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TECHNOLOGY & LEARNING INSTITUTION LIMITED

Every Life, Every Moment, Every Day. A New Discovery...

TELECOMMUNICATIONS COURSES

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Every Life, Every Moment, Every Day. A New Discovery...

5G MOBILE NETWORKS COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is 5G?

5th Generation Mobile Networks or 5th Generation Wireless Systems which is 5G in shortened form is the upgraded mobile technology in telecommunications higher in performance than the previous 4G/IMT-Advanced standards.

Advantages of 5G Mobile Network

1. 5G Data rates is about 10 Gbps and above which provides better user experience improving download and upload speeds.

2. 5G Latency is less than 1 ms, leading to faster connection establishment and reducing traffic load on 5G base stations.

3. 5G provides higher bandwidth than the previous versions.

4. 5G Antenna size is even smaller operating at higher frequencies.

5. 5G Dynamic beamforming is employed to overcome pathloss at higher frequencies.

6. 5G Architecture handoff is smooth as it doesnt interefere with data transfer when mobile user changes cells.

Main Features of 5G Include

5G planning targets at higher capacity than 4G which allows a higher density of mobile broadband users, and supporting device-to-device, ultra reliable, and massive machine communications.

In addition to allowing a higher density of users and providing faster internet speed, 5G users will need to meet new use cases, such as the Internet of Things (internet connected devices), as well as broadcast-like services and lifeline communication in times of natural disaster. Carriers, chipmakers, OEMS and OSATs, such as Advanced Semiconductor Engineering (ASE) and Amkor Technology, Inc., have been preparing for this next-generation (5G) wireless standard, as mobile systems and base stations will require new and faster application processors, basebands and RF devices.

5G is basically the Fifth Generation technology. It has many advanced features potential that is enough to solve many of the problems of our boring and everyday life. It is beneficial for the government, as it makes governance easier. For the students, it helps to broaden their scope on internet connectivity and helps to build career in telecoms. It also makes life easier for the common people as well, as it helps to facilitate reliable internet access everywhere.

5G offers these: 10x throughput, 10x decrease in latency, 10x connection density, 3x spectrum efficiency, 100x traffic capacity and 100x network efficiency.

In the Full Course, you will learn everything you need to know about **5G Mobile Networks** with **Certification** to showcase your knowledge.

Why Study 5G

1. Understand the Structure and Workings of 5G
2. Update Your Knowledge on Mobile Networks
3. Increases Your Earning Potential
4. Job Opportunities and Career Advancement

5G Course Outline

5G - Introduction
5G - Technology
5G - Architecture
5G - Time Period Required
5G - Applications
5G - Advancement
5G - Advantages and Disadvantages
5G - Challenges
5G - Future Scope
5G - Video Lectures
5G - Exams and Certification

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Every Life, Every Moment, Every Day. A New Discovery...

CDMA COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is CDMA?

CDMA which stands for Code Division Multiple Access is a cellular digital technology that is used for both voice and data communications on mobile devices. CDMA is the foundation on which various access methods such as cdmaOne, CDMA2000, and the latest WCDMA are built on. CDMA cellular systems are considered to be far superior to TDMA and FDMA, which is the reason why CDMA plays a very important role in developing practical, robust, and more secure radio communication systems.

CDMA is an example of the **Multiple Access,** where various transmitters can transmit information concurrently over a single channel of communication. This allows lots of users to share the same band of frequencies. To allow this without undue hindrance between the users, CDMA makes use of the **Spread Spectrum** technology and a special programming scheme in where each transmitter is assigned a code.

Each user in a CDMA system makes use of different codes to regulate their signals. Determining the codes to be used to modulate the signals is very important in the performance of CDMA systems. The best performance with CDMA happens when there is a good division between the signal of the desired user and the signals of other users in it. The division of these signals is made possible by comparing the received signal with the locally generated code of the desired user. If the received signal matches the desired user's code, then the correlation function will be high and the system can then extract that signal. If the desired user's generated code has nothing in common with the signal, the correlation should be as close to zero as possible thereby discarding the signal, and this is referred to as cross-correlation.

Features of CDMA

There are lots of features of CDMA and some of them are:

1. In CDMA, every channel makes use of the full spectrum that is available.

2. Individual conversations in CDMA are primarily encoded with a pseudo-random digital sequence, after that, they would be transmitted using a wide frequency range.

3. CDMA unfailingly presents better capacity for both voice and data communications, by allowing more subscribers to connect at any given time.

4. CDMA is the primary platform on which 3G technologies are built on. For 3G, CDMA makes use of 1x EV-DO and EV-DV.History of CDMA.

History of CDMA

CDMA is built around a type of transmission known as Direct Sequence Spread Spectrum. The CDMA history can be strictly connected back to the 1940s when this type of transmission was first conceived. As electronics technology got better, it began to be used for confidential military transmissions in view of the fact that the transmissions appear like noise, it was extremely hard to decipher without the knowledge of the correct codes, and it is quite difficult to jam.

With the revolution in cellular telecommunications that happened in the 1980s a then little known small company named Qualcomm working on DSSS transmissions began to look at this as the fundamental for a cellular telecommunications multiple access scheme-CDMA Code division multiple access.

Key Elements of CDMA

CDMA has a number of unique key elements that are important to the spread spectrum transmission technologies:

1. Use of wide bandwidth: Like other spread spectrum technologies, CDMA uses a wider bandwidth than would be needed for the transmission of the data packets. This gives rise to a number of advantages including increased protection against interference or jamming and multiple user access

2. Spreading codes used: For CDMA to achieve the increased bandwidth, the data packets have to be spread by the use of a code that is independent of the data.

3. Level of Security: For CDMA to receive the data packets, the receiver has to know the spreading code, without this it is not possible to decipher the transmitted data packets, and this gives a count of the measure of security.

4. Multiple Access: The use of the spreading codes that are independent for each user together with synchronous reception allows multiple users to have access to the same channel simultaneously

Benefits and Advantages of CDMA

The following are the benefits or advantages of CDMA:

1. In CDMA, the signal to be transmitted is spread across the wide bandwidth due to spreading. Therefore CDMA is more robust against fading and noisy environments.

