# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

# e-SRUSHTI

*An Innovative Bucket...*

TECHNICAL MAGAZINE

JAN 2022 - JUN 2022
VOLUME X

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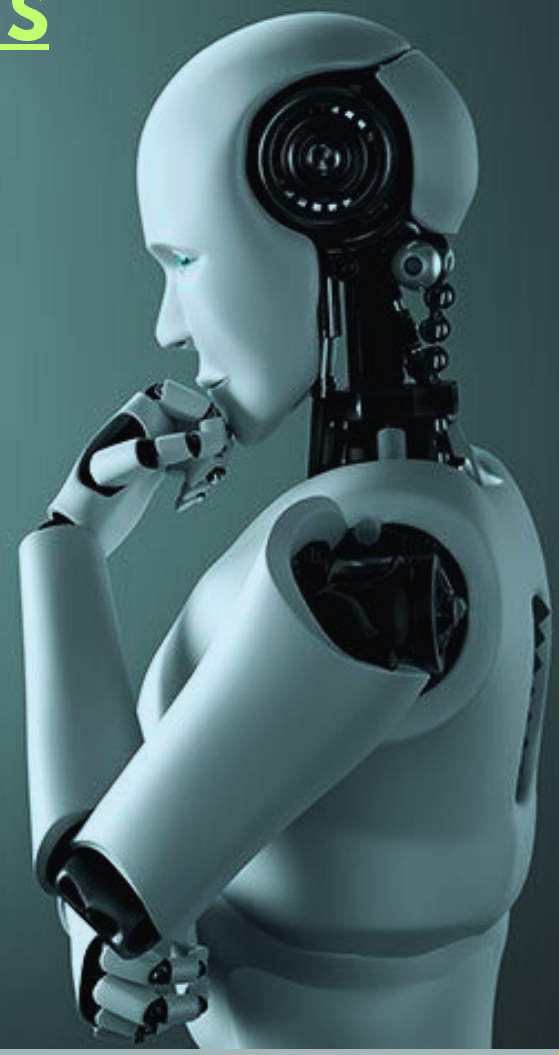

NARAYANA ENGINEERING COLLEGE :: NELLORE
AUTONOMOUS
ACCREDITED WITH GRADE A+ NAAC

## Vision of the Institute

To be one of the nation's premier Institutions for Technical and Management Education and a key contributor for technological and Socio-economic development of the nation.

## Mission of the Institute

- To produce technically competent Engineers and Managers by maintaining high academic standards, world class infrastructure and core instructions.
- To enhance innovative skills and multi disciplinary approach of students through well experienced faculty and industry interactions.
- To inculcate global perspective and attitude of students to face real world challenges by developing leadership qualities, lifelong learning abilities and ethical values.

## Vision of the Department

To produce technically competent and creative engineers who can cater to the industry and societal requirements in the field of Electronics & Communication Engineering

## Mission of the Department

- To impart quality engineering education to students to enhance ability to pursue knowledge by providing core competency and state of the art infrastructure.
- To provide industry oriented learning for empowering and facilitating the learner through industry institute interaction and leadership qualities.
- To promote participation in research and extension activities for addressing the social needs by providing value based education along with life-long learning abilities.

## Program Educational Objectives(PEOs)

**PEO_1:** Attain professional excellence or gain higher degree to face challenges posed by industry and society.

**PEO_2:** Address complex problems in a responsive and innovative manner.

**PEO_3:** Gain reputation by functioning effectively to address social and ethical responsibilities.

## Program Specific Outcomes (PSOs)

**PSO_1: Domain Specific Knowledge:** Implement electronic systems related to Electronics Devices &Circuits, VLSI, Signal processing, Microcomputers, Embedded and Communication Systems to fulfill the solutions to real world challenges

**PSO_2: Hardware Product Development:** Apply the software and hardware tools in Analog and Digital Electronic circuit design to address complex Electronics and Communication engineering problems.

## 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 modelling 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 multidisciplinary 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 multidisciplinary 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

I am proud to see that the students of our department have put in appreciable effort into creating the e-magazine, e-SRUSHTI. It is good to see that today's generation has not lost its literary roots, despite the perpetual efforts of e-Technology to extinguish the flames of the written word.

This e-magazine is an exceptional proof that the literary flame is burning bright. I look forward to seeing the juniors taking up the reigns of this e-magazine in future, so that this tradition remains eternal.

It gives me immense pleasure to announce the release of e-Shrushti. The primary focus of this technical e- magazine is to empower our students with overall development. I am grateful to everyone involved in making this journey successful.

