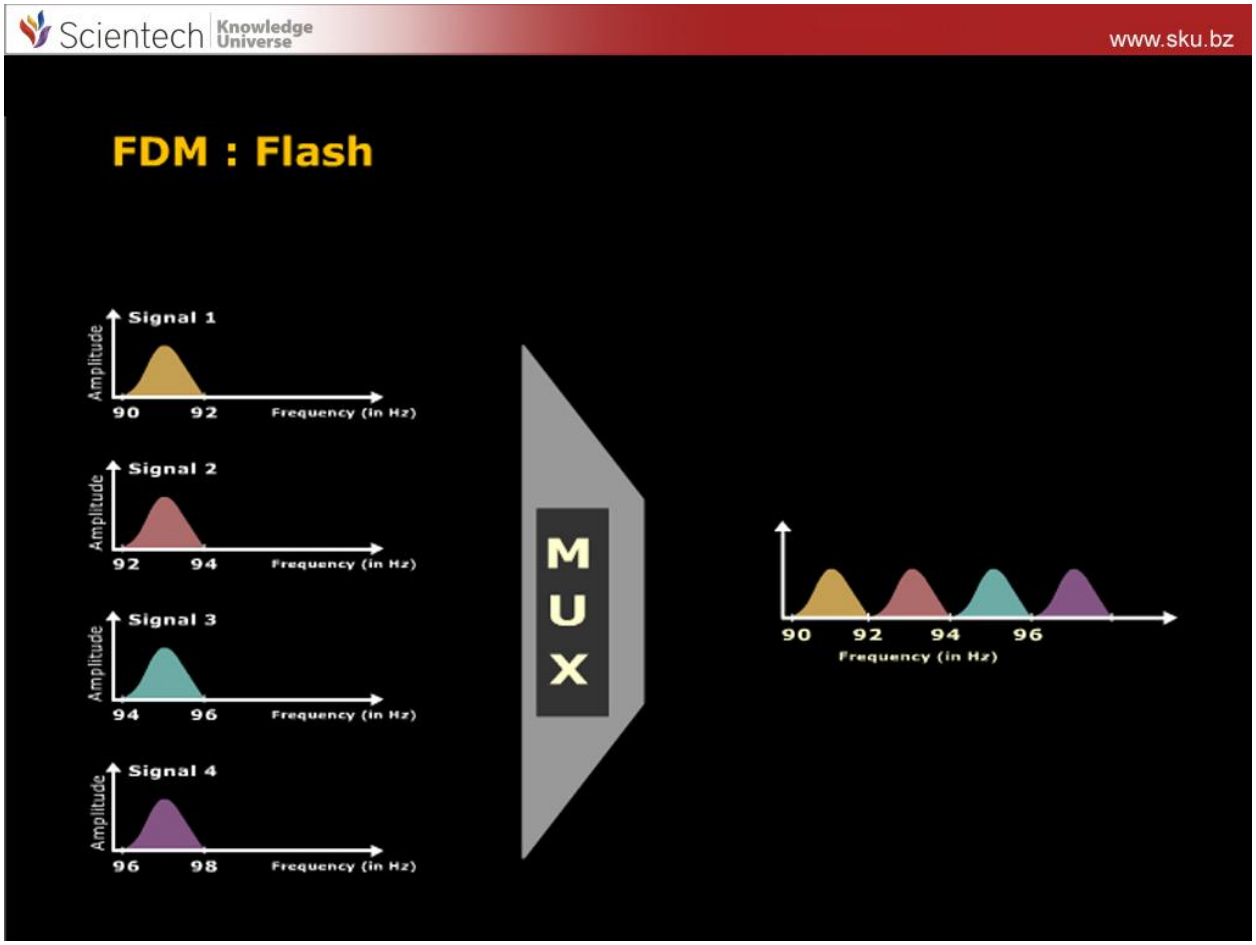
SKU Analog and Digital Communication

Communication is the most important virtue of mankind which consequently makes the study of this branch imperative. SKU-Analog Communication explains how communication carries out in continuous form. It includes the concepts of modulation and its types, Radio Transmitters and how noise affects the information signal. Important concepts have been elucidated by using flash animations, analogies and examples. The subject helps developing the foundation for higher semester communication subjects.



Topics covered in SKU-Analog Communication:

Different types of Signals

Topics Covered: Signals, Types: Continuous, Discrete, Periodic, One dimensional, Two dimensional, Multi dimensional signal, Time Domain and Frequency Domain Representation, Spectral Analysis: Fourier Technique, Fourier Transform Technique and its Properties, Transform of Gate, Signal, Impulse Function and Unit Step Function, Fourier Transform Technique for Periodic Signal, Transform of Train of Pulse and Impulses, Sine and Cosine wave, Signal Energy and Power-Spectral Density, Spectra (Parseval's Theorem), Density Spectra of Periodic Gate and Impulse train, Linear Time Invariant (LTI) Systems-Impulse

Response, Convolution, Convolution with Impulse Function, Casual and Non Causal System, Distortion less System, Impulse Response of Distortion less System, Ideal Filter and Practical Filter.

