

# A.V.C COLLEGE OF ENGINEERING, MANNAMPANDAL, MAYILADUTHURAI



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*Department of Electronics and Communication Engineering*  
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## *“LEMON NEWSLETTER”*

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### *Message from Head of the Department*

I expect the students to enrich their knowledge by participating in seminars, workshops and symposiums.

Encourage the students to show their talents and catch the awards in various schemes implemented by Anna University.

I look ahead from the faculties and students to coordinate and work together to achieve excellence in academics related activities.

*Dr. CHITRAVALAVAN*  
*HOD/ECE*

### *Philosophy of Education*

“All Power is Within You; You can do anything and everything .Believe in that. Don't believe that you are weak. Stand up and express the divinity within you”

1. All knowledge is in human mind.
2. Education is the manifestation of the perfection already in man.
3. Knowledge if inherent in man. No knowledge comes from outside.
4. Like fire in the piece of Flint, Knowledge exists in man. Man discover it.

– SWAMI VIVEKANANDHA

## *Faculty Corner:*

### **BLOCKCHAIN TECHNOLOGY AN INTRODUCTION**

- Mrs .C.Jayasri, AP/ECE

#### **WHAT IS BLOCKCHAIN TECHNOLOGY?**

Blockchain, sometimes referred to as distributed ledger technology (DLT), makes the history of any digital asset unalterable and transparent through the use of a decentralized network and cryptographic hashing.

A simple analogy for how blockchain technology operates can be compared to how a Google Docs document works. When you create a Google Doc and share it with a group of people, the document is simply distributed instead of copied or transferred. This creates a decentralized distribution chain that gives everyone access to the base document at the same time. No one is locked out awaiting changes from another party, while all modifications to the document are being recorded in real-time, making changes completely transparent. A significant gap to note however is that unlike Google Docs, original content and data on the blockchain cannot be modified once written, adding to its level of security.

#### **BLOCKCHAIN MEANING:**

- A blockchain is a digital ledger or database where encrypted blocks of digital asset data are stored and chained together, forming a chronological single-source-of-truth for the data.

- Digital assets are distributed, not copied or transferred
- Digital assets are decentralized, allowing for real-time accessibility, transparency and governance amongst more than one party.
- Blockchain ledgers are transparent — any changes made are documented, preserving integrity and trust
- Blockchain ledgers are public and constructed with inherent security measures, making it a prime technology for almost every sector.

#### **WHY IS BLOCKCHAIN IMPORTANT?**

Blockchain is an especially promising and revolutionary technology because it helps reduce security risks, stamp out fraud and bring transparency in a scalable way.

Popularized by its association with cryptocurrency and NFTs, blockchain technology has since evolved to become a management solution for all types of global industries. Today, you can find blockchain technology providing transparency for the food supply chain, securing healthcare data, innovating gaming and overall changing how we handle data and ownership on a large scale.

#### **HOW DOES BLOCKCHAIN WORK?**

For proof-of-work blockchains, this technology consists of three important concepts: blocks, nodes and miners.

## What Is a Block?

Every chain consists of multiple blocks and each block has three basic elements:

- The **data** in the block.
- The **nonce** — “number used only once.” A nonce in blockchain is a whole number that’s randomly generated when a block is created, which then generates a block header hash.
- The **hash** — a hash in blockchain is a number permanently attached to the nonce. For Bitcoin hashes, these values must start with a huge number of zeroes (i.e., be extremely small).

When the first block of a chain is created, a nonce generates the cryptographic hash. The data in the block is considered signed and forever tied to the nonce and hash unless it is mined.

## What is a miner in block chain?

Miners create new blocks on the chain through a process called mining.

In a blockchain every block has its own unique nonce and hash, but also references the hash of the previous block in the chain, so mining a block isn't easy, especially on large chains.

Miners use special software to solve the incredibly complex math problem of finding a nonce that generates an accepted hash. Because the nonce is only 32 bits and the hash is 256, there are roughly four billion possible nonce-hash combinations that must be

mined before the right one is found. When that happens miners are said to have found the "golden nonce" and their block is added to the chain.