2. As the transmitted information is lesser than the noise floor, it is very difficult to interfere with the CDMA spectrum. Besides, it is very difficult for hackers to crack the CDMA code used over the traffic channels. Therefore CDMA is a more secure system.

3. CDMA allows for the use of the entire bandwidth at the same time and consequently there is no limit on a number of users per cell, unlike the FDMA and TDMA access schemes. This depends on a number of codes that are supported by the CDMA compliant base station. Besides, it is easier to add users.

4. During the switching between the cells, due to the soft handoff feature, the initial connection is being set up with a new cell and therefore, it minimizes chances of call drop or call disconnection.

5. CDMA networks can easily work across other cellular networks such as GSM and LTE. Therefore nationwide roaming is possible without any issues.

6. CDMA networks are flexible in the allocation of resources.

7. CDMA networks carry out efficient practical utilization of the fixed frequency spectrum.

8. Using CDMA it is possible for a hub to communicate with two stations at once.

9. CDMA has significant improvements in network capacity.

Factors That Determine CDMA Capacity

1. Processing Gain
2. Signal to Noise Ratio
3. Voice Activity Factor
4. Frequency Reuse Efficiency

CDMA Code Types

1. PN Codes: PN is the abbreviation for Pseudo-random number codes (Psuedo-noise or PN code). They can be generated with ease, these codes will sum to zero over a certain period of time. Although the sequence is determined because of the capped length of the linear shift register used to produce the sequence, they give a PN code that can be used within a CDMA system to generate the spreading code required

2.Truly Orthogonal Codes: Two spreading codes are said to be orthogonal if when they are multiplies together the resulting value is added over a specific period of time they sum to zero. An example of an orthogonal code set is the Walsh codes that were used in the IS95 / CDMA2000 system.

CDMA Course Outline

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GPRS COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

GPRS Course

GPRS which is the acronym for **General Packet Radio Service** is defined as a packet-oriented mobile data standard that runs only on the 2G and 3G cellular network communication and Global System for Mobile communications (GSM).

GPRS is basically sold according to the entire volume of data that was transferred during the billing cycle, in opposition to circuit-switched data, which is normally billed per minute of per-connection time, or in some cases by one-third minute increments.

GPRS was established by the European Telecommunications Standards Institute (ETSI) in immediate response to the earlier network technologies like the CDPD and i-mode packet-switched cellular network technologies. It is now managed and maintained by the 3rd Generation Partnership Project (3GPP).

GPRS is an excellent-effort service, meaning that variable throughput and latency which both depend on the number of other users that are concurrently sharing the service, as objected to switching of the circuit, where a certain Quality of Service (QoS) is guaranteed and assured during the connection. In 2G software systems, GPRS produces data rates of 56–114 kilobits per second. 2G cellular technologies joined together with GPRS is in some cases described as 2.5G, that is, a technology within the second (2G) and third (3G) generations of mobile telephony.

GPRS provides reasonable-speed data transfer speed, by making use of unused time division multiple access (TDMA) channels in, for example, the General System for Mobile communication system. GPRS is fully integrated into the GSM Release 97 and newer releases.

Elements of GPRS

Two major core network elements are:

1. Serving GPRS Support Node (SGSN): The SGSN monitors the state of the mobile station and tracks its movements within a given geographical area. It is also responsible for establishing and managing the data connections between the mobile user and the destination network.

2. Gateway GPRS Support node (GGSN): The GGSN provides the point of attachment between the GPRS domain and external data networks such as the internet and Corporate Intranets. Each external network is given a unique Access Point Name (APN) which is used by the mobile user to establish the connection to the required destination network.

Applications for GPRS

1. Location-based applications – Applications that provide navigation, update traffic conditions, airline/rail schedules, and location finder, etc.

2. Vertical applications - Delivery, fleet management and automating sales-force.

3. Advertising – Using location-based applications, advertising makes it easier for local retailers.

4. Communications – Fax, E-mail, unified messaging and intranet/internet access, etc.

5. Value-added services – Apps that provide Information services and other games, etc.

6. E-commerce – Retail applications like Flipkart, purchasing tickets using Paytm, banking apps and financial trading, etc.

Features of GPRS

There are many features of GPRS and some of them are:

1. GPRS forms a direct link into the Internet: Due to the mixture of GPRS systems into GSM-Networks, we get a direct link to several packet-oriented networks like X.25 or IP. This link is a direct link and it does not take the deviation way of an intermediate system network. On the other area, GPRS joins together access to the internet with other features of a mobile communication network.

2. Harmony and co-existence with circuit-switched networks: One of the main features of all GPRS networks is their strict combination with other already existing circuit-switched network systems, there can not be a stand-silone-GPRS-network, as this will always be an extension of other GSM network systems. Due to these reasons, all the already existing features will last for the predictable futures and there will only be some new features added to it.

3. Circuit-switched data transfer: Circuit-switched data transfer in the area of GSM implies that the transfer of user data and information, e.g. voice requires the allocation of a fixed and continuous physical resource. For example the allocation of 1 Timeslot on 1 frequency channel for the whole duration of the communication.

4. Higher data rates due to channel combining: GPRS makes use of the principle of bundled timeslots to further improve the data rates. There are up to 8 Timeslots which can be combined together within 1 TDMA Frame.

5. Packet-Switched Data Transfer: GPRS technology uses packet switching in line with the Internet. This makes far more efficient use of the available capacity, and it allows greater commonality with Internet techniques.

6. Vast Applications: The packet-switched technology including the always-on connectivity combined with the higher data rates opens up many more possibilities for new applications.

How GPRS Works

GPRS uses idle radio capacity in mobile phones to establish a data network to be used for data transmission. If a network provider's idle radio capacity decreases, which means a lot of phone calls are being serviced, data transmission and speed decreases as well. Cell phone calls have a higher priority than Internet data transmission in mobile phone network providers.

Benefits of GPRS

There are many benefits of GPRS, and some of them are:

1. GPRS systems offer a relatively low cost of connection.
2. GPRS systems offer a high transfer rate of data.
3. GPRS offers short access times to user data.
4. GPRS offers dynamic allocation of transmitting resources and information.

Why Study GPRS?

Some of the reasons to study GPRS include:

1. Knowledge gain on how GPRS works.
2. Broad understanding of the GPRS Architecture.
3. Increase Your Earning Potential as a Professional.
4. Job Opportunities and Career Advancement.

