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

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Department of Electronics and Communication Engineering

"LEMON NEWSLETTER"

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Message from Head of the Department

I expect from the faculty members to extend their fullest cooperation in the forthcoming semester.

I expect from the UG students to participate in the paper presentation in various colleges.

I wish the UG students to improve their knowledge skills to reach their goals in the forthcoming semesters.

Dr.CHITRAVALAVAN

HOD/ECE

Top Positive Quotes

"The best is yet to be."

"Try to be a rainbow in someone's cloud."

"Do good and good will come to you."

"A positive mindset brings positive things."

"Positivity always win"

"When things go wrong, don't go with them."

"Live life to the fullest and focus on the positive."

"Keep looking up"

Faculty Corner:

5G and the Evolution of Technology

- ***Dr.K.R.Vinothini, AP/ECE***

Telecommunication companies are the front-runners in the dynamic cycle of 5G development. This technology is dramatically reshaping the world. Earlier network generations were more like upgrades, while 5G has the potential to accelerate the Fourth Industrial Revolution.

Essential breakthrough

There will be widespread consumption and adoption of 5G, but that's only one part of the story. 5G technology is expected to enable a consequential revolution in devices to fully reach the projected level of the Fourth Industrial Revolution. A modern smartphone is not an effective vehicle to achieve 5G's maximum potential. While mobile consumption in its current form is not going to change much, new interconnected devices and equipment will indeed revolutionize communication and dramatically enhance 5G technology utilization. This will enhance societal productivity and efficiency, with 5G fundamentally changing the way people live and work.

Latency and speed

Low latency and ultra-high speed will increase content consumption. Today high-speed data transfer enables quick streaming of heavy video content in 8K, VR, or AR across devices as well as many other applications. AR will change our user experience in travel, shopping, acquisition of any service, content consumption, and leisure time.

Almost any process that can be performed in the real world can be replicated in VR. As a result, the early companies that will be able to produce a new, compelling generation of AR/VR content and software will benefit the most from 5G[3]. For example, Google has already implemented AR maps[4], which gives a hint about how the 5G world may look. However, the experience will feel complete once AR technology becomes fully integrated into wearables such as standard eyeglasses and contact lenses.

Transition and network slicing

While 5G is still in development, telcos are thinking about the imminent transition. A highly flexible network is required to successfully transition from 4G to 5G. Network

flexibility is provided by network slicing, which breaks one physical network into several layers, each of which has its own settings adapted to a specific service. This helps reduce expenses while providing efficiency and flexibility. Logically separated segments and isolated systems with different architectures may be used (open) or not (closed), while operators are able to use common functional components.

Network slicing reduces the business risks associated with launching new services because problems in one segment do not affect the functioning of services in another segment. In addition, the use of segmentation reduces issues in migration. A flexible core network with integrated network slicing increases the value of other networks built on a common infrastructure.

5G introduces the network slicing concept through the following three services:

- Enhanced Mobile Broad Band (eMBB): Enables extreme capacity, enhanced data rates/spectral efficiency, extended coverage, and deep awareness.
- Ultra Reliable Low Latency Communications (URLLC): Supports ultra-high reliability, ultra-low latency, strong security, and extreme user mobility.
- Massive Machine Type Communications or Massive Internet of Things (mMTC/mIoT): Supports ultra-high density, ultra low energy, ultra-low complexity, and deep coverage.

These use cases are expected to generate sizable monetization opportunities and experiences :

- V2X, autonomous driving, vehicle maintenance, enterprise (B2B, B2B2X business models), consumer services
- Immersive entertainment (live streaming, AR/VR solutions)
- Connected stadium (fan experience)
- Industrial automation, remote monitoring, IoT platforms, streaming with AR/VR for remote assistance and guidance
- Smart health, smart cities, smart homes
- Drones-as-a-Service (surveillance, 5G signal QoS assessment)

Student Corner:

3D Printer

- ***M.Booshita, III ECE***

What is 3D Printing?

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file.

The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is

created. Each of these layers can be seen as a thinly sliced cross-section of the object.

3D printing is the opposite of subtractive manufacturing which is cutting out / hollowing out a piece of metal or plastic with for instance a milling machine.

3D printing enables you to produce complex shapes using less material than traditional manufacturing methods.

How Does 3D Printing Work?

It all starts with a 3D model. You can opt to create one from the ground up or download it from a 3D library.

3D Software

There are many different software tools available. From industrial grade to open source. We've created an overview on our 3D software page.

We often recommend beginners to start with Tinkercad. Tinkercad is free and works in your browser, you don't have to install it on your computer. Tinkercad offers beginner lessons and has a built-in feature to export your model as a printable file e.g .STL or .OBJ.

Slicing: From printable file to 3D Printer

Slicing basically means slicing up a 3D model into hundreds or thousands of layers and is done with slicing software.