***Dr. K. Murali***
Professor,
HOD of ECE.


# AIR CHARGE TECHNOLOGY

**Introduction:-**

Wireless charging removes the need for a cable, but it still requires carefully placing your device on a charging pad. Xiaomi's latest tech promises a much better experience by allowing an entire room to act as a wireless recharging zone. The tech is called Mi Air Charge.

It uses a combination of 144 antennas and beamforming to accurately detect when a device is in range of the wireless charger and triggers charging to commence using & an extremely narrow millimeter-wide wave beam."The core technology behind Xiamoi's remote charging phenomenon lies in space positioning and energy transmission. Sounds too complicated, right? Let's take it this way, Xiaomi has a self-developed isolated charging pile, more like a set of interference antennas. Which can accurately detect the location of your smartphone.

If your smartphone comes in contact with the said charging pile, it transmits millimeter wide waves through beamforming. Beamforming essentially allows an antenna to transmit a wireless signal from one location to a specific endpoint (in this case your device) instead of aimlessly and inefficiently around an area.

So we know how the charging pile emits waves, but is there anything on the smartphone side. According to Xiaomi, it has developed an antenna array comprising a 'beacon antenna' and 'receiving antennas.' These antennas convert the millimeter-wave signal emitted by the charging pile into electric energy through the rectifier circuit, which is basically turning the sc-fi charging experience into reality.

**Limitations:-**

There are, of course, some limitations to this new technology. First of all, charging is limited to 5 watts, but multiple devices can be charged at the same time at that rate.

The second limiting factor is the need for an array of "beacon antennas" to be present within the device being recharged. So this isn't going to work with existing devices.

Smart Phone Charging through beamforming Technology

**T.LIKHITHA,**
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## DIGITAL TRANSFORMATION

Digital transformation is one of the hottest topics in every industry, and as consumers are eagerly adopting increasing amounts of digital tech, electronics, and IT players have a unique opportunity to impact more industries than ever before. To help guide innovation in this booming space

Expert analysis of the hottest innovation topics and best tech startups found that the top five technologies

**AI-Enabled Sensors** - Merging hardware and software to collect and validate critical data will be a major part of use cases from consumer wearables to medical devices to industrial IOT.

**Digital Biomarkers** - Using data analytics to detect disease through changes in streams of data analytics is a potent path for electronics companies to grab a piece of the healthcare pie.

**Natural Language Processing** - Natural Language Processing (NLP) allows electronics and IT players to extend into new services and industry segments, either by using it to leverage their own data or by providing it as a service.

**Edge Computing** - Limitations in bandwidth and latency are pushing critical computation away from the cloud and out to the edge, with rapidly improving hardware and software enablers.

Synthetic Data - AI needs vast amounts of training data, and when real data is scarce, synthetic data can be a solution. It also boosts data diversity and privacy.

“Digital transformation as a concept has reached a point where developers and end users have to look past the hype and find real ROI from deployment of digital technologies,”

The central theme of these technologies is extracting value from data - whether layering AI on sensor outputs, analysing digital biomarkers to detect conditions, or using edge computing to extract insight locally in close to real time. These technologies are primed to impact every industry, from healthcare to manufacturing and beyond.”


Digital Transmission through Different Devices

**S. SUPRIYA,**
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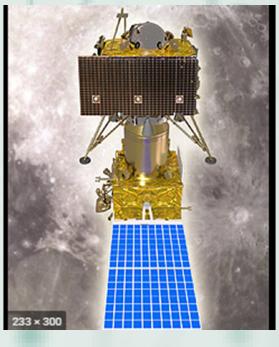
## CHANDRAYAAN-2




Chandrayaan - 2: Lander & Rover

Chandrayaan-2 is the second lunar exploration mission developed by the Indian Space Research Organisation (ISRO), after Chandrayaan-1. It consists of a lunar orbiter, and also included the Vikram lander, and the Pragyan lunar rover, all of which were developed in India.

The main scientific objective is to map and study the variations in lunar surface composition, as well as the location and abundance of lunar water.

The spacecraft was launched on its mission to the Moon from the second launch pad at the Satish Dhawan Space Centre in Andhra Pradesh on 22 July 2019 at 09:13:12 UTC by a GSLV Mark III-M1. The craft reached the Moon's orbit on 20 August 2019 and began orbital positioning manoeuvres for the landing of the Vikram lander. The lander and the rover were scheduled to land on the near side of the Moon, in the south polar region at a latitude of about 70° south on 6 September 2019 and conduct scientific experiments for one lunar day, which approximates to two Earth weeks. A successful soft landing would have made India the fourth country after the Luna 9 (Soviet Union), Surveyor 1 (United States) and Chang'e 3 (China) to do so.

