

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

IV Year		I Semester		
COURSE STRUCTURE				
Code	Subject	T	P	C
	Computer Networks	4+1*	-	4
	Electronic Measurements & Instrumentation	4+1*	-	4
	Cellular and Mobile Communications	4+1*	-	4
	Radar Systems	4+1*	-	4
	<b>Elective-I</b>	4+1*	-	4
	Micro Controllers and Applications			
	Television Engineering			
	Operating Systems			
	<b>Elective-II</b>	4+1*	-	4
	Digital Image Processing			
	Satellite Communications			
	Data Base Management Systems			
	Microwave and Optical Communications Lab.	-	3	2
	Digital Signal Processing Lab	-	3	2
	<b>Total</b>	<b>30</b>	<b>6</b>	<b>28</b>

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

IV Year II Semester

**COURSE STRUCTURE**

Code	Subject	T	P	C
	Optical Communications	4+1*	-	4
	<b>Elective-III</b>	4+1*	-	4
	Embedded and Real Time Systems			
	Bio-Medical Instrumentation			
	Digital Design Through Verilog			
	<b>Elective-IV</b>	4+1*	-	4
	Wireless Communications and Networks			
	DSP Processors and Architectures			
	Artificial Neural Networks			
	Industry Oriented Mini Project	-	-	2
	Seminar	-	-	2
	Project Work			10
	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>15</b>	<b>-</b>	<b>28</b>

**Note :** All End Examinations (Theory and Practical) are of three hours duration.

**\* - Tutorial    T – Theory    P- Practical    C - Credits    D - Drawing**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

<b>IV Year B.Tech. ECE. I-Sem</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>4+1*</b>	<b>0</b>	<b>4</b>

**COMPUTER NETWORKS**

**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, Broad cast, Multi cast, distance vector routing.

**UNIT – VI**

Dynamic routing – Broadcast routing. Rotary for mobility. Congestion, Control Algorithms – General Principles – of Congestion prevention policies. Internet working: The Network layer in the internet and in the ATM Networks.

**UNIT –VII**

**Transport Layer**: Transport Services, Connection management, TCP and UDP protocols; ATM AAL Layer Protocol.

**UNIT – VIII**

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

**TEXT BOOKS :**

1. Computer Networks — Andrew S Tanenbaum,4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.

**REFERENCES :**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

<b>IV Year B.Tech. ECE. I-Sem</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>4+1*</b>	<b>0</b>	<b>4</b>

**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

**UNIT I**

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. DC Voltmeters- Multirange, Range extension/Solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt. Thermocouple type RF ammeter, Ohmmeters series type, shunt type, Multimeter for Voltage, Current and resistance measurements.

**EBOOKS FOR JNTU SUBJECTS : WWW.BEEBOOKS.BLOGSPOT.COM**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**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**

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance - Schering Bridge. Wheat stone bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter.

**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 :**

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

**REFERENCES :**

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed., 2004.
3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education - 2005.

**IV Year B.Tech. ECE. I-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**CELLULAR AND MOBILE COMMUNICATIONS**

**UNIT I**

**CELLULAR MOBILE RADIO SYSTEMS** : Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

**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 a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

**UNIT III**

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**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 :**

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2<sup>rd</sup> Edn., 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2<sup>nd</sup> Edition, 2007.

**REFERENCES :**

1. Wireless Communications - Theodore. S. Rappoport, Pearson education, 2nd Edn., 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3<sup>rd</sup> Edition, 2006.
3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
4. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

**IV Year B.Tech. ECE. I-Sem**

T	P	C
4+1*	0	4

**RADAR SYSTEMS**

**UNIT I**

Introduction Nature of Radar, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Related Problems.

**UNIT II**

**Radar Equation** : Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment). Related Problems.

**UNIT III**

**CW and Frequency Modulated Radar** : Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar.

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**UNIT IV**

FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/Receding Targets), FM-CW altimeter, Measurement Errors, Multiple Frequency CW Radar.

**UNIT V**

**MTI and Pulse Doppler Radar** : Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance. Non-coherent MTI, MTI versus Pulse Doppler Radar.