When your file is sliced, it's ready for your 3D printer. Feeding the file to your printer can be done via USB, SD or Wi-Fi. Your sliced file is now ready to be 3D printed **layer by layer**.

3D Printing Industry

Adoption of 3D printing has reached critical mass as those who have yet to integrate additive manufacturing somewhere in their supply chain are now part of an ever-shrinking minority. Where 3D printing was only suitable for prototyping and one-off manufacturing in the early stages, it is now rapidly transforming into a production technology.

Most of the current demand for 3D printing is industrial in nature. Acumen Research and Consulting forecasts the global 3D printing market to reach $41 billion by 2026.

As it evolves, 3D printing technology is destined to transform almost every major industry and change the way we live, work, and play in the future.

Examples of 3D Printing

3D printing encompasses many forms of technologies and materials as 3D printing is being used in almost all industries you could think of. It's important to see it as a cluster of diverse industries with a myriad of different applications.

A few examples:

- – consumer products (eyewear, footwear, design, furniture)
- – industrial products (manufacturing tools, prototypes, functional end-use parts)
- – dental products
- – prosthetics
- – architectural scale models & maquettes
- – reconstructing fossils
- – replicating ancient artefacts
- – reconstructing evidence in forensic pathology
- – movie props

Rapid Prototyping & Rapid Manufacturing

Companies have used 3D printers in their design process to create prototypes since the late seventies. Using 3D printers for these purposes is called **rapid prototyping**.

Dental

In the dental industry, we see molds for clear aligners being possibly the most 3D printed objects in the world. Currently, the molds are 3D printed with both resin and powder based 3D printing processes, but also via material jetting. Crowns and dentures are already directly 3D printed, along with surgical guides.

Bio-printing

As of the early two-thousands 3D printing technology has been studied by biotech firms and academia for possible use in tissue engineering applications where organs and body parts are built using inkjet techniques. Layers of living cells are deposited onto a gel medium and slowly built up to form three

dimensional structures. We refer to this field of research with the term: bio-printing.

Questions on Antennas and Microwave Engineering

- ***Abirami.S, IV ECE***

1. The basic requirements of transmitting antennas are:
   a) High efficiency
   b) Low side lobes
   c) Large signal to noise ratio
   d) Lone of the mentioned
2. _____ is a device that converts electrons to photons or vice-versa.
   a) Antenna
   b) Electron gun
   c) Photon amplifier
   d) Microwave tube
3. The basic equation of radiation that is applied to any antenna irrespective of the type of the antenna is:
   a) iL= Qv
   b) iQ = Lv
   c) i/L=Q/v
   d) None of the mentioned
4. When the separation between two lines that carry the TEM wave approaches λ the wave tends to be radiated.
   a) True
   b) False
5. The number of patterns radiation pattern required to specify the characteristic are :
   a) Three
   b) Four
   c) Two
   d) Five
6. The beam width of the antenna pattern measured at half power points is called:
   a) Half power beam width
   b) Full null beam width
   c) Beam width
   d) None of the mentioned
7. An antenna has a field pattern of E (θ) = cos2 θ, θ varies between 0 and 900. Half power beam width of the antenna is:
   a) 33^0
   b) 66^0
   c) 1200^0
   d) None of the mentioned
8. An antenna has a field pattern E (θ) =cos θ. cos 2θ. The first null beam width of the antenna is:
   a) 45^0
   b) 90^0
   c) 180^0
   d) 120^0
9. The solid area through which all the power radiated by the antenna is:
   a) Beam area
   b) Effective area
   c) Aperture area
   d) Beam efficiency
10. Power radiated from an antenna per unit solid angle is called radiation intensity.
    a) True
    b) False

Answers:

1. a) High efficiency
2. a) Antenna
3. a) iL= Qv
4. a) True
5. a) Three
6. a) Half power beam width
7. b) 66^0
8. b) 90^0
9. a) Beam area
10. a) True

LOGIC PUZZLES

- ***Devi . S, IV ECE***

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1. A man has 53 socks in his drawer: 21 identical blue, 15 identical black and 17 identical red. The lights are fused and he is completely in the dark. How many socks must he take out to make 100 per cent certain he has a pair of black socks?
   Answer: 40 socks.
2. 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 .
3. A bag of potatoes weighs 50 lbs divided by half of its weight. How much does the bag of potatoes weigh?
   Answer: 10 lb.
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 and 20 women.

Editors Desk

7 amazing benefits of Amla

- *Boosts immunity. Amla is a rich source of polyphenols and vitamin C, which help support digestion and strengthen immune functioning.*
- *Purifies blood.*
- *Regulates blood sugar levels.*
- *Improves Digestion.*

- *Good for mental health.*
- *Helps in hair growth.*
- *Maintains healthy skin.*

Send your suggestions to:

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Vision of the Institute

To blossom into a cynosure of technological innovations

Mission of the Institute

To participate in the noble cause of nation building by offering professional education, research and training in engineering and technology especially to the rural based poor Students

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.