GPRS Course Outline

GPRS - Home
GPRS - Overview
GPRS - Applications
GPRS - Architecture
GPRS - Protocol Stack
GPRS - Quality of Service
GPRS - MS Classes
GPRS - PDP Context
GPRS - Data Routing
GPRS - Access Modes
GPRS - Processes
GPRS - Billing
GPRS - Mobile Phones
GPRS - Summary
GPRS - Video Lectures
GPRS - Exams And Certification

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GSM ENGINEERING COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is GSM Engineering?

GSM Engineering refers to the art of designing, building, installing and maintaining GSM mobile phones and networks using a very precise and detailed understanding of mobile phone technology.

A GSM Engineer is someone who is responsible for building, developing and maintaining an industry-standard GSM Networks and Devices.

A GSM Engineer or GSM Technician is also an individual who fixes GSM Mobile Phones.

GSM is the acronym of the Global System for Mobile Communication, and it is a digital portable network that is popularly used by phone users all over the world. It is a Digital Cellular Technology used widely for transmitting mobile voice and data services.

GSM uses a slight difference in a Time Division Multiple Access (TDMA) and it is the most widely used of the three digital wireless telephone transmission technologies which are:

TDMA,
GSM, and
Code Division And Multiple Access (CDMA).

GSM converts data to a digital form, compresses the data, then sends the data through a channel along with two different streams of user data, each in its own set time. The digital system has the ability to carry from 64 Kbps to 120 Mbps of data rates. GSM operates at either 900 Megahertz (MHz) or 1800 MHZ frequency band, while the word Engineering in GSM refers to the job of designing, building, installing, repairing and maintaining GSM Mobile Phones and Network.

Features of GSM Mobile Phones

A GSM Phone is made up of the following components:

Battery: A battery that provides power source for the phone.

Input Mechanism: An input system to provides interface for the user to interact with the phone such as the Keypad, Touch screens etc.

Output Mechanism: The output system that runs the actual functions and services of the phones such as phone calls, text messages, internet access etc.

Display Screen: This is the visual screen that shows input and output activity of the phone.

SIM Card: SIM Cards (Subscriber Identity Module) provides users with connection identity and allows account and information to be stored and swapped among devices.

Features Of GSM Network

A GSM Network is made up of the following components:

1. A Mobile Station: This refers to the mobile device which has the network receiver, the processor and the display and it is controlled by a subscriber identification module (SIM) card operating over the network.

2. Network Subsystem: It provides the fundamental network connection to the network stations. The basic parts of this network Subsystems are the mobile service switching center that allows access to the different networks available like ISDN, PSTN, etc. It is also made up of the home location register and the visitor location register which gives the call the routing and roaming abilities of a GSM network it also contains the equipment Identity Registrar that maintains an account of all the mobile equipment of which each mobile is uniquely identified by its own IMEI number. IMEI represents the International Mobile Equipment Identity.

3. Base Station Subsystem: The Base station subsystem acts as a link between the mobile station and the network subsystem. It is made up of the Base Transceiver station that contains the radio transceivers and manages the protocols for communication with mobile devices. it also consists of the base station controller which commands the base transceiver station and acts as a link between the mobile station and the mobile switching center.

Features Of A GSM Module

Below are some of the features of a GSM module:

1. International roaming
2. Support for new services
3. Improved Spectrum efficiency
4. Compatibility with services integrated in the digital network
5. Real-time clock with alarm management
6. Fixed Dialing number
7. High-quality speech
8. Short message service (SMS)
9. Uses encryption to make phone calls more secure

Benefits Of GSM

Below are some of the advantages of GSM:

1. Extensive Coverage
2. Greater Phone Variety
3. No Roaming Charges on International Calls
4. Easy Communication
5. Offers Both Data and Voice Communication

Advantages of Studying GSM Engineering

Studying GSM Engineering has a lot of benefits, for example:

1. It makes us understand and know about the underlying workings of GSM Devices and Network
2. We can build, manage, modify an existing network of mobile devices.
3. It provides job opportunities for engineers.
4. It offers self-employment opportunity.
5. It boosts your career as a phone engineer.

In The Full Course, you will learn everything you need to know about **GSM Engineering** with **Diploma Certificate** to showcase your knowledge and competence.

GSM Engineering Course Outline

GSM Engineering - Introduction/Overview
GSM Engineering - Architecture
GSM Engineering - Specification
GSM Engineering - Addressing
GSM Engineering - Operations
GSM Engineering - Protocol Stack
GSM Engineering - User Services
GSM Engineering - Security
GSM Engineering - Billing
GSM Engineering - Mobile Phones
GSM Engineering - Basic Phone Repairs
GSM Engineering - Smart Phone Repairs
GSM Engineering - Video Lectures
GSM Engineering - Exams and Certification

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TELECOMMUNICATION COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is Telecommunication?

Telecommunication is the transmission of signals, sounds and messages or information by Electrical means or by Electromagnetic means such as wires, radios, optical, fibers, and other electromagnetic systems.

Telecommunication is achieved when the exchange or transmission of information between the sender and the receiver is successful. Transmission can be either Electrically over physical media, such as cables, or via Electromagnetic radiation. The transmission tracks are often divided into communication channels which afford the advantages of multiplexing.

A revolution in wireless communication started in the first decade of the 200th century with early developments in radio communications by Gugliemo Marconi, who won the Nobel Prize in Physics in 1909, and other notable pioneering inventors and developers in the field of electrical and electronic telecommunications.

Telecommunications and broadcasting are carried out worldwide by an agency of the United Nations called the International Telecommunication Union (ITU). Most countries have their own agencies for carrying out telecommunications regulations.

Brief History of Telecommunication

In the early days, means of communicating occurs over a distance using visual signals, such as smoke signals, beacons, signal flags, semaphore telegraphs, and optical heliographs. Wireless communication revolution began in the first decade of the 20th century with the developments in radio communications pioneered by Guglielmo Marconi.

