

# TECHCOM

JULY 2022 - DEC 2022  
VOLUME -11

Faculty Co-Ordinators

Mr. M V S S Babu  
Assoc. professor

Mr. S Brahmaiah  
Asst. Professor

Student Co-Ordinators

Pitchikala Baby Aparna    Gurijala yaswanth  
(20F15A0408)                      (20F11A0428)

Bobba Jyothsna                      Gopalam Madhu Sri  
(19F11A0405)                      (20F11A04A3)

## CONTENTS

- Warp Drive: Travelling faster than Light
- Quantum Computing: Bringing Sci-Fi to Reality
- Thermocouples—How Does a Thermocouple Work?
- Solar Vacuum Cleaner & Floor Cleaner Robot
- Water Landing and Take-off Drone
- Auto Light/Water Saving Project
- Mobile Charging On Coin Insertion
- Vehicle Speed Limiter Project



### **Vision of the Institute**

To be one among the premier institutions of the country for professional Education in producing technocrats with Competent skills, Innovative ideas and Ethics strong to serve the nation.

### **Mission of the Institute**

- To provide an environment most conducive to learning with state of the art infrastructure, well equipped Laboratories and research facilities to impart high quality technical education.
- To emphasize on innovative ideas and creative thinking and prepare them to meet the growing challenges of the industry.
- To inculcate the leadership qualities, multi-disciplinary approach, ethics and lifelong learning in graduates to serve the diverse societal needs of our nation.

### **Vision of the Department**

To produce technically competent Electronics & Communication Engineers with a motive to meet the needs of the industry and evolving society through advanced research, professional ethics and lifelong learning.

### **Mission of the Department**

- To enrich the technical skills of the students through effective teaching-learning practices, continuous assessment methods and eminent faculty.
- To continuously enhance creative thinking, research ability and innovative skills of students through training on core and multidisciplinary technologies and skill enhancement programs.
- To inculcate leadership qualities, ethics, social responsibility and gratitude through outreach programs.

### **Program Educational Objectives (PEOs)**

PEO-1: Attain the global and local opportunities and reach greater heights in their chosen profession by demonstrating technical expertise.

PEO-2: Gain recognition by exhibiting problem solving expertise for addressing significant problems of industry and society.

PEO-3: Become good leaders with ethics and support, contribute and encourage diversity and inclusiveness in their workplace and society.

### **Program Specific Outcomes (PSOs)**

PSO-1: Responsive to ideas: Apply the knowledge on core Electronics and Communication Engineering in order to develop skills to analyze, design and develop innovative solutions for the real world problems.

PSO-2: Domain Expertise: To develop interpersonal skills to demonstrate proficiency using the latest hardware and software solutions by maintaining professional and societal responsibilities.

### **Program Outcomes (POs)**

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## Professor Desk



The Department of Electronics and Communication Engineering is committed to render-quality and professional pedagogy to pioneering engineers. The ECE department provides opportunity for the students to learn and fulfill the industry demands of Communication Engineering. The Department has state of art equipment, in various laboratories which is necessary to blend the theoretical & practical aspects of engineering. The Department offers UnderGraduate program in Bachelors of Technology. The Department has faculty members having expertise in wide variety of fields in Electronics & Communication. The department has a strong industry institution interaction.



## Warp Drive: Travelling faster than Light

Imagine taking a space tour for your summer vacation and getting back to earth before your school or college starts. Traveling in space as in Sci-Fi films like the Star-Trek series and our childhood masterpiece Doraemon. Ever since the sound barrier was broken, people have turned their attention to how we can break the light speed barrier. Many technologies had come into existence to make space travel faster and faster such as high-speed rocket engines, cryogenic engines, ion propulsion, etc.

The Sci-Fi film franchise, Star-Trek had a fictional space travel technology called The Warp drive. This technology enables us to travel faster than at light speed. Inspired by this Star-Trek series, a scientist named Miguel Alcubierre came up with an idea called The Alcubierre Drive. With warp drive, we can reach our nearest star Proxima Centauri in <3 yrs.