Making a change to any block earlier in the chain requires re-mining not just the block with the change, but all of the blocks that come after. This is why it's extremely difficult to manipulate blockchain technology. Think of it as "safety in math" since finding golden nonces requires an enormous amount of time and computing power.

When a block is successfully mined, the change is accepted by all of the nodes on the network and the miner is rewarded financially.

## *What Is Decentralization in Blockchain?*

One of the most important concepts in blockchain technology is decentralization. No one computer or organization can own the chain. Instead, it is a distributed ledger via the **nodes** connected to the chain. Blockchain nodes can be any kind of electronic device that maintains copies of the chain and keeps the network functioning.

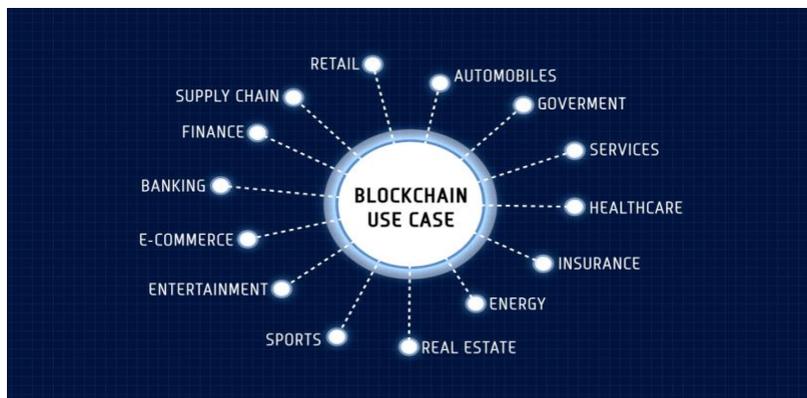
Every node has its own copy of the blockchain and the network must algorithmically approve any newly mined block for the chain to be updated, trusted and verified. Since blockchains are transparent, every action in the ledger can be easily checked and viewed, creating inherent blockchain security. Each participant is given a unique alphanumeric identification number that shows their transactions.

Combining public information with a system of checks-and-balances helps the blockchain maintain integrity and creates trust among users. Essentially, blockchains can be thought of as the scalability of trust via technology.

### **HOW BLOCKCHAIN WORKS**

- The blockchain is a digital database, composed of encrypted blocks of data which are “chained” together and secured by complex math problems.
- The math problems involving matching nonces and hashes is almost impossible to change later — the record of previous actions on the blockchain is highly accurate and secure from manipulation.
- The blockchain is distributed identically across different decentralized nodes, ensuring no one organization can own or manipulate it.

### **BLOCKCHAIN USES**



### **Student Corner:**

#### **Electrical Transmission Towers : Introduction And Applications**

**- Kamalika. K, II- ECE**

#### **Transmission Towers:**

Electric transmission towers transport massive volumes of high - voltage current, typically range between 23,000 and 765,000 volts, over great distances, similar to the interstate highway system. their high -voltage cables connect the wind farms or power plants to the source substations and satellite substations in nearby populated areas. Transmission towers are classified as electric towers or cell towers.

#### **Transmission Towers works:**

Transmission towers are structures built to support overhead power lines, ground cables and electrical conductors. Besides carrying electricity across hundreds of kilometres,they also provide strength and prevent the cables from sagging and getting contaminated.

The use of transmission towers is no longer limited to transmitting electrical power over long distances but can be extrapolated for the transmission and reception of radio,mobile telephony, broadcasting and other electromagnetic signals as well. Cup shaped anemometers indicating the wind speed or other meteorological equipment spinning.

#### **Types of Transmission Towers:- Angel of deviation.**

- # A- type tower -angle of deviation 0-2 degree
- # B- type tower -angle of deviation 2-15 degree
- # C- type tower - angle of deviation 15-30 degree
- # D- type tower -angle of deviation 30-60 degree

A- type tower also called tangent suspension tower.  
B,C,D - type tower also called as section tower.