In 1909 he won the Nobel Prize in Physics, and other notable pioneering inventors and developers in the field of electrical and electronic telecommunications include Alexander Graham Bell (inventor of the telephone), Charles Wheatstone and Samuel Morse (inventors of the telegraph), Vladimir K. Zworykin, John Logie Baird and Philo Farnsworth (some of the inventors of television), Edwin Armstrong and Lee de Forest (inventors of radio)

Advantages of Telecommunication

1. It allows the free flow of information and communication.
2. Telecommunication enables information sharing thereby adding improvement to society.
3. Telecommunication boost teamwork in organization and parastatals.
4. Telecommunication is a veritable tool for economic growth.
5. Telecommunication saves time and cost.
6. It serves as a source of self-employment.
7. It provides job opportunities.

Components of a Telecommunication System

Most new-age telecommunications systems are best described in terms of a network. There are six basic components of a telecommunications network.

1. Input and also output devices also called "terminals": These helps to provide the starting and stopping points of all forms of communication. A telephone is an example of what a terminal is. In computer networking, these devices are commonly called nodes and they consist of computer and peripheral devices.

2. Telecommunication Channels: These help to transmit and receive data.

3. Telecommunication Processors: These help to provide an amount of control and support functions. For Example, in so many systems, data needs to be converted from digital to analog and back.

4. Control Software: This is responsible for controlling the functionality and regular activities of the network.

5. Messages: These are represented by the actual data that is being transmitted.

6. Protocols: These specify how each form of telecommunication system handles the transmitted messages.

Scope of Telecommunication Networks

The three principal types of telecommunication networks can be explained based on their geographical scope. They are:

1. Local Area Networks: This a privately accessed network that interconnects various processors, which are usually microprocessors within a building or on a campus site that has very high buildings.

2. Wide Area Networks: This is a telecommunication network that covers a wide geographical area.

3. Metropolitan Area Networks: These are telecommunication networks that interconnect different local area networks within a metropolitan area, that is, within a 50-mile radius.

Various Forms and Generations of Telecommunications

Some of the various forms and generations of Telecoms include:

GSM uses time division access and it means: Global System for Mobile Communication used to transmit mobile data and mobile services.

GPRS means General Packet Radio System. it is a third-generation to have internet access. GPRS has a big data rate and it has easy billing.

LTE means Long Term Evolution which is equivalent to the 4G Technology recently utilized.

WAP means Wireless Application Protocol, it has been demonstrated as I mode which means internet mode.

WiMAX meaning World Wide Interoperability of Microwave Access. It is based on Wireless MAN technology. It offers about 40 Mbs.

WiFi a wireless technology meaning Wireless Fidelity.

WML is a Wireless Mark up Language.

Telecommunication Links

Telecommunication links can be implemented with different communication media with a diverse variety of characteristics. The main characteristic of a medium is its potential transmission speed, also called **Channel Capacity**, which is expressed in bits per second (bps) in data transmission. A different measure of transmission channel capacity is bandwidth - the range of signal frequencies that can be transmitted over the channel.

Six media are employed to implement telecommunication links:

1. Twisted Pair
2. Coaxial Cable
3. Fiber Optics Cable
4. Terrestrial Microwave.
5. Satellite Transmission
6. Radio Transmission.

Telecommunication Network Topology

Switches, computers, terminals that are interconnected by network links are called Nodes collectively. The purpose of network control is to provide a connection between nodes that need to communicate.

Telecommunication Network Topology is the way nodes are linked in a telecommunication network.

A Telecommunication Network Topology has to fit and match the structure of the organizational units that will make use of the network, and this topology should beadapted to the unit's communication inflow patterns and to the way, the databases will be stored in order to allow access to them.

The following are network topologies that are widely used:

1. Hierarchical Network
2. Star Network
3. Ring Network.
4. Bus Network.

Switching in Telecommunication Networks

Many users can be connected simultaneously to a network of communication channels. Switching devices create connections between nodes that need to communicate over a network. Important techniques for switching include:

1. Circuit Switching.
2. Packet Switching.
3. Fast Packet Switching.

In the Full course, you will learn everything you need to know about **Telecommunication** with **Certificate** to showcase your knowledge

Telcommunication Course Outline

Telecommunication Introduction
Telecommunication Etymology & History
Telecommunication 5G
Telecommunication CDMA
Telecommunication LTE
Telecommunication GPRS
Telecommunication GSM
Telecommunication WAP
Telecommunication WML
Telecommunication Wi-Fi
Telecommunication WiMAX
Telecommunication i-Mode
Telecommunication Billing
Telecommunication SIP
Telecommunication UMTS
Telecommunication NGN
Telecommunication FTTH
Telecommunication TSSN
Telecommunication Video Lectures
Telecommunication Exams and Certification

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TELECOM BILLING COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is Telecom Billing?

Telecom Billing is a process of collecting usage, summing it up, applying the required charges and finally producing invoices for the customers. The Telecom Billing process also involves receiving and recording payments from customers.

Sending voice, picture, data, fax, etc, from one location to the other with the aid of electronic media is referred to as telecommunication and in short form, 'Telecom'. Examples include Phones, Television. radio and the Internet. The medium of transmission involves copper wires, Ethernet(wireless), Fiber Optics, microwave, Radio towers, Satellite, etc.

There could be very difficult scenarios of charging, which might be very hard to handle manually. There are some state-of-the-art Billing Systems available in the software market that can efficiently handle billing tasks, and provide you with lots of flexibilities to help providers offer their services with different price structures.

Billing Systems are often viewed as accounts receivable, as the Billing System aids in the collection (receipt) of money from your customers. Billing Systems are also one of the major parts of accounts that are essential for inter-carrier settlements, as customers mostly use services from other companies such as wireless roaming, long-distance, and call completion through other networks.

Billing Systems are the pillar of any telecom operator. If a Telecom operator does not have a strong Billing System, then it might not be possible for them to serve out their products and services with very attractive promotions and deals and eventually they can not stand in today's aggressive and dynamic market.

This course would give you a complete understanding of Telecom Billing.

Why Study Telecom Billing Systems?

1. Telecommunications And Business: Telecommunications and business functions are intertwined in today's world. Primarily the reason why most companies deploy efficient telecom billing software to improve everyday business operations. Telecom Billing software plays an important role in the management of costs and expenses. The efficiency of telecom billing solutions is in expense management. It can incorporate functions that are custom-made to incorporate the unique requirements of your business.