However, the lander crashed when it deviated from its intended trajectory while attempting to land on 6 September 2019.According to a failure analysis report submitted to ISRO, the crash was caused by a softwareglitch. ISRO will re-attempt a landing in August 2022 with Chandrayaan-3.


GSLV Mark-III carrying Chandrayaan - 2

**HRUTHIKA PARVATHA REDDY,**
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# 3D INTERNET

Watching 3-D Internet using Wearables

3D Internet is the next generation after the stream 2d internet. 3D Internet includes interconnected services, displayed as virtual worlds.

The objective of 3D Internet is to pass interactive real-time 3D graphics over the internet. It is also a provocation of a 2D webpage in real-life graphics.

**Applications of 3D:** Education, Real Estate, Social Interaction, Tourism, Entertainment, Religion, Arts. 3D Internet uses artificial intelligence, 3d eyewear, implements 6th sense technology and uses sensors and holographic image projections.

3D internet can be used in all walks of life. 3D internet can be used for subjects such as Chemistry and English where more personalization is needed than traditional distance learning.

**Applications of 3D Internet:**

There are various applications of 3D Internet which are as follows –

**Education**

By using the 3D Internet in education, people can have a better recognition of the subject. They can view the address and analysis in a 3D manner that will support them to understand more efficiently than the traditional methods.

**Real Estate**

The 3D Internet can extremely change the real estate market. Users can view the property they are interested in online with a stereoscopic aspect.
They will receive a basic concept of the area and locality they are going to live in even before its entire construction. This will ease the selection procedure of property to a high extent.

**Social Interaction**

The modern generation has a much more active online social life as distinguished from real life. The inclusion of 3D in social networking can transform our digital world. Video calls can be more mutual and attractive. 3D conversation areas can be introduced to social media.

Personal communication won't be defined in the real world.

**Tourism**

It is necessary to choose the right destination to provide holidays which can be easier after the execution of 3D Internet. Tourists can have a sample 3D view of the acquired locations and next decide which destination has to be inspected.

**Entertainment**

Online 3D games, 3D movies, etc. won't be a vision anymore. All this can be produced using the 3D Internet. Users won't be forced to go to a multiplex for recognizing a 3D movie. Gamers can enjoy 3D online games at home and can simply be linked with their friends.

**Religion**

Religious organizations can develop the use of the 3D Internet to open virtual conference places within particularized areas.

**Arts**

The modeling in 3D Internet can enable the artists to generate new forms of art, that in several methods are not possible in real life because of physical constraints or high associated values.
In 3D Internet, artists can show their works to an audience across the globe. This has generated a whole artistic culture on its own where some residents who purchase or develop homes can shop for artwork in the area there.

World of 3-D Internet

**S. LOKAPAVANI,**
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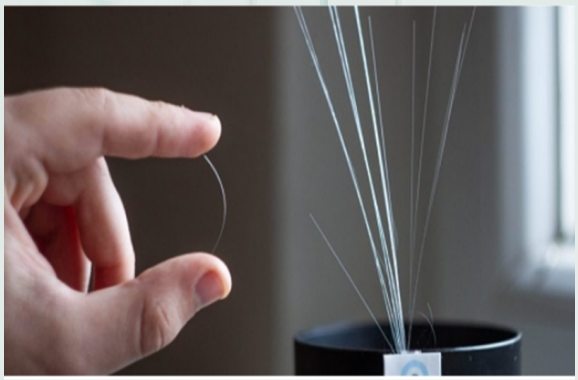
## GLASS-COATED CUSTOM PASSIVE SENSOR

The robust contactless sensors are magnetic and can measure a range of physical quantities for IoT applications The robust contactless sensors are magnetic and can measure a range of physical quantities for IOT.



Microwire Sensors

**Introduction:**

Micro Wire sensors by RV magnetics are miniaturised (diameter ca. 3–70 µm) magnetic contactless sensors of physical quantities (temperature, pressure, pull, mechanical stress, torsion, magnetic field, position, etc.). Micro Wires are made of metallic alloy core (diameter ca. 1–50 µm) and glass coating (thickness 2–20 µm). They are prepared by drawing and rapid quenching of molten alloys and glass.