The Alcubierre drive is a speculative warp-drive idea according to which a spacecraft could achieve apparent faster-than-light travel by contracting space in front of it and expanding space behind it, under the assumption that a configurable energy-density field lower than that of vacuum (that is, negative mass) could be created.

The expansion and contraction of space are called Space-Time Warp, this creates a bubble around spacecraft called the Warp Bubble. This technology is based on Einstein's General relativity. The theory of general relativity says that the observed gravitational effect between masses results from their warping of spacetime. Many possibilities make the warp drive from theory to reality.



**MASIMUKKALA SAI VEERA  
ABHIRAM  
20F11AO450**

## Quantum Computing: Bringing Sci-Fi to Reality

Have you ever watched Sci-Fi movies like Ironman or The Matrix? In these films, we can see powerful AI machines that think faster than a human, and help the hero resolve problems.

How cool if all that Sci-Fi becomes reality? Surprisingly, that Sci-Fi stuff is going to become real in the Future with Quantum Computing.

Quantum computing is a rapidly-emerging technology that harnesses the laws of quantum mechanics to solve problems too complex for classical computers.

According to Wikipedia, Quantum computing is a type of computation whose operations can harness the phenomena of quantum mechanics, such as superposition, interference, and entanglement. Devices that perform quantum computations are known as Quantum Computers. To put it simply Quantum computing is a technology that enables us to solve problems from the quantum level i.e., performing complex tasks using principles of light.

All knew about supercomputers, machines that can perform the most complex tasks which scientists find very difficult to solve. Supercomputers are powerful machines but, when there are tasks with a high degree of complexity i.e., with thousands of variables these classical machines struggle to solve. Whereas for Quantum Computers those tasks are just a piece of cake, they perform at whole another level.

Let's look at an example that shows quantum can succeed where classical computers fail: A supercomputer is powerful enough to handle difficult tasks like analyzing and sorting data through a large database. But these computers struggle to solve complex problems like studying how each atom behaves in a molecular complex where thousands of variables and combinations become complex. No classical computer has the memory to handle all the possible.

A quantum computer takes a different approach by creating multidimensional spaces which makes it easier to study all the possible combinations. Whereas classical computers cannot create these computational spaces so, they cannot find the patterns to analyze.

Quantum computing is a rapidly-emerging technology that harnesses the laws of quantum mechanics to solve problems too complex for classical computers. Today, IBM Quantum makes real quantum hardware -- a tool scientists only began to imagine three decades ago -- available to hundreds of thousands of developers.

Quantum computers are elegant machines, smaller and requiring less energy than supercomputers. An IBM Quantum processor is a wafer not much bigger than the one found in a laptop. And a quantum hardware system is about the size of a car, made up mostly of cooling systems to keep the superconducting processor at its ultra-cold operational temperature.

A classical processor uses bits to perform its operations. A quantum computer uses qubits (CUE-bits) to run multidimensional quantum algorithms. A quantum works based on the principles of light like interference and superposition. They use superfluids and superconductors for quantum tunneling. Two superconductors placed on either side of an insulator form a Josephson junction. These junctions are used as superconducting qubits. By firing microwave photons at these Qubits, we can control their behavior and read their quantum information.

This includes U.S.-based tech giants such as Amazon, Google, Hewlett Packard Enterprise, Hitachi, IBM, Intel and Microsoft as well as Massachusetts Institute of Technology, Oxford University and the Los Alamos National Laboratory. Other countries, including the U.K., Australia, Canada, China, Germany, Israel, Japan and Russia, have made significant investments in quantum computing technologies. The U.K. recently launched a government-funded quantum computing program. In 2020, the Indian government introduced its National Mission on Quantum Technologies & Applications.



**GOPALAM MADHUSRI**  
**20F11A04A3**

## Thermocouples—How Does a Thermocouple Work?

A temperature-measuring device consisting of two wires of different metals joined at each end.

Thermocouples are commonly used for measuring higher temperatures and larger temperature ranges.