Modulation Techniques

Topics Covered: Need of Modulation, Types of modulation techniques: Amplitude Modulation, Frequency Spectrum, Power Distribution, Modulation by Complex Signal, Low Level and High Level AM Modulators, Linear Integrated Circuit AM Modulators, Suppressed Carrier Generation (Balance/Chopper and Square Law Modulation), SSB Generator (Phase and Frequency Discrimination Method), VSB Transmission and Application. Detection of AM signals: Envelope Detector Circuit, RC Time Constant, Synchronous Detection Technique, Error in Synchronous Detection, SSB signal detection, PLL and its use in demodulation.

Angle Modulation

Topics Covered: Frequency and Phase Modulation, Frequency spectrum, bandwidth requirement, Frequency and Phase Deviation, Modulation Index, NBFM and WBFM, Multiple frequencies FM, FM Modulators: Direct and Indirect Method of frequency modulation, FM Detector: Slope Detector, Foster Seely Discriminator, Ratio Detector and Phase lock loop detectors.

Radio Receivers

Topics Covered: Block Diagram of Radio Receiver, Receiver Characteristics: Selectivity, Fidelity and Sensitivity, AM Receiver, RF Receiver, Super-heterodyne Receiver, RF Amplifier, Frequency Mixer, AVC and AFC, Image Signal, Intermediate Frequency Selection, Diversity Reception, FM Receiver.

Noise

Topics Covered: Sources and types of noises, Noise power density, White Noise, Noise from Single and Multiple noise source for Linear Systems, Super Position of Power Spectrum, Equivalent Noise Bandwidth, Noise Figure, Equivalent Noise Temperature, Noise Figure, Noise Performance, In-phase and Quadrature Phase Components, Figure of Merit, Calculation for AM, AM-SC and SSB System, Noise in Angle Modulated System, Figure of Merit for FM, Noise Density of Output of FM. Detector, Pre-Emphasis and De-Emphasis, Phasor Representation, Capture Effect, Comparison of Noise Performance of AM and FM.

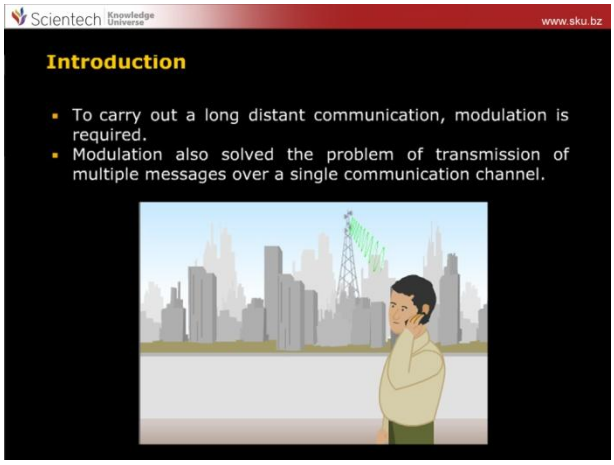
Digital Modulation Techniques

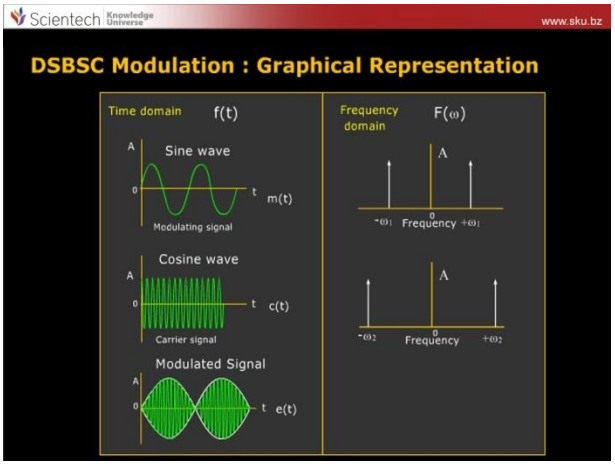
Topics Covered: Analysis, Generation and Detection (Block Diagram), Spectrum and Bandwidth of Amplitude Shift Keying (ASK), Binary Phase Shift Keying (BPSK), Differential Phase Shift Keying (DPSK), Offset and Non-offset Quadrature Phase Shift Keying (QPSK), M-ary PSK, Binary Frequency Shift Keying (BFSK), M-ary FSK, Minimum Shift Keying, Quadrature Amplitude Modulation (QAM), Comparison of digital modulation techniques on the basis of probability of error, Matched Filter.

