## Course Structure

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<td>Digital Signal Processing Lab</td>
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UNIT – I
Introduction : OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks , Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT - II
Physical Layer : Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT - III
Data link layer : Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

UNIT - IV
Medium Access sub layer : ALOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANS. Bridges.

UNIT - V
Network Layer : Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing.

UNIT – VI

UNIT – VII

UNIT – VIII
Application Layer – Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS :

REFERENCES :
UNIT I

UNIT II
Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform.

UNIT III
Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

UNIT IV
Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency.

UNIT V
Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type, Frequency counter, Time and Period measurement.

UNIT VI

UNIT VII
Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors.

UNIT VIII
Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement. Data acquisition systems.

TEXTBOOKS :

REFERENCES :
UNIT I

UNIT II
ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN: General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in an omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT III
INTERFERENCE: Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

UNIT IV
CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT V
CELL SITE AND MOBILE ANTENNAS: Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT VI
FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT VII
Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT VIII
DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

TEXTBOOKS:

REFERENCES:
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

UNIT VI

UNIT VII

UNIT VIII
Radar Receivers – Noise Figure and Noise Temperature. Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

TEXT BOOKS :

REFERENCES :
UNIT I

UNIT II
8051 FAMILY MICROCONTROLLERS INSTRUCTION SET: Basic assembly language programming – Data transfer instructions – Data and Bit-manipulation instructions – Arithmetic instructions – Instructions for Logical operations on the tes among the Registers, Internal RAM, and SFRs – Program flow control instructions – Interrupt control flow.

UNIT III
REAL TIME CONTROL: INTERRUPTS: Interrupt handling structure of an MCU – Interrupt Latency and Interrupt deadline – Multiple sources of the interrupts – Non-maskable interrupt sources – Enabling or disabling of the sources – Polling to determine the interrupt source and assignment of the priorities among them – Interrupt structure in Intel 8051.

UNIT IV
REAL TIME CONTROL: TIMERS: Programmable Timers in the MCU’s – Free running counter and real time control – Interrupt interval and density constraints.

UNIT V

UNIT VI
REAL TIME OPERATING SYSTEM FOR MICROCONTROLLERS: Real Time operating system – RTOS of Keil (RTX51) – Use of RTOS in Design – Software development tools for Microcontrollers.

UNIT VII

UNIT VIII
ARM 32 Bit MCUs: Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set – Development tools.

TEXT BOOKS:

REFERENCES:
UNIT I

UNIT II
TV SIGNAL TRANSMISSION AND PROPAGATION: Picture signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT III
TV CAMERAS: Camera tube types, Vidicon, Silicon Diode Array Vidicon, Monochrome TV camera, color camera. CCD Image Sensors.

UNIT IV
PICTURE TUBES: Monochromatic Picture tube, Electrostatic focussing, Beam deflection, picture tube characteristics and specifications, colour picture tubes. TV Standards: American 525 line B&W TV system, NTSC colour system, 625-line monochrome system, PAL colour system, TV standards.

UNIT V
MONOCHROME TV RECEIVER: RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits. PAL-D Colour Receiver: Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Colour Phasors, synchronous demodulators, Subcarrier generation, raster circuits.

UNIT VI
VISION IF SUBSYSTEM: AGC, noise cancellation, video and intercarrier sound signal detection, vision IF subsystem of Black and White receivers, Colour receiver IF subsystem. Receiver sound system: FM detection, FM Sound detectors, typical applications. TV Receiver Tuners: Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions.

UNIT VII
COLOUR SIGNAL DECODING: PAL – D decoder, chroma signal amplifiers, separation of U and V signals, Color burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, RO phase shift and 180o PAL–SWITCH circuitry, U & V demodulators, Colour signal mixing.

UNIT VIII

TEST BOOKS:

REFERENCES:
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Memory Management: Memory Management requirements – loading programmes in to main memory – virtual memory – hardware and Control structures – OS Software – Examples of Memory Management.

UNIT VI

UNIT VII

UNIT VIII

TEXT BOOKS:

REFERENCES:
1. Operating Systems A design approach- Crowley, TMH.
UNIT I

UNIT II

UNIT III
Image enhancement Point processing. Histogram processing. Spatial filtering.

UNIT IV
Enhancement in frequency domain, Image smoothing, Image sharpening.

UNIT V
Colour image processing : Pseudo colour image processing, full colour image processing.

UNIT VI

UNIT VII
Image segmentation Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.

UNIT VIII
Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

TEXT BOOK :

REFERENCES :
UNIT I

UNIT II

UNIT III

UNIT IV
SATELLITE LINK DESIGN[1] : Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

UNIT V
MULTIPLE ACCESS[1][2] : Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA), Spread spectrum transmission and reception.

UNIT VI

UNIT VII
LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS[1] : Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs

UNIT VIII

TEXT BOOKS :

REFERENCES :
UNIT – I

UNIT – II

UNIT – III
Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity’s – AND, OR and NOTR – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL 0 Triggers and Active Data bases.

UNIT – IV

UNIT – V

UNIT – VI

UNIT – VII

UNIT – VIII

TEXT BOOKS:
REFERENCES:
1. Introduction to Database Systems, C.J.Date Pearson Education
Minimum Twelve Experiments to be conducted:

Part – A (Any 7 Experiments):
1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance and Frequency Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Circulator.

Part – B (Any 5 Experiments):
10. Characterization of LED.
12. Intensity modulation of Laser output through an optical fiber.
14. Measurement of NA.
15. Measurement of losses for Analog Optical link.

Equipment required for Laboratories:

1. Regulated Klystron Power Supply
2. VSWR Meter
3. Micro Ammeter 0 – 500 µA
4. Multimeter
5. CRO
6. GUNN Power Supply, Pin Moderator
7. Reflex Klystron
8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slosted line carriage
12. Probe detector
13. wave guide shorts
14. Pyramidal Horn Antennas
15. Directional Coupler
16. E, H, Magic Tees
17. Circulators, Isolator
18. Matched Loads
19. Fiber Optic Analog Trainer based LED
20. Fiber Optic Analog Trainer based laser
21. Fiber Optic Digital Trainer
22. Fiber cables (Plastic, Glass)
LIST OF EXPERIMENTS:

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
   a) Using rectangular window
   b) Using triangular window
   c) Using Kaiser window
5. To Implement IIR filter (LP/HP) on DSP Processors
7. MATLAB program to generate sum of sinusoidal signals.
8. MATLAB program to find frequency response of analog LP/HP filters.
9. To compute power density spectrum of a sequence.
10. To find the FFT of given 1-D signal and plot.