**UNIT VI**

**Tracking Radar** : Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse. Target Reflection Characteristics and Angular Accuracy. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

**UNIT VII**

**Detection of Radar Signals in Noise** : Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

**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 :**

1. Introduction to Radar Systems – Merrill I. Skolnik, SECOND EDITION, McGraw-Hill, 1981.

**REFERENCES :**

1. Introduction to Radar Systems – Merrill I. Skolnik, THIRD EDITION, Tata McGraw-Hill, 2001.

**IV Year B.Tech. ECE. I-Sem**

T	P	C
4+1*	0	4

**MICRO CONTROLLERS AND APPLICATIONS  
(ELECTIVE – I)**

**UNIT I**

**OVERVIEW OF ARCHITECTURE AND MICROCONTROLLER RESOURCES** : Architecture of a microcontroller – Microcontroller resources – Resources in advanced and next generation microcontrollers – 8051 microcontroller – Internal and External memories – Counters and Timers – Synchronous serial-cum-asynchronous serial communication - Interrupts.

**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.

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**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**

**SYSTEMS DESIGN : DIGITAL AND ANALOG INTERFACING METHODS** : Switch, Keypad and Keyboard interfacings – LED and Array of LEDs – Keyboard-cum-Display controller (8279) – Alphanumeric Devices – Display Systems and its interfaces – Printer interfaces – Programmable instruments interface using IEEE 488 Bus – Interfacing with the Flash Memory – Interfaces – Interfacing to High Power Devices – Analog input interfacing – Analog output interfacing – Optical motor shaft encoders – Industrial control – Industrial process control system – Prototype MCU based Measuring instruments – Robotics and Embedded control – Digital Signal Processing and Digital Filters.

**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**

**16-BIT MICROCONTROLLERS** : Hardware – Memory map in Intel 80196 family MCU system – IO ports – Programmable Timers and High-speed outputs and input captures – Interrupts – instructions.

**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 :**

1. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005.
2. The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI, 2000.

**REFERENCES :**

1. Microcontrollers (Theory & Applications) – A.V. Deshmuk, WTMH, 2005.
2. Design with PIC Microcontrollers – John B. Peatman, Pearson Education, 2005.

**IV Year B.Tech. ECE. I-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**TELEVISION ENGINEERING  
(ELECTIVE – I)**

**UNIT I**

**INTRODUCTION** : TV transmitter and receivers, synchronization. Television Pictures: Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal: Horizontal and vertical sync, scanning sequence. Colour signal generation and Encoding: Perception of brightness and colours, additive colour mixing, video signals for colours, luminance signal, colour difference signals, encoding of colour difference signals, formation of chrominance signals, PAL encoder.

**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**

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**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**

**SYNC SEPARATION, AFC AND DEFLECTION OSCILLATORS** : Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit. Deflection Oscillators, deflection drive lcs. Receiver Antennas. DIGITAL TV Digital Satellite TV, Direct to Home Satellite TV, Digital TV Receiver, Digital Terrestrial TV.

**TEST BOOKS :**

1. Modern Television Practice – Principles, Technology and Service – R.R. Gulati, New Age International Publication, 2002.
2. Monochrome and Colour TV – R.R. Gulati, New Age International Publication, 2002.

**REFERENCES :**

1. Colour Television Theory and Practice – S.P. Bali, TMH, 1994.
2. Television and Video Engineering - A.M. Dhake, 2nd Edition.
3. Basic Television and Video Systems – B. Grob and C.E. Herndon, McGraw Hill, 1999.

**IV Year B.Tech. ECE. I-Sem**

T	P	C
4+1*	0	4

**OPERATING SYSTEMS  
(ELECTIVE - I)**

**UNIT I**

Computer System and Operating System Overview; Overview of Computer System hardware – Instruction execution – I/O function – Interrupts – Memory hierarchy – I.O Communication techniques. Operating System Objectives and functions – Evaluation of operating System – Example Systems.

**UNIT II**

Process Description – Process Control-process states – Process and Threads - Examples of Process description and Control.

**UNIT III**

**Concurrency** : Principles of Concurrency – Mutual Exclusion – Software and hardware approaches – semaphores – Monitors – Message Passing – Readers Writers Problem.