**Applications Areas:**

Road Safety Systems	High way road Safety pedestrian road Safety
Area lighting illumination	Street and road lighting Large area and yard
Telecommunication	Telecom tower structures Optical fibre cabling
Utility	Power transmission, power distribution , Power substation, Railway electrification structure, Rural electrification

***INTERESTING FACTS ABOUT ELECTRONICS***

- *S. Ashika, III-ECE*

- 1) In 1977, we received a radio signal in space which lasted for 72 seconds. Till now we don't know where it came from.
- 2) One gram of our DNA is sufficient to store all of Facebook and Google's data.
- 3) The first electronic device ever invented is the relay, a remote switch controlled by electricity that was invented in 1835.
- 4) Printed circuit boards are almost always green Because they are made from a glass-epoxy, which is naturally green.
- 5) Mirochips double in power every 18 to 24 months. Gordon E. Moore, a founder of Intel proposed the concept in 1965.
- 6) Samsung is 38 years and 1 month older than Apple.
- 7) The radio took 38 years to reach an audience of 50 million.
- 8) The first computer mouse wasn't made from plastic, it was made out of wood.
- 9) The first alarm clock could only ring at one time.

- 10) The first cell phone call was made in New York city in 1973 by Martin Cooper.

**DID YOU KNOW?**

- *Srija.M, IV-ECE*

**1. Why do we say "hello" when answering the phone?**

In Japan, phone callers are greeted with the phrase "mighty-mighty," and in China, when picking up the phone, people say "wei". Russians, like most of the world, say "hello". But why exactly "hello"?

The first version insists that the word has Norman roots. When William the Conqueror invaded England, he heard local shepherds shouting "Hallo!" as they gathered their sheep. From this word the verb halloer, "to shout," was later formed.

According to another theory, the word "hallo" was formed from hallow, which English sailors used to say when meeting ships.

A third option suggests the Hungarian origin of the telephone greeting. In that language there is the word hallom, which translates as "I hear you." The word became popular thanks to Tivadar Puskás, the man who founded the first telephone news service. It was the word he used at the beginning of the broadcast.

**2. Why can't we put burning food in the refrigerator?**

Refrigerator manufacturers do not recommend putting hot food into the refrigerator, and say to cool it down to room temperature beforehand.

Accordingly, if you put hot food in the refrigerator, it will not turn off for longer — hence the increased load on the

compressor and electricity consumption. The service life of the refrigerator decreases.

**3. Why does *Mona Lisa* have shaven forehead hair and plucked eyebrows?**

In Western Europe in the 15th century the ideal of a woman was as follows: S-shaped silhouette, curved back, round pale face with a high clear forehead.

To match the image, women shaved their forehead hair and plucked their eyebrows, just like *Mona Lisa* in Leonardo's famous painting.

**4. Why do ants follow each other in a chain?**

So as not to lose their trail. The scout ants travel along a complicated path while searching. When they find food or something else relevant, they return to the anthill by the shortest route, marking it with scent secretions.

The ants mobilized by the scout move along this path, also leaving scent trails.

Each ant tries to stick to the chain of trails it has already laid, and as a result, the insects follow one another.

**5. Why do pigs enjoy wallowing in mud so much?**

Pigs lack sweat glands and cannot sweat even on the hottest days. That's why they like to roll around in the cool mud, chilling themselves in this peculiar way.

In addition, after such a mud bath, sensitive skin is covered with a crust that protects against sunlight and insect bites.

**AUDIO SPOTLIGHTING**

*- Meenatchi .T,III ECE*

Audio spot lighting is a very recent technology that creates focused beams of sound similar to light beams coming out of a flashlight. By shining sound to one location, specific listeners can be targeted with sound without others nearby hearing it. It uses a non-linear acoustics for its working. But it is real and is better than any conventional loud speaker. This acoustic device comprises a speaker that fires inaudible ultrasound pulses with very small wavelength which act in a manner very similar to that of a narrow column.

The ultra sound beam acts as an airborne speaker. Holosonic Research Labs invented the Audio Spotlight that is made of a sound processor, an amplifier and the transducer. Being the most recent and dramatic change in the way we perceive sound, audio spot light technology can do many miracles in various fields like Home theatre audio system. Navy and military applications, museum displays etc. Thus audio spotlighting helps us to control where sound comes from and where sound comes from and where it goes.