Their size, high added value, robustness, simple production process and also their symmetry, glass-coating, possibility of contactless sensing leads to their utilisation as a miniaturised sensor with a wide range of applications in different industries. Micro Wire sensors are magnetic. Magnetic properties are mainly given by magneto-elastic interaction of magnetic moments with a distribution of mechanical stresses induced during production.

Axial mechanical stresses arise as a result of drawing and rapid quenching of the wire. Radial and circular stresses arise from different thermal expansions coefficients of glass coating and metallic core. In addition, shape anisotropy is given by physical dimensions (diameter of the wire ~1–40 µm, length of the wire ~1–4 cm).

**Operation Behind :**

To sense the magnetic energy, an AC magnetic field needs to be generated with an excitation coil. Unless present in noisy magnetic or electric fields, the coil is powered with a few milli amperes. The magnetic response from the Micro Wires (with high sensitivity to temperature, pressure and position in the magnetic field), in terms of a magnetization change, is sensed with another pick up/sensing coil.Output from the sensing coil includes signals from magnetic and electric noises present in the vicinity of the sensing coil during the measurements. Filtered and amplified signal is digitalized in MCU (ARM chip) and ready for data post-processing in customer's preferred software.

**Conclusion :**

Smart sensors has developed and proved a new miniatured Smart Sensor Network Measurement System. It significantly reduces the number and lengths of cables, the components size and system weight. It provides greater flexibility in design, configuration and installation.

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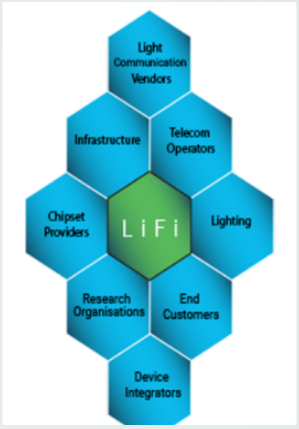
## LI - FI TECHNOLOGY




Components of Li - Fi

LiFi is a wireless technology holds the key to solving challenges faced by 5G. LiFi can transmit at multiple gigabits, is more reliable, virtually interference free and uniquely more secure than radio technology such as Wi-Fi or cellular

LiFi is a mobile wireless technology that uses light rather than radio frequencies to transmit data. the technology is supported by a global ecosystem of companies driving the adoption of LiFi , the next generation of wireless that is ready for seamless integration into the 5G core.

Global Light Communication Standard the objective is to extend 802.11 to include the light medium . A standard with input across the Wi-Fi ecosystems 802.11 bb TG aiming to deliver standard by mid 2021 Radio frequency communication requires radio circuits, antennas and complex receivers

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## A IOT 5G


Emerging Technologies

A lot has changed in the last two years – from how we communicate to how we perceive work. The acceleration of the adoption of digital technologies due to the pandemic has led to an increase in streamlining operations with connected technologies and automation, resulting in greater speed, less work and more focus on making the lifestyles of the end consumer more seamless.

AIOT gaining momentum Even before the pandemic, the two trends that were dominating the technology industry are the Internet of Things(IoT),Artificial intelligence(AI).As world progressed towards to rapid digitalization, the convergence of IoT and

AI started to redefine the future of automation and is set to lead the consumer revolution.

Three vital emerging technologies empower the IoT:

• **Artificial intelligence (AI):**

Programmable functions and system allow devices to read ,design and method information like humans.

• **5G Networks :**

High speed fifth generation mobile networks ,the near-zero interval for real-time data processing.

• **Big Data :**

With the numerous internet - connected sources, data is processed in huge volumes. Collectivelly, these interconnected devices change how we communicate with our devices ta home and work, building the A IoT("Artificial Intelligence of Things") in the method.

**The Major IoT Parts:**

Lets unleash the potential of There are four major parts in which 5G and AIoT the AIoT is making an influence:

• WEARABLES 5G AIoT will enable Wearables devices such as smart more distributed intelligence watches continuously monitor and track from the cloud to the edge . user preferences and habits. As per However, before industry and Gartner's recent research, the global society can begin to benefit wearable device market is predicted from these powerful to see more than $87 billion in revenue technologies working together, by 2023. the telecommunications

• SMART CITY industry has some of its Smart city innovations keep own transformation to do speed, With investments enhancing public before the future will happen. security Carrier and energy productivity. Already the Practical applications of AI in traffic control

• SMART HOME Smart homes can grasp devices, lighting, Electronic devices and more. Smart home market could see a combined yearly growth rate (CAGR)of 25% between 2020- 2025 to reach $246 billion.