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**UNIT IV**

Principles of deadlock – deadlock prevention, detection and avoidance dining philosophers problem – example Systems.

**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**

Uniprocessor Scheduling: Types of Scheduling – Scheduling algorithms – I/O management and Disc Scheduling – I/o devices – organization – of I/O function – OS design issues – I/O buffering – Disk I/O – disk scheduling Policies – examples System.

**UNIT VII**

File Management and Security: Overview of file management – file organization and access – File Directories – File sharing – record blocking – secondary Storage Management – example system.

**UNIT VIII**

**Security** : Security threats – Protection – intruders – Viruses – trusted System.

**TEXT BOOKS :**

1. Operating Systems' – Internal and Design Principles, Fifth Edition–2005, Pearson education./PHI
2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne,7th Edition John Wiley

**REFERENCES :**

1. Operating Systems A design approach- Crowley, TMH.
2. Modern Operating Systems, Andrew S Tanenbaum. 2nd Edition, PHI/PEARSON.

**IV Year B.Tech. ECE. I-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**DIGITAL IMAGE PROCESSING  
(ELECTIVE – II)**

**UNIT I**

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relation ship between pixels. Imaging Geometry.

**UNIT II**

Image Transforms 2-D FFT , Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform.

**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**

Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**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 :**

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Edition, 2002.

**REFERENCES :**

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wiley, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

**IV Year B.Tech. ECE. I-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**SATELLITE COMMUNICATIONS  
(ELECTIVE – II)**

**UNIT I**

**INTRODUCTION [2]** : Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

**UNIT II**

**ORBITAL MECHANICS AND LAUNCHERS[1]** : Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

**UNIT III**

**SATELLITE SUBSYSTEMS[1]** : Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

**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**

**EARTH STATION TECHNOLOGY[3]** : Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

**UNIT VII**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**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**

**SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM [1]** : Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

**TEXT BOOKS :**

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

**REFERENCES :**

1. Satellite Communications : Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

**IV Year B.Tech. ECE. I-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**DATABASE MANAGEMENT SYSTEMS  
(ELECTIVE-II)**

**UNIT – I**

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

**UNIT – II**

Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra and Calculus: Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

**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**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form.

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**UNIT – V**

Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery.

**UNIT – VI**

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking. Crash recovery: Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing – recovering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

**UNIT – VII**

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning.

**UNIT – VIII**

Storing data: Disks and Files : - The Memory Hierarchy – Redundant Arrays of Independent – Disks – Disk Space Management – Buffer Manager – Files of records – Page Formats – record formats. Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure. Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Exendble vs. Liner hashing.

**TEXT BOOKS :**

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.
2. Data base System Concepts, Silberschatz, Korth, Mc.Graw hill, IV edition.

**REFERENCES :**

1. Introduction to Database Systems, C.J.Date Pearson Education
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition.Thomson.
3. Data base Management System, Elmasri Navrate Pearson Education.
4. Data base Management System Mathew Leon, Leon Vikas.
5. Data base Systems, Connoley Pearson education.

**IV Year B.Tech. ECE I-Sem**

T	P	C
0	3	2

**MICROWAVE AND OPTICAL COMMUNICATIONS LAB**

**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.
9. Scattering parameters of Magic Tee.

**Part – B ( Any 5 Experiments ) :**

10. Characterization of LED.

**EBOOKS FOR JNTU SUBJECTS : WWW.BEEBOOKS.BLOGSPOT.COM**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

11. Characterization of Laser Diode.
12. Intensity modulation of Laser output through an optical fiber.
13. Measurement of Data rate for Digital Optical link.
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  $\mu$ A
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. Slotted 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)

<b>IV Year B.Tech. ECE I-Sem</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>0</b>	<b>3</b>	<b>2</b>

**DIGITAL SIGNAL PROCESSING LAB**

**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
6. N-point FFT algorithm.
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.

<b>IV Year B.Tech. ECE. II-Sem</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>4+1*</b>	<b>0</b>	<b>4</b>

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**OPTICAL COMMUNICATIONS**

**UNIT I**

Overview of optical fiber communication - Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers.

**UNIT II**

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. [2]. Fiber materials — Glass, Halide, Active glass, Chalcogenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

**UNIT III**

Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

**UNIT IV**

Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints,. Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Reliability of LED&ILD.