2. Telecommunications And Wireless Phone Industry: These are at the core of financial solutions in the wireless phone industry. The software also creates bills that are made available to customers. The incorporation of various modules into a single program helps a company manage all its monetary resources. These solutions help in keeping track of the overall time use of a customer, this makes it possible to only bill customers per usage.

3. Eliminates errors: Billing errors arise due to bad communication or inconsistent information. In addition, using different programs for financial activities leads to more errors. One important advantage of telecom billing solutions is their ability to reduce or eliminate the recurring errors that occur in billing.

4. Integrating Financial Operations: Unifying different billing modules within a single software helps in ensuring communication between those modules. This not only leads to more accurate billing but also reduces the chance of errors in the first place. Integrating different financial operations into a single program imparts homogeneity to the process.

5. Customer Retention: This often drives the most efficient business strategies. A contemporary telecom company does everything possible to improve its image in the eyes of its customers.

6. Accountability: Telecom companies need to be particular about their billing requirements. This is to account for every byte of information flowing across the network because of changes in the telecom industry, need for manpower, and multiple service providers.

7. Job Opportunities and Career Advancement

Features Of Telecom Billing Systems

Telecom Billing has a lot of features and some of them are:

1. Rating and billing: This involves rating the products or the usage of the services and bringing out bills monthly.

2. Payment processing: This involves sending the customer's payments into the customer's personal account.

3. Credit control and collections: This involves following up with the outstanding payments and taking necessary actions to collect the payments.

4. Disputes and adjustments: This involves recording the customer's disagreement against their bills and creating an adjustment to refund their disputed amount to settle the issues.

5. Pre-pay and post-pay services: This involves supporting both the pre-paid and the post-paid customer at the same time.

6. Multilingual and multiple currencies: Multilingual and multiple currencies support would be needed if the business area spans across the globe and have international customers from different geographical areas, or else if the government regulations demand it.

7. Inter-carrier settlements: This involves the sharing of revenue across the carriers that provide services to each separate's customers.

8. Products & Services: This involves providing a flexible and easy way to maintain and manage the various products and services and sell them individually or in packages.

9. Discount applications: This involves assigning various discount schemes to retain customers and attract new customers to the system.

Benefits of Telecom Billing

There are lots of benefits and advantages of using a Telecom billing software and some of them are:

1. A Telecom Billing Software helps in Minimizing the numbers of errors that are related to billing.
2. With a Telecom Billing Software, you have an edge over competitors.
3. A telecom Billing Software enables you to Screen duplicate records.
4. Availability of itemized bill
5. Bill cycles
6. E-billing process
7. Easy tariff changes
8. Easy Budgeting.
9. It Support for management decisions

Telecom Billing Course Outline

Telecom Billing - Introduction
Telecom Billing - System Architecture
Telecom Billing - Products & Services
Telecom Billing - Tariff Planning
Telecom Billing - Usage Capturing
Telecom Billing - Rating Processes
Telecom Billing - Processes
Telecom Billing - Discount Application
Telecom Billing - Invoice Generation
Telecom Billing - Credit Control
Telecom Billing - Collection Process
Telecom Billing - Payment Processing
Telecom Billing - Disputes & Adjustments
Telecom Billing - Reports Generation
Telecom Billing - Pre-Paid vs Post-Paid
Telecom Billing - Retail Billing
Telecom Billing - Interconnect Billing
Telecom Billing - Roaming Billing
Telecom Billing - MVNO Billing
Telecom Billing - Convergent Billing
Telecom Billing - Support & Maintenance
Telecom Billing - System Interfaces
Telecom Billing - Video Lectures
Telecom Billing - Exams and Certification

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Every Life, Every Moment, Every Day. A New Discovery...

MOBILE TESTING COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is TSSN?

Telecommunication Switching Systems and Networks - TSSN is simply the control mechanisms available in Telecoms.

Telecoms or Telecommunication is the exchange of communication between two or more individual via telecom applications and devices.

Switching Systems is the control method used to link calling subscribers and called subscribers together.

The Switching Ssystem is classified into two which are:

1. Manual and
2. Automatic (Electromechanical and Electronic).

Features and Benefits of TSSN

1. TSSN offers smooth means of exchanging information and communication with the use of control mechanisms.
2. TSSN is an important tool for businesses as it helps to communicate effectively with customers and deliver high standards of customer service.
3. TSSN is a key element in teamwork and project management allowing employees to collaborate easily from wherever they are located.
4. TSSN makes communication process easier for everyone through a long distance.
5. TSSN offers flexibility of work in workplaces.
6. TSSN develops the society at large through smooth communication.
7. TSSN helps to improve teamwork and collaboration and increases business growth.
8. TSSN saves time and cost of operations.
9. TSSN offers lots of job opportunities such as:

+ Broadcasting Technician
+ Network System Analyst
+ Programmer Radio Dispatcher
+ Communication Equipment Operator
+ Data Communication Analyst etc.

Components of Telecommunication Switching Systems

The components of switching systems are as follows:

1. Switching Network: this provides switching paths between the calling subscriber and called subscriber.

2. Control Subsystem: identifying the inlet and outlet lines and interpreting the signaling information received on a particular line.

3 Signaling: For Signals.

4. Trunk Interface: It's used for connections between the Switching Systems.

5. Subscriber Line Interface: this used for connections between the subscriber and the switching system.

6. Line Scanning Unit: It senses and obtains the signaling information from the different lines.

7. Distributor Units: this used for distributing or sending out signaling information on the various lines.

8. Operator Console: It allows interaction with the switching system for the administrative and maintenance.

9. Service Circuit Interface: this provides interaction between circuit for the purposes of maintenance and testing.

10. Junctures: It provides a folded connection for the local subscribers and the service circuits.

Here we highlight some of the modules you will learn in this course:

The Invention: Alexander Bell invented and demonstrated his set of telephone and possibility of long-distance voice communication in 1876.

Switching System: where the network cannot be simply made with telephone sets and a bunch of wires, but a good system is required to make a break connection which is the switching system, then we talk about the classification of switching system which is Manual and Automatic.

Telecommunication Networks: where we talk about Folded Network, Blocking Network, Switching Network, etc. We talk about Signaling, Trunk interface, Subscriber Line Interface, Junctures, Direct and Indirect Control Switching System.

Stronger Switching System and how it is being operated, talking about Dialing (Pulse Dialing and Rotary Dial Telephone). Moving unto Multi-exchange Network, Common Control System, Exchange Identifier, and Subscriber Identifier.