• Industry 4.0

Last but not least ,digital transformation is used by industries ranging from manufacturing to mining to improve efficiency and reduce human error.

**M. NAZMA NOORJAHAN,**
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## HUMANOID ROBOTS

A Humanoid may be defined as something that resembles or looks like a human and having characteristics like opposable thumb, ability to walk in upright position, etc. These robots are called Humanoid Robots or may be simply "HUMANOIDS".

In general Humanoid robots have a torso with a head, two arms and two legs, although some forms of humanoid robots may model only part of the body, for example, from the waist up. Some humanoid robots may also have a 'face', with 'eyes' and 'mouth'.

The features of Humanoid robots are self-maintenance, autonomous learning, avoiding harmful situations to people, property, and itself, and safe interfacing with human beings and the environment.

This concept explains the dynamic balance of humanoids during walking which requires information about the contact forces and the current and desired direction of motion.

Humanoid Robot operating Keyboard

As per the ZMP theory, the pressure under supporting foot can be replaced by the appropriate reaction force acting at a certain point of the mechanism's foot. Since the sum of all moments of active forces with respect to this point is equal to zero, it is termed as the Zero. Moment Point (ZMP). Through the technology has advanced much in field of Humanoid Robotics, there are still several problems which need attention. The technological brilliance of the humanoids is required to be sharpened more and the shortcomings in the results must be dealt with properly.

Planning in robots is the process of planning out motions and trajectories for the robot to carry out. Control is the actual execution of these planned motions and trajectories. In humanoid robots, the planning must carry out biped motions, meaning that robots should plan motions similar to a human. Since one of the main uses of humanoid robots is to interact with humans, it is important for the planning and control mechanisms of humanoid robots to work in a variety of terrain and environments.

To maintain dynamic balance during the walk, a robot needs information about contact force and its current and desired motion. The solution to this problem relies on a major concept, the Zero Moment Point (ZMP).
umanoid robots can be used as test subjects for the practice and development of personalized healthcare aids, essentially performing as robotic nurses for demographics such as the elderly Humanoids are also suitable for some procedurally-based vocations, such as reception-desk administrators and automotive manufacturing line workers.

Humanoid Robot in Reception Desk

**CHEELLA.MADHAN,**
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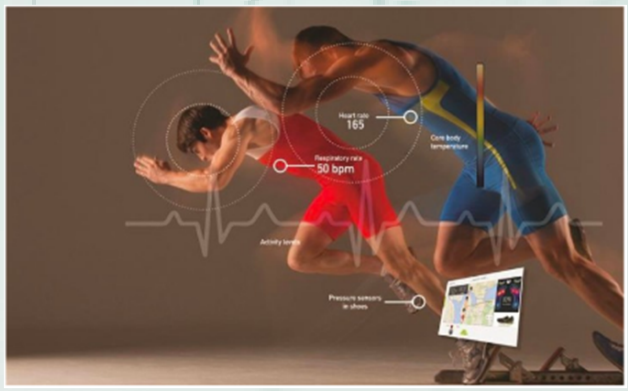
## ELECTRONIC TEXTILES




Human with Smart Clothing

Electronic textiles (or smart clothing) are fabrics embedded with digital components and electronics to provide added value to the wearer. There are many other applications that rely on integrating electronics into fabrics, such as interior design technologies.

This type of technology is considered revolutionary because it has the ability to do several things that conventional fabrics cannot, including conduct energy, communicate, transform, and grow.

Future applications for smart clothing may be developed for health monitoring, tracking soldiers, and monitoring pilot. Personal and portable physiological monitoring, communications, heating, and lighting can all benefit from this technology.

Electronic textiles or e-textiles are fabrics that enable electronic components such as batteries, lights, sensors, and microcontrollers to be embedded in them. They are not to be confused with smart textiles, which are fabrics that have been developed with new technologies that provide added value. Many smart clothing, wearable technology, and wearable computing projects involve the use of e-textiles.

Electronic textiles are distinct from wearable computing because the emphasis is placed on the seamless integration of textiles with electronic elements like microcontrollers, sensors, and actuators. Furthermore, e-textiles need not be wearable. For instance, e-textiles are also found in interior design. The related field of Fibretronics explores how electronic and computational functionality can be integrated into textile fibers.