To summarize how thermocouples work, any conductor subjected to a thermal gradient will generate a small voltage. This phenomenon is known as the Seebeck effect. The magnitude of the generated voltage is dependent upon the type of metal. Practical applications of the Seebeck effect involve two dissimilar metals that are joined at one end and separated at the other end. The junction's temperature can be determined via the voltage between the wires at the non-junction end.

Thermocouples are manufactured in a variety of styles, such as thermocouple probes, thermocouple probes with connectors, transition joint thermocouple probes, infrared thermocouples, bare wire thermocouple or even just thermocouple wire.

Thermocouples are commonly used in a wide range of applications. Due to their wide range of models and technical specifications, but it is extremely important to understand its basic structure, functionality, ranges as to better determine the right thermocouple type and material of thermocouple for an application.

When these junctions are kept at different temperatures, generally cold junction is kept at 0°C and measuring junction is kept at an unknown temperature which we want to measure (i.e. the temperature of the junction is raised by heating it). An e.m.f. will be generated in this circuit due to the temperature difference of the junctions.

When both the junctions are at different temperatures, a current will flow through the meter. And the meter will show the deflection. As the generated e.m.f. is proportional to the temperature difference, the amount of current flow will also be proportional to the temperature difference. And therefore, the meter can be calibrated directly in terms of temperature.

The reference, or cold junction is normally connected to the measuring instrument and held at 0°C. For accurate temperature measurement, the reference junction temperature must remain constant or suitable compensation provided if it should change. To reduce inaccuracies, most thermocouples are now installed with instruments that provide automatic reference compensation.

With the introduction of protective wells, the response of a thermocouple slows down considerably. Where the fast response is a primary requirement, bare or thin sheathed thermocouples should be used.

## Thermocouple Types

There are various types of thermocouples. Certain combinations of alloys have become popular, and the desired combination is driven by variables including cost, availability, chemical properties, and stability. Different types are best suited for different applications, and they are commonly chosen based on the required temperature range and sensitivity. shows a graph of thermocouple characteristics.



**BIRADAVOLU LOKESH REDDY**  
**20F11A0491**

## Solar Vacuum Cleaner & Floor Cleaner Robot

Here we present a solar based floor cleaner robot that makes cleaning outdoor spaces, terraces, open restaurants, large campus etc very easy. The system is made to help cleaners clean large open spaces without any physical effort and without the need to constantly charge the robot.

The robot is made to provide following features:

- Easy and instant cleaning
- Vacuum Cleaning for dust collection
- Water tank and brush for wet cleaning
- Solar power supply for long battery life
- Remote Controlled Operation

The robot is built to help in daily cleaning tasks and simplify it. It brings together both dry and wet cleaning operations using a vacuum cleaner as well as wet cleaning brush.

The robot is controlled by an RF remote. The remote is used by user to send movement commands to the user. The robot consists of an rf receiver circuitry to receive movement commands and operate the moors to achieve desired movement.

The robot uses a battery that is constantly charged by a solar panel as it is drained by the motors. This provides a longer battery life when it is exposed to sun rays. The system consists of a vacuum cleaner with added ultrasonic sensor for obstacle detection. Cleaning is important work approximate every place . Sometimes this is easy and sometimes difficult .

Sometimes we assigned people for purpose of cleaning and pay money and sometimes cleaning is required in areas where presence of living being dangerous so we cannot assigned living being in every place . Some places are so that have a large floor areas in that place for cleaning purpose we need more than one person so we required some technique to compensate this problems . In advancement of science a robot come in light but in operate by a personnel . To avoid this limitations of personnel we require more technologies.

Automation is a great solution of this problem . So we make an autonomous floor cleaning robot .Ultrasonic sensor is the most important component for autonomous floor cleaning robot because ultrasonic sensor works as eyes of robot . Ultrasonic sensor useful for turning of robot by sensing the obstacle or wall . Sensing distance range set by programming . In this range robot sense the obstacle and turn back .Cleaning is Important work inexact each spot. At times this is simple and once in a while troublesome. At times we allocated individuals for reason for cleaning and pay cash and once in a while cleaning is needed in regions where presence of livingbeing hazardous so we can't relegate living being in each spot.