**Introduction to Audio spotlighting technology:**

Hi-fi speakers range from piezoelectric tweeters to various kinds of mid-range speakers and woofers which generally rely on circuits and large enclosures to produce quality sound, whether it dynamic, electrostatic or some other transducer - based design. Engineers have struggled for nearly a century to produce a speaker design with the ideal 20Hz-20,000Hz capability of human hearing and also produce a narrow beam of audible sound.

Audio spot lighting is a very recent technology that creates focused beams of sound similar to light beams coming out of a flash light. Specific listeners can be targeted with sound without others nearby hearing it, i.e. to focus the sound into a coherent and highly directional beam. It makes use of non-linearity property of air.

The Audio spotlight developed by American Technology Corporation uses ultrasonic energy to create extremely narrow beams of sound that behaves like beam of light. Audio spotlight exploits the property of non-linearity of air. A device known as parametric array

employs the non-linearity of the air to create audible by products from inaudible ultrasound, resulting in extremely directive and beam like sound.

This source can projected about an area much like a spotlight and creates an actual specialized sound distant from a transducer. The ultrasound column acts as a airborne speaker, and as the beam moves through the air gradual distortion takes place in a predictable way. This gives rise to audible components that can be accurately predicted and precisely controlled.

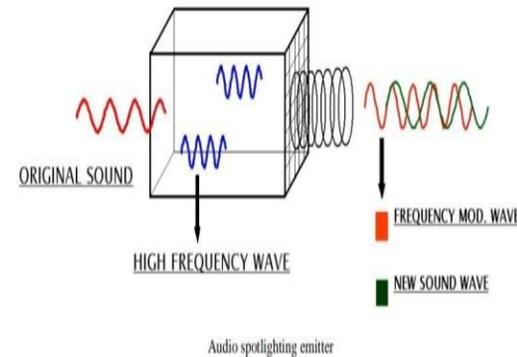
#### **Working:**

The original low frequency sound wave such as human speech or a music is applied into an audio spotlight emitter device. This low frequency signal is frequency modulated with ultrasonic frequencies ranging from 21 kHz to 28 kHz. The output of the modulator will be the modulated form of original sound wave.

Since ultrasonic frequency is used the wavelength of the combined signal will be in the order of few millimeters. Since the wavelength is smaller the beam angle will be around 3 degree, as a result the sound beam will be a narrow one with a small dispersion.

While the air, the frequency modulated signal travels through non linearity property of air comes into action which slightly changes the Sound wave.

The newsound - ultrasound pulses are fired into the air, it Spontaneously converts inaudible ultrasound into audible sound tones, he A device known as parametric aurdy employs the nonlinearity of air to croate audible by-products from inaudible ultrasound, resulting in an extremely directive beamlike wide-band acoustical Source. That the Audio spotlight speaker, more accurately called transducer, is mounted no more than 3 meters from the average listeners ears, or 5 meters in the air.



#### **Future of Audio Spotlighting and Conclusion:**

Even the best loudspeakers are subject to distortion and thou normal omni directional sound is annoying to people in vicinity who do not wish to listen.

Audio spotlighting system holds the promise of replacing Conventional speakers. Audio spat lighting really "Put bound where you want it" and will be "A REAL BOON TO FUTURE".

#### **AUGMENTED REALITY**

- Venkatesh.S , III-ECE

#### **What is Augmented Reality?**

- ✦ Augmented reality is a live view of a physical real-world environment whose elements are merged with virtual computer-generated imagery.
- ✦ With the help of AR technology , information about the surrounding real world of user becomes interactive and digitally usable .



- † Artificial information about the environment and the objects in it can be stored and retrieved as an information layer on top of the real world view .

### How Does Augmented Reality Works?

- † Augmented reality can be delivered in variety of formats ,including smart phones ,table glasses. AR delivered through contact lenses is also being developed . The technology require hardware components such as a processor, sensor, a display ,and input devices. Mobile already typically have this hardware available ,with sensor including cameras , accelerometer , GPS ,solid-state compasses . This help make AR more accessible to the everyday user .
- † Sophisticated AR programs used by the military for training can also include machine mission ,object recognition, and gesture recognition. AR can be computationally intensive , so if a device lacks processing power , data processing can be off loaded to a different machine .
- † Augmented reality apps are return in special 3D programs that enable developers to tie Animation or contextual digital information in the computer program through an Augmented reality marker in the real world.