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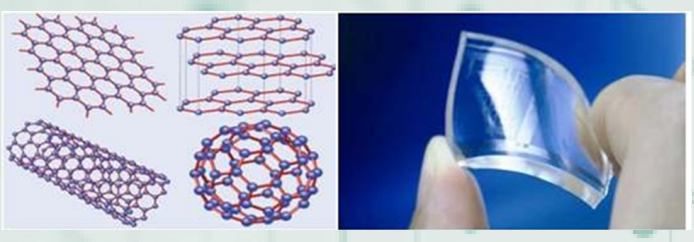
## GRAPHENE - THE FUTURE



Structure of Carbon

With the rapid advancement in the field of electronics, size, speed and flexibility have become the most important aspects. With the existing technology, we have to compromise with any one of these aspects. The only way to not compromise with these three aspects is by using graphene. Graphene is an allotrope of carbon in the form of a single layer of atom in 2- Dimensional Hexagonal lattice in which one atom forms each vertex. Graphene is so small that it is considered the world's first 2-D crystal. It was discovered by Russian born scientists Andre Geim and Kostya Novoselov in 2004 and they won the Nobel Prize for their discovery in 2010. Graphene has very high conduction capability because of its electron mobility. The mobility of electrons is 100 times faster than silicon and its heat conduction is also two times better than diamond. Graphene possesses electrical conductivity about 13 times better than copper. Graphene is harder than diamond and also more elastic than rubber. It is one of the strongest known materials if not the strongest material and also it is tougher than steel and yet lighter than aluminum. Graphene has the potential to create the electronics materials which are now considered as science fiction. Graphene might find its place in almost all engineering fields. Because of its conductivity it can be used as superconducting material, solar cells, transparent conducting electrode. In biomedical application graphene can be used for improved drug delivery and it can also be used in cancer treatment. It can be used in flexible displays, efficient solar panels, bulletproof vest as it can absorb twice as much impact as Kevlar which is normally used in bullet proof vests. Coming to aerospace industry, graphene can be used in space propulsion due to its lightweight and strong interaction with light. One day it might find its place in super computer. The only problem with graphene is that, it is not easy to produce in large quantities at a decent quality and it costs about 100 dollars to 200 dollars per gram. All these things can be possible only if we can produce it in bulk or is it all just hype for the material!

**B.SWETHA**
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## SMART POT

Smart Pot for Growing Plants

Smart Pot is the one of the methods to grow a plant effectively. Each and every thing related to grow a plant that is temperature, moisture, sunlight everything is monitored by Smart Pot. So, it will inform the owner about his/her plant. And also, Smart Pot saves water by turning off the water supply when plant is having enough amount of water. Two main effective things in this project is, it is concerned to save water and plant, which are very precious things on the earth. This project is modern way of growing plant. Because it includes technology like IoT and electronics things to monitor plants status. So, this is best way of growing plant effectively. It is our duty to protect the plant. If we allow to destroy our natural resources like this then it will be dangerous for all human beings. Because without oxygen we can't even imagine our life. Trees and plants are the source of oxygen. So, we have to think about saving greenery on the earth. Our innovation should not be harmful towards natural resources.

•The smart pot which will nourishes the plant itself without human effort.

•The components which are used to make this smart pot are esp8266, OLED, DTH11 sensor, Soil moisture sensor, servo motor

•Soil moisture sensor gives the amount of water content in the soil and displays the reading on OLED

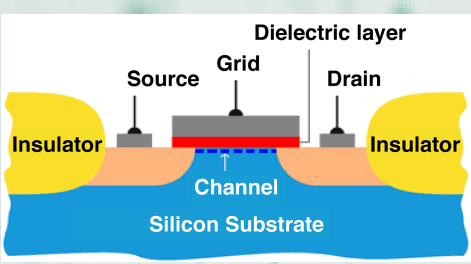
•If water supplied is less, then servo motor runs and supplies the water.

•DHT11 sensor senses the humidity & temperature around the plant &displays that on dashboard.