**NELAKUDURU VISHNU PRIYA**  
**20F11AO455**

## Water Landing and Take-off Drone

The use of drones in search and rescue operations, mapping and surveying, and in other civil applications like policing and firefighting, has only multiplied. Drones are popular because of their simplicity, expedition and wide range of applications. Because of the increasing number of crimes and robbery the high-security surveillance is required in commercial and industrial places. Night patrolling surveillance drone doesn't miss a chance to get, detect, observe and interdict unusual events. The most purpose of this project is to survey an enormous area from one place without having the safety person to physically monitor it. The drone is going to be equipped with a camera along sidelights to supply visibility in the dark. Also, the legs of the drone would be fitted with floatable material which can help the drone float on water, thus providing it with the capability of take-off moreover as landing to and from water bodies. This may further help to avoid robbery and it also can be used by soldiers for surveillance of hostile places where it's impossible to survey physically because of unfavorable terrains or harsh conditions



**GADAM MOUNISHA**  
**20F11AO423**

## Auto Light/Water Saving Project

Present now living the 21st century .Now a days we are mostly dependent on technology. We cannot think ourselves without technology for a single moment. Now computer technology have developed enormously. Now most of technology is basically dependent on the computer technology. We are now using technology to make ourselves automated. People are now using automated technology of their day to day life. Microcontroller based automatic system are getting more popular. Various sensors are being used with the microcontroller. Our study is basically a small attempt to promote a simple home automation.

We used PIR Infrared Motion Sensor, IR sensor, Temperature sensor. We have built a prototype for our project including two room, one water basin, and a fire alarm in the home .For two room we used two PIR sensor which basically perform automatic switching of light. PIR sensor used the movement of any object. Then the IR sensor basically controlling the motor. IR sensor detects the object by using the infrared ray. Finally temperature sensor works to detect the high temperature and then fire alarm get started.

A common thing we all often forget is to switch off the room lights and tap water. It's one of common human tendencies to forget things at times. This usually leads to water as well as electricity wastage. To avoid this unnecessary wastage we present an innovative system. The Auto light and tap switcher automatically switches on lights as it detects a human presence in a room. The system is fitted with sensors and counters to keep count of persons in a room. The system switches off the lights if the person counter equals zero value.

In the present world microcontroller and sensor based automation are getting more popular. People are thinking about their comfort. There are various kind of sensors which is basically run by the microcontroller. Microcontroller is a small processor. Accordingly mostly home automation sensors and microcontroller has been using for a long time. A microcontroller is a digital device that can be programmed to make decisions and alter outputs based on its inputs. It is traditionally a digital system but is often interfaced to the analog world. These microcontrollers use a program that executes in a loop to complete a task. Our dishwasher and washing machine along with our remote control and our cell phone are all controlled by a microcontroller. It can be thought of as a mini computer all on a chip. Home automation gives us access to control devices in our home from a mobile device anywhere in the world.

