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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

"A Report of FDP on "Key Enabling Techniques using 5G Communications"

Department of **E**lectronics & **C**ommunication **E**ngineering, Narayana Engineering College, Nellore, organized a "FDP on Key Enabling Techniques using 5G Communications". The FDP was conducted on the following dates: 05/09/2022 to 09/09/2022. The total number of participants attended the faculty development program is 30. The purpose of this FDP is to bring together researchers & PG students from Academia and Engineers & Scientists from industry and R&D institutes to have discussions on emerging 5G wireless technology.

TITLE: Inaugural

- □ Head of the department, Dr. K. Murali, has delivered the inaugural address and spoke about the role of FDPs to improve technical skills and knowledge.
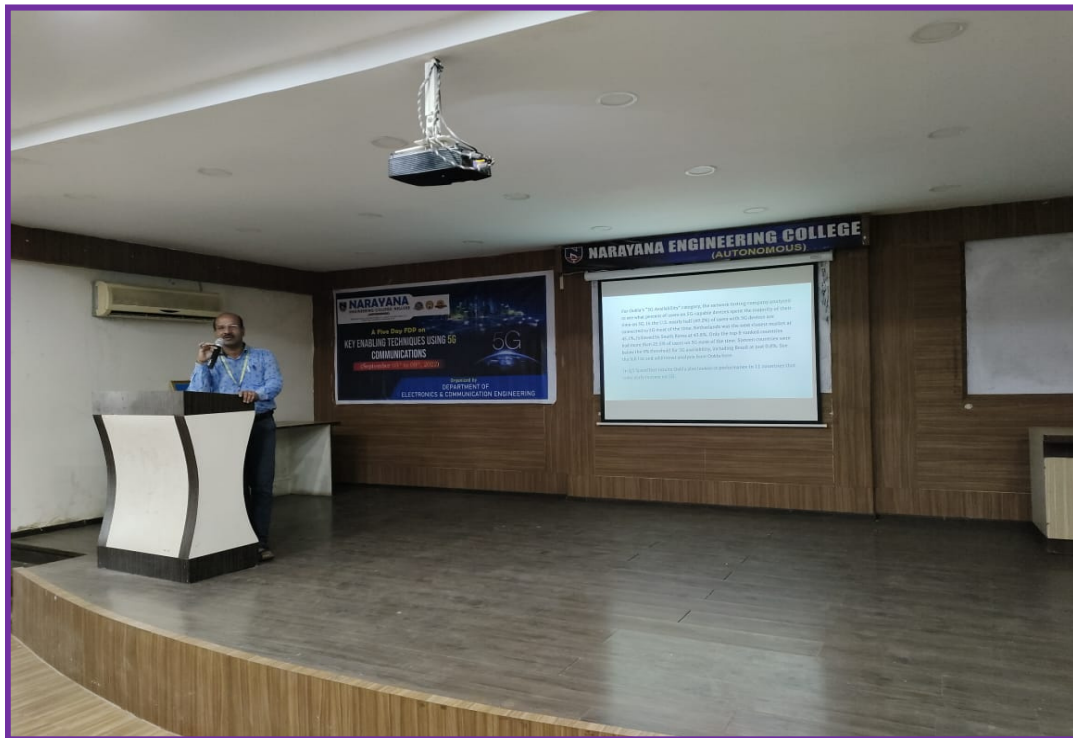
Dr. K. Murali While delivered the inaugural address

TITLE: Device-to-device (D2D) communication.

REPORT: In this session delivered the following points in his lecture.

➢ D2D is considered a key technology used to establish direct connectivity between user equipment
(UE).
➢ For providing a higher data rate, offering peer-to-peer service, and improving coverage, D2D technology is used and it will be implemented by a 5G cellular network.
➢ D2D communication provides several advantages such as coverage expansion, power management, spectrum efficiency, improving capacity with reuse of radio resources which allows network functions to devices that also provide services namely safety, traffic offloading, and location-based proximity services.
➢ D2D communication is divided into different types based on intervention with network control from infrastructure such as autonomous, network controlled, and network-assisted D2D.
➢ In autonomous D2D, devices in the network establish links and communicate with each other in a fully distributed manner similar to ad hoc, each device head handles all functions of the network similar to self-organizing networks.

Mr. Chittibabu, SDE, BSNL, Vijayawada, while presenting on Device-to-device Communication

- ➢ In network-controlled D2D, all devices are allowed for data communication only, when the network is fully centralized

- ➢ In network-assisted D2D, infrastructure supports network functions such as security, synchronization, and link management are supported by infrastructure.

TITLE: Machine-to-machine (M2M) communication

REPORT: In this session delivered the following points in his lecture.

➢ For transmitting a small size of sensed data with time constraints, M2M communication is used.

➢ According to spectrum resources, two types of Random Access Technologies (RAT) namely Lower Powered Wide Area Networks (LPWAN) and Cellular IoT are used.