**UNIT V**

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

**UNIT VI**

Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photodetectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

**UNIT VII**

Optical system design — Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

**UNIT VIII**

Transmission distance, Line coding in Optical links, WDM, Necessity , Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

**TEXT BOOKS :**

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

**REFERENCES :**

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Edition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

**IV Year B.Tech. ECE-II-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**EMBEDDED AND REAL TIME SYSTEMS**

**EBOOKS FOR JNTU SUBJECTS : WWW.BEEBOOKS.BLOGSPOT.COM**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**(ELECTIVE – III)**

**UNIT I**

**INTRODUCTION** : Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

**UNIT II**

**GENERAL PURPOSE PROCESSORS** : Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

**UNIT III**

**STATE MACHINE AND CONCURRENT PROCESS MODELS** : Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

**UNIT IV**

**COMMUNICATION INTERFACE** : Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

**UNIT V**

**EMBEDDED / RTOS CONCEPTS – I** : Architecture of the Kernel, Tasks and Task scheduler, Interrupt service routines, Semaphores, Mutex.

**UNIT VI**

**EMBEDDED/RTOS CONCEPTS – II** : Mailboxes , Message Queues, Event Registers, Pipes, Signals

**UNIT VII**

**EMBEDDED / RTOS CONCEPTS – III** : Timers, Memory Management, Priority inversion problem, Embedded operating systems Embedded Linux, Real-time operating systems, RT Linux, Handheld operating systems, Windows CE.

**UNIT VIII**

**DESIGN TECHNOLOGY** : Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

**TEXT BOOKS :**

1. Embedded System Design – A Unified Hardware/Software Introduction - Frank Vahid, Tony D. Givargis, John Wiley, 2002.
2. Embedded / Real Time Systems – KVKK Prasad, Dreamtech Press, 2005.

**REFERENCES :**

1. Embedded Microcomputer Systems – Jonathan W. Valvano, Brooks / Cole, Thompson Learning.
2. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
3. Introduction to Embedded Systems – Raj Kamal, TMS, 2002.
4. Embedded Real Time Systems Programming – Sri Ram V Iyer, Pankaj Gupta, TMH, 2004.

**IV Year B.Tech. ECE.II-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**BIO-MEDICAL INSTRUMENTATION  
(ELECTIVE – III)**

**UNIT I**

**EBOOKS FOR JNTU SUBJECTS : WWW.BEEBOOKS.BLOGSPOT.COM**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

Components of Medical Instrumentation System. Bioamplifier. Static and dynamic characteristics of medical instruments. Biosignals and characteristics. Problems encountered with measurements from human beings.

**UNIT II**

Organisation of cell. Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuro-muscular junction.

**UNIT III**

Bio Electrodes – Biopotential Electrodes-External electrodes, Internal Electrodes. Biochemical Electrodes.

**UNIT IV**

Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart.

**UNIT V**

Cardiac Instrumentation Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

**UNIT VI**

Therapeutic equipment. Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine.

**UNIT VII**

Neuro-Muscular Instrumentation Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Interpretation of EEG and EMG.

**UNIT VIII**

Respiratory Instrumentation Mechanism of respiration, Spirometry, Pneumotachograph Ventilators.

**TEXT BOOKS :**

1. Biomedical Instrumentation and Measurements – Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Ed, 1980.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley, 3rd Ed., 1998.

**REFERENCES :**

1. Principles of Applied Biomedical Instrumentation – L.A. Geddes and L.E. Baker, John Wiley, 1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur, TMH, 2nd Ed., 2003.
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley, 1968.

**IV Year B.Tech. ECE.II-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**DIGITAL DESIGN THROUGH VERILOG  
(ELECTIVE – III)**

**UNIT I**

**INTRODUCTION TO VERILOG :** Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

**LANGUAGE CONSTRUCTS AND CONVENTIONS :** Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks, Exercises.

**UNIT II**

**GATE LEVEL MODELING :** Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip-

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits, Exercises.