•LDR measures the amount of sunlight fallen on the plant and displays that on dashboard

**K.PRANAY**
**18711A0452, ECE-A**

## HIGH-K DIELECTRIC MATERIALS




Fabrication of High K Dielectric

The microelectronics revolution of the past six decades has been intimately connected with advances in computer aided design, material science and fabrication technology. Over the years, complexity has increased from single transistor to integrated circuits, to large scale integration to very large scale integration where entire subsystems are placed on a single chip. Moore's law is the empirical observation that component density and performance of integrated circuits doubles every year, which was later revised to doubling every two years. Guided by the scaling rules set by Dennard in 1974, smart optimization, timely introduction of new processing techniques, device structures and materials, Moore's law has continued unabated for the last 40 years and is likely to continue in the future. The present MOSFET based VLSI technology is working on the principle of small dimensions with high integration". In recent years, the ever increasing demand for higher speed, low power dissipation and more function on a chip, has led to relentless scaling of MOSFETs from sub microns to nanometer regime. For this historical trend to continue existing materials and technologies are approaching their physical limits and several technological challenges need to be overcome. In addition to the critical dimension control, oxide thickness, shallow junction formation, isolation and interconnect technologies need immediate attention. When the channel length is of the same order of magnitude as the depletion layer widths of the drain and the source, a MOSFET is said to be short. This reduction in channel length has resulted in different physical effects such as enhanced leakage current, drain induced barrier lowering (DIBL), short channel effects, sub threshold conduction and so on. The thickness of silicon dioxide (SiO2) gate dielectric is reduced as transistors are scaled down, in order to increase the drive current, reduce threshold voltage and increase device performance. Due to thinning of the standard SiO2 gate dielectric, tunneling induced leakage current and dielectric breakdown will lead to unacceptable device performance resulting in increased power dissipation thus leading to its replacement. High-k dielectric materials could be a solution to overcome the scaling limit of SiO2.

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## ELECTRIC VEHICLE

EV to Reduce Greenhouse Gases

World is too big for an individual to change it on their own but each one of us can change what we can; Our environment, our space, our people then we can change the world. There are several ways to change the world one of them is by switching to Electric Vehicles (EV).

Do Electric Vehicles really help the environment? yes it does. Because regular cars run on gasoline and pumps CO2 directly into the atmosphere where as EV's run on electricity they don't burn gasoline at all. So, no gas, no CO2.

The main reason why everyone must shift towards EV's is because of the increased versatility. EV's use coal to power it. And also, it can use nuclear, or waste, or wind, or solar, or any other method of producing electricity. With gas cars, you just have gas. The switch to electric cars gives us the option to switch to better ways of producing electricity, rather than being stuck with what we got.

Recently to tackle air pollution the Delhi Cabinet has approved a policy on EV's. And the Indian government is also supporting switch to EV's by announcing 1.5lakh income tax deduction on interest paid on loans for the purchase of electric vehicles. There are number of great benefits to EV's, these are cheaper to run, cheaper to maintain, health benefits, and also reduces the petroleum import bill.

Norway is the world leader in the adoption of electric cars and other nations like France and UK announcing the plan to ban the sales of gas and diesel cars by 2040.

The EV's are actually nothing new, they started in 1832 well before the first gasoline vehicles. In fact, the first EV's were faster than 100km/hr was in 1899 called 'JAMAIS CONTENTE'. People were apparently satisfied with electric cars by 1910 they were almost twice as common on American roads as internal combustion engines. But then came Model T which at $650, was significantly cheaper than the electric car's, and then these gas stations popped up all over the country

There are many types of EV'S

i) Plug in EV's these are any vehicles that can be recharged from an external source of electricity.

ii) Hybrid EV's these are the type of hybrid vehicles that combines conventional combustion engine system with electric propulsion sysem

iii)Railborne EVs The fixed nature of a rail line makes it relatively easy to power EVs through permanent overhead lines or electrified third rails, eliminating the need for heavy onboard batteries.

iv) Space rover vehicles :- Related to space exploration, like Manned and unmanned vehicles have been used to explore the Moon and other planets

v) Airborne EV's:- related to aircrafts, Currently flying electric aircraft include manned and unmanned aerial vehicles.

vi) Seaborne EV's: - Electric motors can and have also been used in sailboats instead of traditional diesel engines.

vii) Electrically powered spacecraft:- The power sources used for spacecraft are batteries, solar panels and nuclear power.

Electric motors don't require oxygen, unlike internal combustion engines; this is useful for submarines and for space rovers.

Recently Tesla has revealed its new model named Tesla Cybertruck. This is an all-electric battery-powered light commercial vehicle, with range estimates of 250–500 miles (400–800 km) and an estimated 0–60 mph time of 2. Major auto companies have invested heavily in this technology. Tesla has plans to build 1 million EVs by 2020.

EVs will soon become a reality for many drivers, auto companies and transport sector companies, and the impact of EVs on the environment will help create a greener future.