### Problem

- † Augmented is changing what , when ,where, and how we access information .

- † Technical issues with Augmented reality training (example: hardware, content , and user difficulties).
- † Limited AR training content capabilities .
- † Vendor issues when outsourcing extended reality training ❖  
AR Training can be less immersive than other modalities .

### Fall In To The Gap :

- † Slow adoption / few users of AR
- † Lack of research in AR
- † Expertise limited
- † Responses based on uninformed opinions
- † Pop-lit is positive but lacks concrete evidence

### Augmented Reality(AR) Vs Virtual Reality(VR):

- † AR and VR are often confused, so let's clarify .AR users uses the existing real world environment and puts virtual information – or even a virtual world – on top of it to enhance the experience. For example, think of Pokémon Go , where users are searching in their real life neighbourhoods for animated characters that pop up on the phone or tablet . In the NFL ,broad casters use AR technology in order to better analyse place .
- † In contrast , virtual reality immerses users into an entirely different environment, typically a virtual one created and rendered by computers. For example, VR users may be immersed in an animated seen or a digital environment. VR can also be used to photograph an actual location and embed it in a VR app.

### Applications:

- † Archaeology
- † Architecture
- † Education

- † Fitness
- † Military
- † Navigations
- † Social interaction
- † Industrial design
- † Remote collaboration
- † Urban design and planning

### **NANOELECTRONICS**

**-PadmaPriya, III-ECE**

Nanoelectronics is a field that deals with the use of nanotechnology in electrical components. On the other hand, nanotechnology is a branch of engineering that deals with the matter at an atomic and molecular level.

Nanoelectronics more or less is based on the transistors. The transistors used here have size lesser than 1000 nanometers. These are so small that there is separate study to understand the inter atomic interactions as well as quantum mechanical properties. These transistors are designed through nanotechnology and are very much different from the traditional transistors.

The work that a nanoelectronic device can do depends upon its size. With increase in volume, the power of the device will increase. The development in this field is in progress as there are some limitations of it when used in real world.

#### **Different approaches to Nanotechnology:**

The different approaches to nanotechnology are:

- Nanofabrication
- Nanomaterials Electronics
- Molecular Electronics
- Nanoionics
- Nanophotonics

#### **Applications of Nanoelectronics:**

Certain development and applications have been made in this field of nanotechnology which are as follows:

- **Nanoradio** – These will have nanoprocessors for its working with high speed and performance. Carbon nanotubes are being used in this application.
- **Nanocomputers** – Traditional computers will be replaced by nanocomputers for higher performance and speed. Detailed research is being carried out in this field.
- **Medical Diagnostics** – Nanoelectronic devices can detect biomolecules and thus will help in medical diagnostics.
- **Energy Production** – Research is being conducted to create energy efficient solar cells, galvanic cells and fuel cells.

#### **Medical Benefits of Nanotechnology:**

Nanotechnology has the potential to bring major advances in medicine. Nanobots could be sent into a patient's arteries to clear away blockages. Surgeries could become much faster and more accurate. Injuries could be repaired cell-by-cell. It may even become possible to heal genetic conditions by fixing the damaged genes. Nanotechnology could also be used to refine drug production, tailoring drugs at a molecular level to make them more effective and reduce side effects.

In 2021, Nonwoven News reported that researchers at the University of Rhode Island have developed a smart bandage that can detect and monitor an infection in wounds using single-walled carbon nanotubes. The nanotubes can identify infections by detecting concentrations of hydrogen peroxide. The bandage is monitored wirelessly with a miniature wearable device, and transmitted to a smartphone to alert the patient or a health care provider when an infection is detected.