**UNIT III**

**BEHAVIORAL MODELING** : Introduction, Operations and Assignments, Functional Bifurcation, *Initial* Construct, *Always* Construct, Examples, Assignments with Delays, *Wait* construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The case statement, Simulation Flow. *if* and *if-else* constructs, *assign-deassign* construct, *repeat* construct, *for* loop, the *disable* construct, *while* loop, *forever* loop, parallel blocks, *force-release* construct, Event.

**UNIT IV**

**MODELING AT DATA FLOW LEVEL** : Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

**SWITCH LEVEL MODELING.**

Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets, Exercises.

**UNIT V**

**SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES** : Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises,

**FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES** : Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines)

**UNIT VI**

**DIGITAL DESIGN WITH SM CHARTS** : State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

**UNIT VII**

**DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE**

**LOGIC DEVICES** : Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

**UNIT VIII**

**VERILOG MODELS** : Static RAM Memory, A simplified 486 Bus Model, Interfacing Memory to a Microprocessor Bus, UART Design, Design of Microcontroller CPU.

**TEST BOOKS :**

1. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, 2004 IEEE Press.
2. A Verilog Primer – J. Bhaskar, BSP, 2003.

**REFERENCES :**

1. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.
2. Digital Systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.
3. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.
4. Digital systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.

**IV Year B.Tech. ECE.II-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**WIRELESS COMMUNICATIONS AND NETWORKS  
(ELECTIVE – IV)**

**UNIT I**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION** : Introduction, FDMA, TDMA, Spread Spectrum, Multiple access, SDMA, Packet radio, Packet radio protocols, CSMA protocols, Reservation protocols

**UNIT II**

**INTRODUCTION TO WIRELESS NETWORKING** : Introduction, Difference between wireless and fixed telephone networks, Development of wireless networks, Traffic routing in wireless networks.

**UNIT III**

**WIRELESS DATA SERVICES** : CDPD, ARDIS, RMD, Common channel signaling, ISDN, BISDN and ATM, SS7, SS7 user part, signaling traffic in SS7.

**UNIT IV**

**MOBILE IP AND WIRELESS ACCESS PROTOCOL** : Mobile IP Operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, wireless transaction, Wireless datagram protocol.

**UNIT V**

**WIRELESS LAN TECHNOLOGY** : Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE 802 protocol Architecture, IEEE802 architecture and services, 802.11 medium access control, 802.11 physical layer.

**UNIT VI**

**BLUE TOOTH** : Overview, Radio specification, Base band specification, Links manager specification, Logical link control and adaptation protocol. Introduction to WLL Technology.

**UNIT VII**

**MOBILE DATA NETWORKS** : Introduction, Data oriented CDPD Network, GPRS and higher data rates, Short messaging service in GSM, Mobile application protocol.

**UNIT VIII**

**WIRELESS ATM & HIPER LAN** : Introduction, Wireless ATM, HIPERLAN, Adhoc Networking and WPAN.

**TEXT BOOKS :**

1. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, PHI, 2nd Edn., 2002.
2. Wireless Communication and Networking – William Stallings, PHI, 2003.

**REFERENCES :**

1. Wireless Digital Communications – Kamilo Feher, PHI, 1999.
2. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, Pearson Education, 2002.
3. Wireless Communications – Andreaws F. Molisch, Wiley India, 2006.
4. Introduction to Wireless and Mobile Systems – Dharma Prakash Agarwal, Qing-An Zeng, Thomson 2<sup>nd</sup> Edition, 2006.

**IV Year B.Tech. ECE.II-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**DSP PROCESSORS AND ARCHITECTURES  
(ELECTIVE – IV)**

**UNIT I**

**INTRODUCTION TO DIGITAL SIGNAL PROCESING** : Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation, Analysis and Design tool for DSP Systems MATLAB, DSP using MATLAB.

**UNIT II**

**EBOOKS FOR JNTU SUBJECTS : WWW.BEEBOOKS.BLOGSPOT.COM**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS** : Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

**UNIT III**

**ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES** : Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

**UNIT IV**

**EXECUTION CONTROL AND PIPELINING** : Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

**UNIT V**

**PROGRAMMABLE DIGITAL SIGNAL PROCESSORS** : Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

**UNIT VI**

**IMPLEMENTATIONS OF BASIC DSP ALGORITHMS** : The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

**UNIT VII**

**IMPLEMENTATION OF FFT ALGORITHMS** : An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

**UNIT VIII**

**INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES :**

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

**TEXT BOOKS :**

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

**REFERENCES :**

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar, TMH, 2004.
2. Digital Signal Processing – Jonatham Stein, John Wiley, 2005.