Touch-Tone Dialing which was introduced in telephone to replace the Rotary Dial. Which on pressing a button on the touch-tone dial phone indicates the number dialed using certain frequencies (touching) and we also talk about DTMF (Dual-Tone Multi-Frequency)

Crossbar Switching Method which was developed in the 1940s and helped in sharing resources, call processing, charging and event monitoring.

SPC (Stored Program Control) which allows Abbreviated Dialing, Call Forwarding, Call Waiting, Do Not Disturb etc. then to Switching Techniques such as Circuit Switching, Message Switching, and Packet Switching.

PSTN (The Public Switched Telephone Network) which is used for providing Public Telecommunication - POTS. Switching Hierarchy and Routing talking about Mesh Topology, Star Topology, and Hierarchial.

Private Branch Exchange (PBX) which can be understood as local exchange within an office, a more private exchange system that switches calls between users on local lines and still allow them to share a certain number of external lines.

The ISDN: which was first defined in the CCITT red book in 1988 and is a network-based infrastructure that allows the transmission of voice and data simultaneously at high speed with greater efficiency. We have several kinds of ISDN interfaces such as the BRI, PRI, Narrowband ISDN, Broadband ISDN etc.

In the Full Course, you will learn everything about TSSN - Telecommunication Switching System and Network, including their components and as well as the principles of operations with **Certificate** to showcase your knowledge.

TSSN Course Outline

TSSN - Introduction
TSSN - Switching Systems
TSSN - Elements of a Switching System
TSSN - Strowger Switching System
TSSN - Switching Mechanisms
TSSN - Common Control
TSSN - Touch-tone Dial Telephone
TSSN - Crossbar Switching
TSSN - Crossbar Switch Configurations
TSSN - Crosspoint Technology
TSSN - Stored Program Control
TSSN - Software Architecture
TSSN - Switching Techniques
TSSN - Time Division Switching
TSSN - Telephone Networks
TSSN - Signaling Techniques
TSSN - ISDN
TSSN - Video Lectures
TSSN - Exams and Certification

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WAP COURSE

DURATION: 2 WEEKS
FORMAT: WEB/PDF PLUS VIDEO LECTURERS

CERTIFICATE OF COMPLETION

What is WAP?

WAP - Wireless Application Protocol is a technical standard that is used in accessing information that is over a Mobile Wireless Network. A WAP browser is a web browser that is used for mobile devices such as mobile phones that makes use of the protocol.

WAP was introduced in 1999, WAP gained some popularity in the early 2000s, but by 2010s it had been mostly superseded by more recent and modern internet standards. Most modern handset internet browsers now fully support HTML, so they do not need to make use of WAP for developing markups for their web page compatibility, and therefore, most of them are no longer able to render and display web pages that are written in WML, which stands for WAP's markup language.

Before the introduction of WAP technologies, mobile internet service providers had very restrained and limited opportunities to offer data services that are highly interactive, but needed interactivity to support and maintain Internet and Web applications such as stock prices, email services, news, and sports headlines.

The bottom-most protocol in the suite, which is the Wireless Datagram Protocol (WDP), works as an adaptation layer that makes every data network to look a bit like UDP to the higher layers by offering unreliable transport of data with double, 16-bit port numbers (which are the origin and the destination). All the upper layers view WDP as one and the same protocol, that has several "technical realizations" on top of other "data bearers" services such as USSD, SMS, etc. On native IP bearers such as the GPRS, UMTS packet-radio service, or the PPP that is on top of a circuit-switched data connection, WDP is in fact exactly the same as UDP

Components of WAP

A WAP network consists of the following components:

1. WAP-enabled device
2. Gateway
3. Application server

Features of WAP

1. A programming model similar to the Internet's: The concepts of the WAP are very to that of the Internet concepts, letting you introduce them quickly to the WAP-based services, as the concepts are very familiar to both the manufacturers and the developers.

2. Wireless Markup Language (WML): As HTML language is used for developing a web-based software application, the markup language that is used for authorizing and developing the WAP-based services is WML, which serves the same purpose as that of regular HTML. In addition, WML is developed to fit with small handheld devices as well.

3. WML Script: As VB script or JavaScript is used for improving the features and functionalities of the web applications, on similar lines WML script is used for improving the functionality of a WAP-based service. In addition, several procedural logic and computational functions can also be added to WAP-based services.

4. Optimized protocol stack: The WAP protocols are Internet protocols such as HTTP and Transmission Control Protocol (TCP) and both of these are optimized in order to solve and address the limitations of the wireless environment like low bandwidth or high latency.

How WAP Works

The application server in WAP can be located in either a public or private IP network. The gateway normally is located in telecom networks, but it can be set up by a company using its own computer systems. A user with a WAP device requests content from the application server, the request reaches the gateway first, which does the protocol translation from WAP to HTTP and routes the HTTP request to the destination server, the server returns WML output and adds HTTP headers to the gateway, depending upon whether dynamic or static pages are requested, the gateway converts WML and HTTP to binary form to conserve bandwidth and returns a WAP response to the user, the browser inside the WAP device interprets the WML and shows the contents.

Online applications and services that do not transfer a large amount of information across a network will fuel most of WAP's success. Services such as stock quotes, news, weather, and sports are already operational. As mobile commerce becomes a faster, more secure channel, services such as banking, retail coupons, wireless ticketing, and sales notification will become commonplace.

Benefits of WAP

There are many benefits of WAP, and some of them are;

1. WAP services are portable.
2. WAP services are easy to use.
3. WAP lets you access a vast variety of services on a competitive market level.
4. WAP gives you the possibility of having personalized data services.
5. WAP offers more convenient, fast, and efficient access to data services.

Application For WAP

1. Mobile Banking: The WAP allows not just information provision but also secure mobile transactions and electronic commerce.

2. Mobile Commerce: It is expected that mobile commerce will become just an extension of electronic commerce on the Internet. There will not need to be any special applications developed for the mobile to take into account the screen, bandwidth and security limitations of the mobile device.

3. Games: These are a huge service that many people see as being a key application for future mobile devices.

4. Ringtones: Another emerging service is downloading ringtones. it has become popular to download new ringtones from an Internet site to the phones.

