etc. have been taken into consideration in the present paper. Comparison among gas sensors by taking care of sensitivity, drift correction, operating temperature and power consumption is also discussed in details. The above mentioned points conclude to re- search for portable, reliable, low price and most efficient gas sensor. The main goal of the present paper is to develop such a gas sensor that can detect and monitor harmful as well as poisonous gasses in the environment and also to warn form dangerous organic compounds.

APPLICATIONS

This project can be used in many forms of useful ways like in,

- Automobiles
- Machines
- Robotics
- Industry
- Medicine
- Aerospace

CONCLUSION

The results showed that it is possible to implement an artificial sensory system, which allows to detect very fast and discriminate differentiate chemical compounds that are harmful to health Conclusion: In this study it was possible to detect compounds of pesticides in fruit from the response of a artificial sensory system, composed of a measurement chamber with an array of 16 sensors chemical fumes.

4. BIDIRECTIONAL VISITOR COUNTER

PROJECT DONE BY II YEAR ECE

HARI PRIYA B (312418106047) KETZIA J (312418106069)



SNAPSHOT OF THE PROJECT

ABSTRACT

The Congestion control Bidirectional Digital visitor counter is a consistent circuit which is mainly designed to monitor the room appliances as well as count number of people entering in the arena very accurately and also avoids congestions in the different areas of usage. When a person enters into the arena a counter is maintained for presenting the number of people and is updated by one and the appliances in the arena will be turned ON and when a person leaves the arena counter is maintained for presenting the number of people and is decreased by one. The appliances will turned OFF when all the persons in the arena go out. The overall count of people inside the arena will be presented on Liquid crystal display. When a particle

passed through the Infrared Receiver's then the Infrared Rays falling on the receivers are obstructed. This obstruction is sensed by the Arduino Microcontroller. It also can manage fans based on relay provide, If the room reaches the maximum capacity then by using wifi module message is sent to authorities to limit the person entering the room. Thereby congestion is avoided.

APPLICATIONS

1. This project can be used in seminar halls, classrooms.

2. This project can also be used in industries

CONCLUSION

In our project, we have designed and implemented a Bidirectional Counter. The target users of the project can be any one right from a common man to any organization. Lets say if any one uses our project for Seminar Purpose then the track record of the persons attending the seminar will give the exact idea about the no. of candidate attending and leaving the seminar and accordingly the Project Model will control the persons attending.

5. FLOOR PAINTING AND CLEANING EDGE DETECTING BOT

PROJECT DONE BY II YEAR ECE

HARINI GOVINDARAJ (312418106046)

ABSTRACT

Automation of the car braking system is an important feature in the development of the smart car. The ability of a smart car to detect and classify an obstruction that is in varying proximities from it play a vital role in the system's design. In this study, EV3 Lego Mindstorms equipped with an ultrasonic sensor was used as a model of a large scale vehicle. EV3 Lego Mindstorms was programmed to slow down when it is at a certain distance from the obstruction, and to stop when it is 15 cm away from the obstruction. The distance measurement of the ultrasonic sensor and the Neural Network was used for the classification of the obstruction and Multiple Correlation was used for obstacle detection. There is a high correlation coefficient in the distance measurement of the different types of obstruction materials



SNAPSHOT OF THE PROJECT

APPLICATIONS

- 1. Used in mobile robot navigation systems
- 2. Used for household work like automatic vacuum cleaning
- 3. Used in dangerous environments, where human penetration could be fatal.
- 4. Automatic changeover of traffic signals
- 5. Intruder alarm system

CONCLUSION

The result is obtained for obstacle avoidance robot using Arduino, if the robot moves forward if any obstacle detect it check for other directions and moves where there is no obstacles it moves in forward direction, to sense the obstacle ultrasonic sensor is used. We used servo motor to rotate the ultrasonic sensor.

6. GAS ALARMING SYSTEM

PROJECT DONE BY II YEAR ECE

HEMALATHA B (312418106050) KEERTHANA A (312418106066) KEERTHANA P (312418106067) KEERTHANA T (312418106068)

ABSTRACT

No matter where we are this modern world has been a great tool to make our work easier but on the other hand it is also bundled up with a variety of problems. They can also be used for fire fighting. Gas detection systems are designed to provide an early warning indication that toxic or combustible gases may be present. Basic systems include one or more gas detectors, a centralized controller with user interface and local or remote warning strobe lights or warning horns. The controller powers the gas detectors and the ultrasonic sensor which cause alarming signals.

APPLICATIONS

- 1. Widely used in industries.
- 2. Used in firefighting.
- **3.** Found in locations like, such as oil rigs, to monitor manufacture process and emerging technologies such as photovoltaic.



SNAPSHOT OF THE PROJECT

CONCLUSION

When a person is about to enter the leakage zone the message is immediately passed to the buzzer and the buzzer alerts the person through an alarm. This has a positive impact to the environment and makes the job easier by automating it.

7. SELF BALANCING BOT USING ARDUINO

PROJECT DONE BY III YEAR ECE

AVINASH DIYYA (312417106016) M.KEVIN BRADLEY (312417106047)



SCREEN SHOT OF THE PROJECT

ABSTRACT

In this report, we deal with Arduino and its application in the form of a self balancing robot. To begin with, Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing. Arduino

has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. With the help of this project, we showcase one of the many applications of embedded systems using Arduino which is a water management system, which detects the level of the water and decides when to stop the motor.