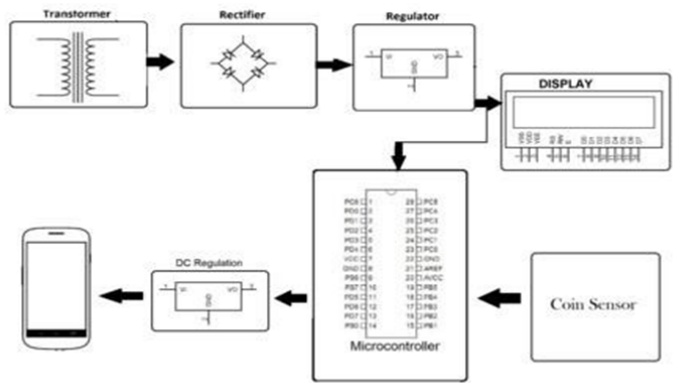


**GADAM MOUNISHA**  
20F11A0423

### Mobile Charging On Coin Insertion

This is the smart coin based mobile charging system that charges your mobile for particular amount of time on inserting a coin. The system is to be used by shop owners, public places like railway stations to provide mobile charging facility. So the system consists of a coin recognition module that recognizes valid coins and then signals the microcontroller for further action. If a valid coin is found it signals the microcontroller and microcontroller then starts the mobile charging mechanism providing a 5V supply through a power supply section to the mobile phone, now system also needs to monitor the amount of charging to be provided. So the microcontroller starts a reverse countdown timer to display the charging time for that mobile phone. Now if the user inserts another coin in that time, the microcontroller adds the time to currently remaining charging time and starts the reverse countdown. So the system can be used for smart mobile charging at public places.

When a coin is entered into the coin-based mobile charging system, the phone is charged. This technology is used by store owners and rural residents, and it can be deployed in public places such as train stations and bus stops to allow mobile charging. As a result, the coin acceptor detects legitimate coins and alerts the Arduino to take action. If a genuine coin is found, the Arduino receives a signal and begins the mobile charging mechanism, which provides a 5v supply to the phone via a power supply section. To display the charging time for the cell phone, the Arduino launches a reverse countdown timer. The user then inputs another coin, which the Arduino adds to the time left and decrements the countdown once more. And also here we connect Arduino to the internet by adding ESP8622 WI-FI module. It is a wireless and everything will be done on offline. It enables IoT service. Which updates the number of entries of a coin to the system. It will available in server side.



**NALLANGU VENKATA SESHASAI HARSHA**  
**VARDHAN**  
20F11A04C7

## Vehicle Speed Limiter Project

The Indian Law Commission has an advisory to limit the speed at critical zones, to reduce the road accidents and to make a peaceful environment for the people. The existing methodologies can't able to reduce the accidents still now, Because of the rash driving of some drivers. Hence speed control is in need to be implemented in all the vehicles. Here is the new idea of ours to install an automated speed control system in the vehicles mainly in the restricted areas. Here setup device as a transmitter where the multiple devices are combined to monitor the speed of the vehicle when the vehicle enters above the prescribed speed and controls it by placing a receiver at the vehicles, based on the signals transmitted the speed of the vehicle get reduced by interfacing a microcontroller. The current speed of the vehicle is sensed by the dc motor and the output of it was given to the microcontroller where it compares the speed with the prescribed limit and the speed is controlled automatically. The technology used in this system to communicate between transmitter and receiver is Zigbee technology, which covers up to 10-100m within its range. This is comparatively cheaper than others. Therefore this system controls and monitors the overall vehicles in its covered area.

Over speeding vehicle make lot of nuisance sometimes also leading to loss of lives and other damages. Also imposing speed restrictions through sign boards have been rendered fruitless wherein the vehicle drivers do not comply with it and resulting catastrophic. Vehicle Speed Limit Controller Project is a great solution to this problem as it not only provides speed limitations, it also implements it through a controlling mechanism.

The project works with RF communication between the speed sign post and the vehicle controller system. A motor is used here to depict as a vehicle. Whenever a vehicle comes in range of the RF speed sign post, the sign post transmits the speed limit for that particular road to the vehicle system.

The vehicle controller system receives this signal through RF receiver and further perceived by the microcontroller. The speed of the vehicle can be incremented / decremented manually with the help of push buttons. If the system was at lower speed than the limit received from the sign post than there will be no changes made to the speed of the system.

However, if the speed of the vehicle was manually incremented to a higher value, then the controller will impose the speed restriction and bring back the speed value to the value specified by the limit. Now if the user tries to increase the speed, the system does not allows it to do so till it is in range of the RF speed sign post. The speed of the vehicle and the limits are displayed on an LCD. Thus this system greatly helps in curbing the speed of over speeding vehicles ensuring safety of vehicles on accident prone road ways.



YANAMALA ANUSHA  
20F11AO4F3



<http://www.necg.ac.in>