**IV Year B.Tech. ECE.II-Sem**

<b>T</b>	<b>P</b>	<b>C</b>
<b>4+1*</b>	<b>0</b>	<b>4</b>

**ARTIFICIAL NEURAL NETWORKS  
(ELECTIVE – IV)**

**UNIT I**

**INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS** : Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between Brain and the Computer, Comparison Between Artificial and Biological Neural Networks, Network Architecture, Setting the Weights, Activation Functions, Learning Methods.

**EBOOKS FOR JNTU SUBJECTS : [WWW.BEEBOOKS.BLOGSPOT.COM](http://WWW.BEEBOOKS.BLOGSPOT.COM)**

**VIGNAN'S LARA INSTITUTE OF TECHNOLOGY AND SCIENCE :  
VADLAMUDI**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
KAKINADA.**

**B. TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**UNIT II**

**FUNDAMENTAL MODELS OF ARTIFICIAL NEURAL NETWORKS** : Introduction, McCulloch – Pitts Neuron Model, Architecture, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Least Mean Square (LMS) rule, Competitive Learning Rule, Out Star Learning Rule, Boltzmann Learning, Memory Based Learning.

**UNIT III**

**FEED FORWARD NETWORKS** : Introduction, Single Layer Perceptron Architecture, Algorithm, Application Procedure, Perception Algorithm for Several Output Classes, Perceptron Convergence Theorem, Brief Introduction to Multilayer Perceptron networks, Back Propagation Network (BPN), Generalized Delta Learning Rule, Back Propagation rule, Architecture, Training Algorithm, Selection of Parameters, Learning in Back Propagation, Application Algorithm, Local Minima and Global Minima, Merits and Demerits of Back Propagation Network, Applications, Radial Basis Function Network (RBFN), Architecture, Training Algorithm for an RBFN with Fixed Centers.

**UNIT IV**

**ADALINE AND MADALINE NETWORKS** : Introduction, Adaline Architecture, Algorithm, Applications, Madaline, Architecture, MRI Algorithm, MRII Algorithm.

**UNIT V**

**COUNTER PROPAGATION NETWORKS** : Winner Take – all learning, out star learning, Kohonen Self organizing network, Grossberg layer Network, Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application Procedure, Forward Only counter Propagation Network, Architecture, Training Algorithm, Applications, Learning Vector Quantizer (LVQ).

**UNIT VI**

**ASSOCIATIVE MEMORY NETWORKS - I** : Types, Architecture, Continuous and Discrete Hopfield Networks, Energy Analysis, Storage and Retrieval Algorithms, Problems with Hopfield Networks.

**UNIT VII**

**ASSOCIATIVE MEMORY NETWORKS – II** : Boltzman Machine, Bidirectional Associative Memory, Adaptive Resonance Theory Networks Introduction, Architecture, Algorithm.

**UNIT VIII**

**APPLICATIONS OF NEURAL NETWORKS** : Implementation of A/D Converter using Hopfield Network, Solving Optimization Problems, Solving Simultaneous Linear Equation, Solving Traveling Salesman Problems using Hopfield Networks, Application in Pattern Recognition, Image Processing.

**TEXTBOOKS :**

1. Introduction to Artificial Neural Systems - J.M.Zurada, Jaico Publishers, 3rd Edition.
2. Introduction to Neural Networks Using MATLAB 6.0 - S.N. Shivanandam, S. Sumati, S. N. Deepa, TMH.

**REFERENCES :**

1. Elements of Artificial Neural Networks - Kishan Mehrotra, Chelkuri K. Mohan, and Sanjay Ranka, Penram International.
2. Artificial Neural Network – Simon Haykin, Pearson Education, 2nd Ed.
3. Fundamental of Neural Networks – Laurene Fausett, Pearson, 1st Ed.
4. Artificial Neural Networks - B. Yegnanarayana, PHI.