5. Email: This is likely to be a fast-growing and popular application for WAP, mainly due to the high and increasing usage of Internet email to communicate globally, and the benefit from using WAP Push to notify mobile users about important new emails messages.

6. Qualitative Information: A wide range of content can be delivered to mobile phone users ranging from share prices, sports scores, weather, flight information, news headlines, lottery results, jokes and so on.

7. Chat: Due to its association with the Internet, the General Packet Radio Service (GPRS) would allow mobile users to participate fully in existing Internet chat groups.

Why Study WAP?

1. WAP services are very easy to implement and use.
2. It gives you the possibility of having personalized data services.
3. It offers more convenient, fast, and efficient access to data services.
4. Job opportunities and career advancement.
5. Enrich your CV and Increase your earning potential.

WAP Course Outline

WAP - Introduction
WAP - Key Features
WAP - The Model
WAP - Architecture
WAP - Environment
WAP - WML Syntax
WAP - WML Script
WAP - Core Services
WAP - Key Benefits
WAP - Modern Devices
WAP - Future Prospects
WAP - Summary
WAP - Video Lectures
WAP - Exams And Certification

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WI-FI COURSE

DURATION: 2 WEEKS
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CERTIFICATE OF COMPLETION

What is WI-FI?

WiFi is the acronym for **Wireless Fidelity.**

WiFi Technologies are based on the IEEE 802.11 family of network standards and are basically a LAN (local area networking) technology that is designed to give its users in-house broadband coverage.

Present-day WiFi network systems offer support for a peak physical-layer data transfer rate of about 54 Mbps and they provide users with indoor coverage of over a distance of 100 feet.

WiFi has become the fundamental standard for fast internet broadband connectivity in homes, buildings, offices, and various public hotspot locations. Systems can primarily provide you with a coverage range of only about 1,000 feet from its base access point.

WiFi offers exceptionally higher top data rates than most 3G systems do, essentially since it can work over a bandwidth that is larger than 20 MHz.

One significant advantage of WiFi over WiMAX and 3G technologies is the wide availability of terminal devices attached to it. A vast number of laptops and computers shipped today have a default built-in WiFi interface. WiFi interfaces are now also being installed in a variety of devices, including regular personal data assistants (PDAs), wireless phones, cellular phones, mobile phones, cameras, media players, etc.

All WiFi networks interfaces are simply contention-based TDD systems, where each access point and the mobile stations all function for use of the same channel. Because of its shared media operation, all WiFi networks are known as half-duplex.

Types Of WI-FI

1. Wi-Fi-802.11a: 802.11a is one of a series of wireless technology. It defines the format and structure of the radio signals sent out by WI-FI networking routers and antennas.

2. Wi-Fi-802.11b: This is a low frequency compared with Wi-Fi-802.11a means it is working reasonable distance. It is low-cost; the signal range is good using the home appliances. This supports bandwidth 11mbps.

3. Wi-Fi-802.11g: It is the best technology for 802.11a and 802.11b. It supports bandwidth up to 54mbps and it uses a 2.4 GHz frequency for greater range. It is fast with maximum speed.

4. Wi-Fi-802.11n: It was designed to improve on 802.11g. The amount of bandwidth supported by utilizing multiple wireless signals and antennas instead of one. It supports 100 Mbps bandwidth and increased signal intensity.

Applications Of WI-FI

1. Mobile applications
2. Computerized application
3. Automotive segment
4. Browsing internet
5. Video conference
6. Business applications
7. Home applications

Features of WI-FI

There are many features of WI-FI networks and some of them are:
1. Ease of Use: WiFi is a new de-facto of networking and it is the most popular currently in the field of networking. The data broadcasting is achieved by means of radio waves. Through WiFi Technology an internet user can easily get direct access to the internet for the objective of sharing information all around the world.

2. No need for cabling in WiFi Technology: Wi-Fi technology has no cable attached prior to use so you can easily move your device from one location to the other, this makes it very helpful, easy and convenient for use. Wi-Fi Technology also lets you play radio online and stream videos and music via remote computers. Downloading of songs, sharing of documents and files, above the ground, data transfer speed makes Wi-Fi Technology a matchless technology in mobility and performance

3. Secure Internet Connection Features: The security system of WiFi Technology makes it more consistent and reliable and it has various tools that it uses to protects your data. The configuration of devices is very easy to implement because it has strong network security features, embedded systems, and standard devices.

4. Scalable System and Robust Performance: The scalable system of WiFi Technologies shows significant results in a while rather than taking days and presenting the exact results. Flexible authentication techniques aid the transportation and procedure of imputing substances. With WI-FI, You don't even need any prior experience to install devices because WiFi Technology itself is not just smart enough to provide security to your personal computer but it also offers you an easy way of network installation.

Benefits Of WI-FI

1. Convenience: The wireless characteristics of WI-FI networks allow their users to directly access internet network resources from nearly any location that is convenient within their basic networking environment.

2. Mobility: With the rise of public wireless networks, internet users can directly access the internet even outside their normal work environment. Most eatery and restaurants, for example, offer their customers a wireless internet connection at little or no cost.

3. Productivity: Users that are connected to a wireless internet network can maintain an almost constant affiliation with the network they desire as they move from place to the other. For a business, this means that an employee can potentially be more productive as his or her work can be accomplished from any location that is more convenient to him.

4. Deployment: Another major advantage of WI-FI is that it doesn't need any special skills to set up in any environment.

5. Safety: It is completely safe and it will not interfere with any network. Wi-Fi as a single technology can help make all connections seamless, Wi-Fi applications with practical uses will have success, It has industry-standard security protections, and the consumers can rely on. Wi-Fi network using WPA2™ which provides both securities, and privacy for communications.

Why Study WI-FI?

1. It lets several users to be connected simultaneously.

2, It helps to ensure that an employee in an organization is more productive since he can work without worrying about the hassles of setting up an internet connection.

3. Wi-Fi promotes mobility, in the sense that you can move from one place to the other while remaining connected.

4. Job opportunities and career advancement

WI-FI Course Outline

Wi-Fi - Introduction
Wi-Fi - What is Wi-Fi ?
Wi-Fi - Working Concepts
Wi-Fi - IEEE Standards
Wi-Fi - Access Protocols
Wi-Fi - Quality of Service
Wi-Fi - Security
Wi-Fi - Network Services
Wi-Fi - Radio Modulation
Wi-Fi - Major Issues
Wi-Fi - Summary
Wi-Fi - Video Lectures
Wi-Fi - Exams and Certification

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WIMAX COURSE

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CERTIFICATE OF COMPLETION

What is WiMAX?