EV Charging Station

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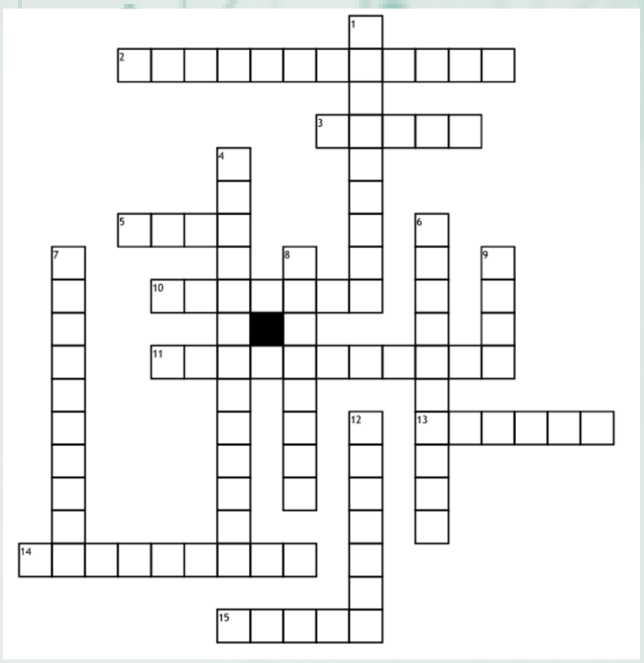
## CROSS WORDS



**Across:**

2. An electric current identifier
3. Measure of inductance.
5. A basic component of an electronic device
10.The term used to designate electrical pressure.
11.Used to simplify algebra expressions [two words]
13. A device that opens or completes an electrical path.
14.A material that opposes the movement of free electrons
15.Measure of inductance

**Down:**

1. A measure of total Opposition to current.
4.A phenomenon that occurs when a vehicle sounding a siren approaches, passes, and recedes from an observer [two words]
6.A resistive component that is designed to be temperature sensitive.
7.Occurs when an atom or molecule gains either and positive or negative charge
8.Used as a capacitor to control voltage
9.An often repetitious code sequence
12. Italian physicist Alessandro Volta (1745–1827) is credited with inventing the first one of these

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## TECHNICAL QUIZ

1.An RLC series circuit is underdamped. To make it overdamped, the value of R
A. has to be increased
B. has to be decreased
C. has to be increased to infinity
D. has to be reduced to zero

2.Which of the following oscillators is suitable for frequencies in the range of megahertz?
A. RC phase shift
B. Wien bridge
C. Hartley
D. Both (a) and (c)

3.Which one most appropriate dynamic system?
A. y(n) + y(n - 1) + y(n + 1)
B. y(n) + y(n - 1)
C. y(n) = x(n)
D. y(n) + y(n - 1) + y(n + 3) = 0

4.At very high temperatures the extrinsic semiconductors become intrinsic because
A. drive in diffusion of dopants and carriers
B. band to band transition dominants over impurity ionization
C. impurity ionization dominants over band to band transition
D. band to band transition is balanced by impurity ionization

5.A uniform plane wave is one in which
A. x = 0
B. .
C. and are perpendicular
D. and lie in a plane

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## Mobile Phone Cloning

**Cell Phone Cloning**

Cell phone cloning refers to the act of copying the identity of one mobile telephone to another.
This is usually done to make fraudulent telephone calls. The bill for the calls go to the legitimate subscriber. This made cloning very popular in areas with large immigrant populations, where the cost to “call home” was very steep. The cloner is also able to make effectively anonymous calls, which attracts another group of interested law breakers. Cell phone cloning started with Motorola “bag” phones and reached its peak in the mid 90’s with a commonly available modification for Motorola “brick” phones such as the Classic, the Ultra Classic, and the Model 8000.
Cloning involved modifying or replacing the EPROM in the phone with a new chip, which would allow one to configure an ESN (Electronic Serial Number) via software. The MIN (Mobile Identification Number) would also have to be changed.
Cloning still works under the AMPS/NAMPS system, but has fallen in popularity as older phones that can be cloned are more difficult to find and newer phones have not been successfully reverse engineered.
Cloning has been successfully demonstrated under GSM, but the process is not easy and currently remains in the realm of serious hobbyists and researchers. Furthermore, cloning as a means of escaping the law is difficult because of the additional feature of a radio fingerprint that is present in every mobile phone’s transmission signal. This fingerprint remains the same even if the ESN or MIN are changed. Mobile phone companies can use the mismatch in the fingerprints and the ESN and MIN to identify fraud cases.

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