

IMPULSE

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SECAB INSTITUTE OF ENGINEERING AND TECHNOLOGY, VIJAYAPURA

Department Vision

To develop professionally competent and socially responsible Electronics and Communication Engineers.

Department Mission

We, the Department of Electronics and Communication Engineering are committed to achieve our vision by:

- **Strengthening core competencies among the learners through outcome-based education.**
- **Imparting technical skills by conducting hands-on training programs/workshops on Emerging technologies.**
- **Producing graduates with societal responsibilities.**
- **To Involving stakeholders in development of the department**

HOD'S Message

The process of learning is extremely important in life. What you learn, how you learn and where you learn play a crucial role in developing ones Intellectual capability. I am pleased to welcome you to the Department of Electronics and Communication Engineering. It is the most flourishing discipline of Engineering.

It offers professional technical training that keeps the students to be in pace with the latest developments in the field of Electronics and Communication Engineering. The department trains its Technocrats to face the challenges in life by providing many value added courses to enhance their career prospects. Continuous Interaction with students, parents and staff, along with the Training and Placement Cell ensures a bright future of the students.

Special attention is provided on practical orientation to the teaching learning process.

The department regularly takes various initiatives like organizing Colloquium by inviting experts from Industry and Academic background. We conduct workshops and Technical seminars for students. We do send students for Internship programs to get exposure in the working environment.

Our goal is to impart value based quality education along with development of positive attitude, skills and abilities to apply their knowledge in order to face the challenges of future. I wish success to all students in your endeavor to join us on the journey of quality education & to have a great learning experience with my excellent, loving & caring team.

**Dr. Noorullah Shariff (B.Tech(ECE),
M.E (Guided Missles), Ph.D(CSE))**

EVOLUTION OF WIRELESS TECHNOLOGIES 1G TO 5G IN MOBILE COMMUNICATION

Mobile Wireless communication system has gone through several evolution stages in past few decades after the introduction of the First generation mobile network in early 1980's.

History of Wireless Technology

Marconi, an Italian inventor, transmitted Morse code signals using radio wave wirelessly to a distance of 3.2KMS in 1895. It was the first wireless transmission in the history of science.

Telephone became popular during the mid of 19th century. Martin Cooper, an Engineer at Motorola during 1970's invented handheld device capable of two way communication wirelessly as first generation of mobile phone.

The first prototype was tested in 1974 and led to an evolution of many wireless technologies.

1G-FIRST GENERATION MOBILE COMMUNICATION SYSTEM

The first Generation of mobile network was deployed in Japan by Nippon Telephone and Telegraph company in Tokyo during 1979.

This system use analog signals(Radio Signals) up to 150MHz & above.

The key features of 1G Technology are

1. Frequency used 800MHz and 900MHz
2. Bandwidth: 10MHZ
3. Technology used: Analog Switching
4. Type of Modulation: Frequency
5. Mode of Service: Voice Only

The Disadvantages of 1G system are

1. Poor voice quality
2. Poor battery life
3. Large size
4. Limited no of user
5. No roaming

2G-SECOND GENERATION MOBILE COMMUNICATION SYSTEM

2G standard was launched by radiolinga in 1991. 2G mobile communication system made use of digital technology for wireless communication known as Global system for mobile communication. 2G standard was capable of supporting upto 14.46kbps data rate.

2G technologies enabled the various network to provide the services such as text, picture messages and MMS.

The Most common 2G technology was time division multiple access (TDMA).

The key features of 2G Technology are

1. Digital system
2. SMS service
3. Roaming
4. Enhanced security
5. Encryption of voice
6. Low data rate
7. Limited features

3G-THIRD GENERATION MOBILE COMMUNICATION SYSTEM

3G technology was developed by International Telecommunication Union in 1980's. The 3G technology makes use of communication spectrum between 400MHZ to 3GHz of frequency in 1998. The first release of 3G was made available in may2001 and first commercial launch of 3G was in Japan 1st October 2001. Japan was the first country to adopt 3G.

In December 2007, 190 3G networks were operating in 40 countries.3G has also introduced the term mobile broadband because of its speed.

The key features of 3G Technology are

1. Higher data rate
2. Video calling
3. Mobile app support
4. Multimedia support
5. TV streaming

Limitation of 3G

1. Expensive spectrum license
2. Costly infrastructure.

4G-FOURTH GENERATION MOBILE COMMUNICATION SYSTEM

4G is the fourth generation of broadband cellular network technology. 4G systems are enhanced version of 3G network developed by IEEE and offer higher data rate. 4G has compatibility with previous version of cellular technology. The major advantage of 4G is, it provides simultaneous transmission of voice and data with improved data rate. 4G technology is digital technology which significantly improve data rate. All services including voice can be transmitted using IP packets.

The key features of 4G Technology are

1. High data rate upto 1Gbps
2. Enhanced security and mobility
3. High video streaming
4. Voice over IP packets.

5G-FIFTH GENERATION MOBILE COMMUNICATION SYSTEM

5G is the fifth generation technology standard for broadband cellular networks which cellular phone companies began deploying worldwide in 2019. All 5G wireless devices in a cell are connected to the Internet and telephone network by radio waves through a local antenna in the cell. The main advantage of the new networks is that they will have greater bandwidth, giving higher download speeds. A 5G network will be composed of networks of up to three different types of cells, each requiring specific antenna designs.

The key features of 5G Technology are

1. Ultra fast mobile internet upto 10Gbps
2. Total cost deduction for data
3. High security
4. Power efficiency and easy maintenance

How does 5G work?

In 5G, the network service area is divided into small geographical areas called cells. All the 5G wireless devices in a cell communicate by radio waves with a local antenna and low power automated transceiver (transmitter and receiver) in the cell. The local antennas are connected with the telephone network and the Internet by a high-bandwidth optical fiber or wireless backhaul connection. The new 5G wireless devices include 4G LTE support as well to establish a connection with the cell and to connect to the internet at locations where 5G access is not available. 5G can support up to a million devices per square kilometer, while 4G supports only up to 100,000 devices per square kilometer.

5G operates on 3 different spectrum bands.

Low-band spectrum – Expect peak speeds up to 100Mbps

mid-band spectrum – Expect peak speeds up to 1Gbps

high-band spectrum – Expect peak speeds up to 10Gbps