#### **Advantages of Nanotechnology:**

- It brought about a great change in electronic commodities
- Blessing for the medical field
- Energy generation
- Disease treatment is possible to a great extent
- Diagnostic equipment has improved

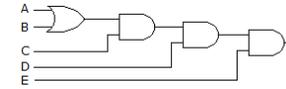
**Disadvantages of Nanotechnology:**

- Negative impact on people's health
- Hazardous weapons accessible
- Economical imbalance
- Unemployment may prevail
- Negative Impact on Environment
- Costly

**Questions on Basic Electronics**

- *Sangeetha. M, IV-ECE*

1. Logically, the output of a NOR gate would have the same Boolean expression as a(n):
  - A. NAND gate immediately followed by an inverter
  - B. OR gate immediately followed by an inverter
  - C. AND gate immediately followed by an inverter
  - D. NOR gate immediately followed by an inverter
2. Determine the values of A, B, C, and D that make the sum term  $A'+B+C'+D$  equal to zero.
  - A.  $A = 1, B = 0, C = 0, D = 0$
  - B.  $A = 1, B = 0, C = 1, D = 0$
  - C.  $A = 0, B = 1, C = 0, D = 0$
  - D.  $A = 1, B = 0, C = 1, D = 1$
3. If A is LOW or B is LOW or BOTH are LOW, then X is LOW. If A is HIGH and B is HIGH, then X is HIGH. These rules specify the operation of a(n) \_\_\_\_\_.
  - A. NAND gate
  - B. OR gate
  - C. AND gate
  - D. XOR gate
4. Derive the Boolean expression for the logic circuit shown below:



- A.  $C(A+B)DE$
- B.  $[C(A+B)D+E]'$
- C.  $[[C(A+B)D]E]'$
- D.  $ABCDE$

5.  $AC + ABC = AC$ 
  - A. True
  - B. False

**Answers:**

1. (B) OR gate immediately followed by an inverter
2. (B)  $A = 1, B = 0, C = 1, D = 0$
3. (C) AND gate
4. (A)  $C(A+B)DE$
5. (A) True

**LOGIC PUZZLES**

- *M.Deepa, III-ECE*

1. A man has 53 socks in his drawer. 21 identical blue, 15 identical black and 17 identical red. The lights are out and he is completely in the dark. How many socks must he take but to make 100 % certain he has at least one pair of black socks?

**Answer: 40 Socks**

2. There were 3 red, 4 Yellow and 5 green cars parked. 8 cars went away. car of what color has definitely become less than it was?

**Answer: Green**

3. Gordon is twice as old as Tony was When Gordon Was as old as tony is now .The combined age of Gordon and Tony is 112 Years. How old are Gordon and Tony now ?

**Answer: Gordon 64 and Tony 48**

4. How many cases do you need if you have to pack 112 Pairs of Shoes into cases that each hold 28 Shoes?

**Answer: 8**

5. In a Party of 35 people there are twice as many women as children and twice as many children as men. How many of each are there ?

**Answer: 5 men, 10 children, 20women**

6. A train moving at 49 mph meets and is passed by moving at 63 mph. A passenger in the first train noted that the a train Second train took As seconds to pass him. How long is the Second train?

**Answer: 740.464t**

### Editors Desk

### Physical health that will help the students to stay healthy and maintain concentration to study well.

- Learn proper portion size
- Vary your meals
- Eat breakfast
- Keep healthy snacks around
- Drink Water regularly
- Don't fight stress by eating
- Take vitamins
- Limit sugary and caffeinated beverages.
- Limit junk food
- Try to eat fruits and veggies

### Send your suggestions to:

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2.B.Maheshkumar ,IV ECE

3.M.Yogeshwaran,III ECE

4.S.Ashika,III ECE

### **Department Vision**

To create globally competent engineers in Electronics and Communication Engineering to meet the industrial progress for betterment of the society

### **Department Mission**

1. To create an academic ambience for quality education in the field of Electronics and Communication Engineering
2. To make the best use of modern tools and software for teaching and research activities
3. To promote industry-institution interaction for skill-based learning of students from rural society
4. To inculcate moral and ethical values with a sense of professionalism.

### **PROGRAMME EDUCATIONAL OBJECTIVES:**

**PEO1:** To enable graduates to pursue research, or have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs.

**PEO2:** To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.

**PEO3:** To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

### **PROGRAMME OUTCOMES:**

Engineering Graduates will be able to:

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

**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.

**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.

**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.

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

**9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**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.

**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.

**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.

### **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

1. To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering.
2. To apply design principles and best practices for developing quality products for scientific and business applications.
3. To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