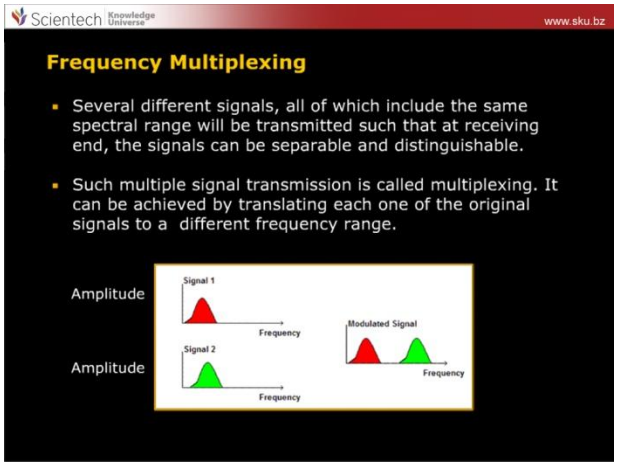
Spread Spectrum Modulation

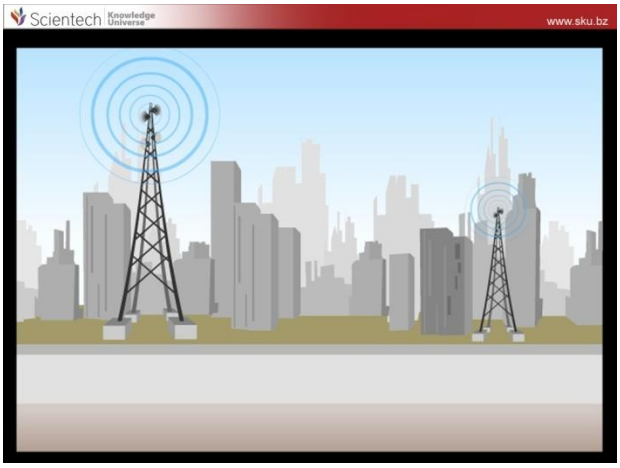
Topics Covered: Introduction to Spread Spectrum modulation, Generation and Characteristics of p-n Sequences, Direct sequence Spread Spectrum System, Spread Spectrum with Code division Multiple Access (CDMA), Frequency Hopping Spread Spectrum.

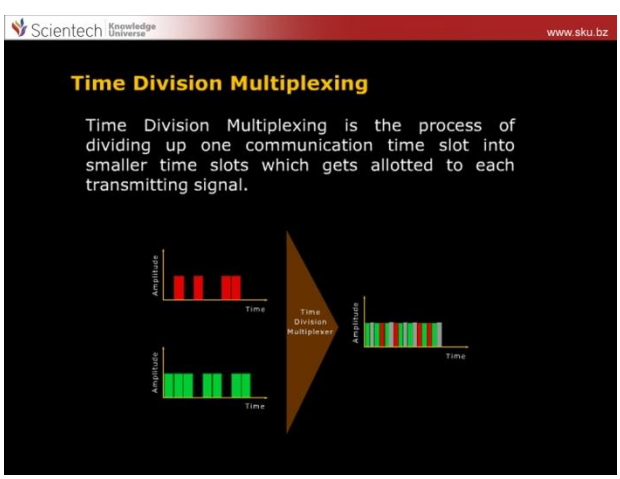
Print Shots of SKU-Analog Communication:







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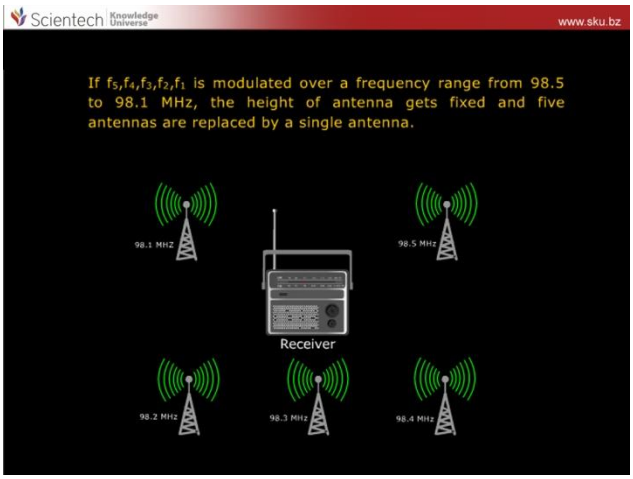
Time Division Multiplexing
Time Division Multiplexing is the process of dividing up one communication time slot into smaller time slots which gets allotted to each transmitting signal.
Amplitude
Time
Time Division Multiplexer
Amplitude
Time
Amplitude
Time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If f_5,f_4,f_3,f_2,f_1 is modulated over a frequency range from 98.5 to 98.1 MHz, the height of antenna gets fixed and five antennas are replaced by a single antenna.
98.1 MHz
98.5 MHz
Receiver
98.2 MHz
98.3 MHz
98.4 MHz