➢ M2M Communication provides Intelligent machines that automatically done all data generation, processing, and data transfer operations.

➢ Deployment with using actuators sensors, machines, and objects that works independently with small or without human assistance is known as M2M communication. For example, sensors are used to record the occupancy of car parking spaces in real-time. In M2M communication over 5G, researchers provided various mechanisms for supporting small data bursts for reducing consumption of power and to avoid network congestion.
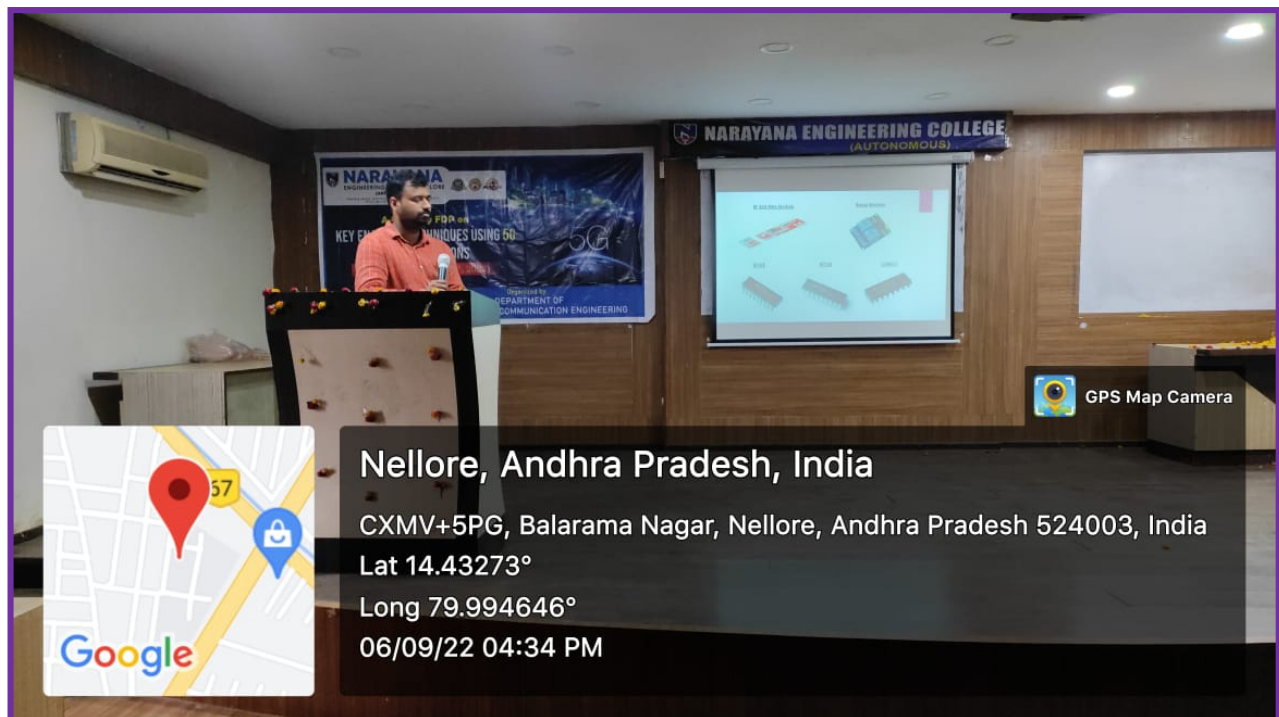
Mr. K. Sripath Roy, Asst Prof, K.L.U, Presenting on IoT

TITLE: Millimetre Wave & Quality of Service (QoS)

REPORT: In this session the following points are discussed.

➢ Mm Wave in 5G is emerging as a key technology for next-generation in the mobile industry which significantly increasing network capacity, and user experiences.
➢ Mm Wave bands have been utilized for large bandwidth 30–300 GHz (1–10 mm wavelength) which supports Gigabit wireless services such as ultra-high-definition TV also very high-speed internet access.
➢ to handle mm-Wave and microwave base stations and user equipment uses separate signal processing components.
➢ In 5G, many small cells a r e overlaid on macrocells, and each cell contains its base station interconnecting each with fiber cable becomes much expensive

Dr. Vijaya Lakshmi, Assoc Prof, NECN, Presenting on key technologies of mobile industry

➢ For QoS implementation, fundamental components are used such as:
  ➢ To Coordinate QoS, between network elements from end to end, marking and identification techniques are used
  ➢ Single network element with QoS
  ➢ QoS policy, accounting, and management functions are used for controlling and administration end-to-end traffic across a network

Expected outcomes:

➢ Opens new avenues for faculty members to pursue research in the area of mobile networking
➢ Provides detailed knowledge of 5G communication and different communication models
➢ Shows the importance of 5G communication, IoT to build smart applications.