WiMAX which is the acronym for **Worldwide Interoperability for Microwave Access** is a part of the group of wireless network broadband communication standards that are completely based on a set of network standards, which are used to offer various Physical Layers options abbreviated as PHY, and Media Access Control abbreviated as MAC.

The name "WiMAX" was brought up by the WiMAX Forum, which was developed in June 2001 to promote the interoperability and conformity of the standard, which includes the definition of certain predefined system profiles for commercial vendors. The WiMAX forum defines WiMAX as "a standard-based software technology that allows for the delivery of last-mile wireless broadband access as a present alternative to DSL and cable. Wireless-MAN-Advanced and IEEE 802.16m was a candidate for the 4G network, in competition with the LTE Advanced network standard.

WiMAX was originally designed to provide 30 to 40 megabit-per-second data transfer rates, with the 2011 update producing up to 1 Gbit/s for fixed stations.

Components of WiMAX

1. WiMAX Tower: The WiMAX tower is like a cellphone network tower, a single one can cover a very large area of up to a 30-mile radius. A WiMax tower, however, can also connect to a second tower — this is what allows the network to provide long-range wireless service.

2. WiMAX Receiver: The WiMAX receiver can be a small box or the card built inside laptops (like how WiFi is accessed).

Features of WiMAX

There are lots of features of WiMAX, and some of them are:

1. OFDM-based Physical Layer: The WiMAX physical layer (PHY) is based on several orthogonal frequency division multiplexing, which is a scheme that presents users with good resistance to multipath, and allows WiMAX to work in NLOS conditions.

2. Very High Peak Data Rates: WiMAX is very capable of supporting very high peak data rates and transmissions. In fact, the top PHY data rate can be as high as 74 megabits per second when operating on a 20MHz wide spectrum.

3. Scalable Bandwidth and Data Rate Support: WiMAX has a highly scalable physical-layer architecture that allows for the data rate to scale and balance itself easily with available bandwidth channels.

4. Adaptive Modulation and Coding (AMC): WiMAX has support for a number of network modulation and forward error correction (FEC) coding network schemes and it also allows the network scheme to be modified as per the user needs and per□frame basis, that is based on channel conditions.

5. Link-layer Retransmissions: WiMAX has support for automatic retransmission requests (ARQ) at the link layer for connections that depends on enhanced reliability. Connections that are ARQ-enabled require each transmitted packet to be recognized by the receiver; unacknowledged packets are taken to be lost and are retransmitted back.

6. Support for TDD and FDD: IEEE 802.16-2004 and IEEE 802.16e-2005 offer supports for both time division duplexing and duplexing of the frequency-division, as well as a half-duplex FDD, which allows for the low-cost implementation of the system.

7. WiMAX Uses OFDM: Mobile WiMAX makes use of Orthogonal frequency division multiple access (OFDM) as a multiple-access technique, also, several users can be designated separate subsets of the OFDM tones.

How WIMAX Works

WiMAX equipment is very much like the WiFi connection. Internet access starts from the Internet Service Provider (ISP) network that is linked to the WiMAX tower, which then sends signals and provides an area with wireless Internet. A WiMAX receiver, such as a laptop or a wireless device, then connects online. This is basically the general idea behind WiMAX equipment. WiMAX has a range of 30-mile radius from the tower; a speed of up to 70 megabits per second; and has frequency bands of 2 to 11 GHz (licensed) and 10 to 11 GHz (unlicensed). Its major advantage lies in its ability to cover great distances. Of course, certain factors such as weather, terrain, large buildings, etc. may affect WiMAX equipment and reduce its range and speed.

With WiMAX, one can now take advantage of a true Internet connection. It isn't restricted to hotspots like the WiFi and can be used anywhere and anytime within range. WiMAX technology enables a lower barrier to entry, it will allow true market-based competition in all of the major telecommunication services: mobile and static voice, video, and data.

Benefits of WiMAX

There are many benefits of WiMAX, and some of them are;

1. WiMAX systems have excellent coverage features.
2. WiMAX has an impeccable hi-speed performance when compared to other products.
3. WiMAX allows you to make use of it with no strings attached.
4. WiMAX helps in multi-tasking.
5. WiMAX is pocket-friendly.
6. WiMAX helps you to stay in touch with end-users.
7. WiMAX has a reliable network and great infrastructure

Applications of WiMAX

WiMAX technology can be applied in the following ways, they are:

1. Digital Subscriber Line (DSL) Alternative or Fill-in: One of the main uses of WiMAX will be as a fill-in or an alternative to cable and DSL. Fixed WiMAX offers a good solution for broadband access in greenfield sites.

2. Mobile Backhaul: Operators can, therefore, use WiMAX equipment to backhaul base-station traffic to their network.

3. Temporary Broadband: WiMAX could be used for temporary situations such as sporting events, construction sites, and trade shows

4. Public Safety: WiMAX could also provide video surveillance cameras with broadband connectivity to control centers and support vehicles enabling officers to view situations and make decisions in real-time.

The mobile application of WiMAX can be divided into two categories:

1. 4G Network
2. Urban Mobile Broadband Access

Why Study WiMAX?

1. Systems developed with WiMAX has excellent coverage capabilities.
2. WiMAX has a reliable network and great infrastructure
3. WiMAX helps in multi-tasking.
4. Job opportunities and career advancement
5. Self-employment opportunities and consultancy

WiMAX Course Outline

WiMAX - Wireless Introduction
WiMAX - What is WiMAX ?
WiMAX - WiMAX & Wi-Fi Comparison
WiMAX - Salient Features
WiMAX - Building Blocks
WiMAX - Reference Network Model
WiMAX - Technology
WiMAX - Physical Layer
WiMAX - OFDM Basics
WiMAX - MAC Layer
WiMAX - Mobility Support
WiMAX - Security Functions
WiMAX - IEEE Standards
WiMAX - WiMAXForum™
WiMAX - Summary
WiMAX - Video Lectures
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