The below schematic shows the operation of the balancing of robot with the use of an accelerometer.

APPLICATIONS

- Can be used as a transport vehicle
- Can be used in Industrial Automation robots for transporting medium weight cargo at faster speeds

• Can be used in existing two wheelers to prevent accidents caused due to loss of balance.



FIG : THE SIMULATION OF A SELF BALANCING ROBOT

CONCLUSION

Hence with the help of this mini project, we were able to view a great application of Arduino which can also be seen used in many places in reality. We also learnt to integrate many complex components into this and learnt their functioning.

8. SMART HOME SECURITY

PROJECT DONE BY III YEAR ECE

SARULATHA D(312417106078) VEDHIKA S (312417106089) SIVAGNANA SOWNDARYA R(312417106108)



SNAPSHOT OF THE PROJECT

ABSTRACT

All over the world, security has been a major concern in every home. Automated security systems are a useful addition to today's home where safety is an important issue. Vision-based security systems have the advantage of being easy to set up, inexpensive and non-obtrusive. etc Home security is both the security hardware in place on a property as well as personal security practices. Security hardware includes doors, locks, alarm systems, lighting, motion detectors, security camera systems, etc. that are installed on a property; personal security involves practices such as ensuring doors are locked, alarms activated, windows closed, extra keys not hidden outside, etc..CCTV(close-circuit television)camera systems are installed to protect your home and shops from burglary and break-ins. But with our busy lives, it is not possible to monitor it 24*7. So, we need a more reliable and robust security system that can notify us when someone breaks into our shop or home.

CONCLUSION

The project idea revolves around creating a home security system using the application of PIR Motion sensor controlled by Arduino. An Arduino controlled PIR Motion sensor is installed to the door to detect any motion at the doorstep any security violation, the owner will automatically get call notification on his/her phone. This project can be implemented anywhere , not only buildings or premises, but in museum, jewelry shops.

APPLICATIONS

It can be used as

- PIR Sensor based Automatic Door Opening System
- Security Alarm System based on PIR sensor
- Human Detection Robot Using PIR Sensor

9. LI-FI

PROJECT DONE BY III YEAR ECE

SWETHA ANNIE A (312417106101) MITHRA JAGADEESAN (312417106057)

ABSTRACT

Li-Fi (Light Fidelity) is wireless communication technology which utilizes light to transmit data and position between devices. In technical terms, Li-Fi is a light communication system that is capable of transmitting data at high speeds over the visible light, ultraviolet, and infrared spectrums. In its present state, only LED lamps can be used for the transmission of visible light. Using light to transmit data allows Li-Fi to offer several advantages, most notably a wider bandwidth channel, the ability to safely function in areas otherwise susceptible to electromagnetic interference (e.g. aircraft cabins, hospitals, military), and offering higher transmission speeds.



SNAPSHOT OF THE PROJECT

CONCLUSION

Li-Fi is the most ideal solution for effective data transmission due to its basic building block : Light, Inexhaustible, accurate, fast, safe and cost effective , Li-Fi could potentially be the successor of Wi-Fi upon further development and it can be put into practical use, every bulb can be used as an alternative to Wi-Fi and wireless data transmission can be done.

APPLICATIONS

- 1. Smart lighting
- 2. Mobile connectivity
- 3. Vehicles and transportation
- 4. Defence and security
- 5. Hospitals and healthcare
- 6. Aviation
- 7. Underwater communication

10. MULTI CONTROLLED WHEELCHAIR

PROJECT DONE BY III YEAR ECE

SARADHA.M (312417106076) SARASWATHY.A.R (312417106077) SWATHI.G (312417106100) S.UMADEVI (312417106105)

ABSTRACT

People with motor disabilities are trying to be more autonomous by using an electric wheelchair with a conventional joystick control. However, a problem arises when these people are suffering from upper extremities disability such as tetraplegia. Several methods were implemented such as voice control, chin control, eye-blink, sip-and-puff, but each has its advantages and disadvantages. Furthermore, in some situations a method is preferred to others. In this paper, we suggest a methodology that incorporates multiple control methods for a wheelchair. Voice control, Bluetooth control and joy stick controllers will all be included in the same wheelchair. The user has the option to choose which one he will use whenever he wants. This helps the individual with disability to be more autonomous because he decides the method that suits him better at any particular time.



SNAPSHOT OF THE PROJECT

APPLICATIONS.

- The main aim of this project implementation is to help all the people who are dependent on wheelchair for their mobility.
- Wheelchair is simple to operate and does not need any external help.
- The objectives of this project have been achieved successfully. This project was able to develop an android system that can control the movement of the wheelchair.
- The application built can be useful for many android phones.

CONCLUSION

This project elaborates the design and construction of Smart Electronic Wheelchair with the help of Bluetooth Module. The circuit works properly to move as the command given by the user. The detection of any obstacle is successfully controlled by the microcontroller. This proposed system contributes to the self-dependency of differently abled and older people.