INDEX

Item | Page No.
---|---
UG Rules and Regulations |  
Detailed Syllabus |  
Annexure-I: List of Professional Science courses offered by ALL departments |  
Annexure-II: List of Liberal Learning courses offered at Institute level |  

List of Abbreviations

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Abbreviation</th>
<th>Stands for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BSC</td>
<td>Basic Science Course</td>
</tr>
<tr>
<td>2</td>
<td>PSC</td>
<td>Professional Science Course</td>
</tr>
<tr>
<td>3</td>
<td>PCC</td>
<td>Program Core Course</td>
</tr>
<tr>
<td>4</td>
<td>LC</td>
<td>Laboratory Course</td>
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<tr>
<td>5</td>
<td>HSSC</td>
<td>Humanities and Social Science Course</td>
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<td>6</td>
<td>MLC</td>
<td>Mandatory Learning Course</td>
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<td>8</td>
<td>LLC</td>
<td>Liberal Learning Course</td>
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## CURRICULUM STRUCTURE OF S. Y.-B.TECH (E & TC)

Effective from A. Y. 2012-2013

### I-Semester:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Course Type/ code</th>
<th>Subject Title</th>
<th>Contact hours</th>
<th>Credits</th>
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<td>01</td>
<td>BSC/</td>
<td>Engineering Mathematics-III</td>
<td>3 L 1 T -</td>
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<tr>
<td>02</td>
<td>PCC/ET 201</td>
<td>Electronics Devices &amp; Circuits</td>
<td>3 T - -</td>
<td>4</td>
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<tr>
<td>03</td>
<td>PCC/ET 202</td>
<td>Digital System Design</td>
<td>3 - - -</td>
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<tr>
<td>04</td>
<td>PCC/ET 203</td>
<td>Signals and Systems</td>
<td>3 - - -</td>
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<tr>
<td>05</td>
<td>PCC/ET 204</td>
<td>Network Synthesis and Analog Filters</td>
<td>3 - - -</td>
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<tr>
<td>06</td>
<td>LC/ET205</td>
<td>EDC Lab</td>
<td>- - 2 T</td>
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<tr>
<td>07</td>
<td>LC/ET206</td>
<td>DSD Lab</td>
<td>- - 2 T</td>
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<tr>
<td>08</td>
<td>LC/ET207</td>
<td>NSAF Lab</td>
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<td>09</td>
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<td>Professional Communication</td>
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<tr>
<td>02</td>
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<tr>
<td>03</td>
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<td>Micro –controllers and Applications</td>
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<td>4</td>
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<td>PCC/ET 210</td>
<td>Integrated Circuits and Applications</td>
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<td>Data Structures and Algorithms</td>
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<td>MC &amp; A Lab</td>
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<td><strong>Total</strong></td>
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<td><strong>19 1 8</strong></td>
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*': **Professional Science Course/s offered by E and TC department:**

1. Principles of Electronic Communication
2. Microcontroller based Systems
3. Probabilistic Systems in Engineering
ET 201  Electronic Devices and Circuits

Teaching Scheme:
Lectures: 3 hrs/week
Tutorial: 1 hr/week

Examination Scheme:
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam- 50

Objectives:
- To study fundamentals of Semiconductor materials used for Device fabrication with Physics perspective.
- To learn electrical properties, characteristics and behavior of basic solid state devices such as PN junction diode/BJT/MOSFET/JFET, supported by lab. practices.
- To develop analog applications in circuit design using device models, supported by lab. practices.

Unit 1  (7 hrs)

Semiconductor Physics: Conduction mechanism in extrinsic semiconductors, Carrier concentrations, Drift and diffusion mechanisms, Drift and diffusion current densities, Excess carriers, Recombination process, Mean carrier lifetime, Conductivity, Mobility, Mass action law, Einstein relationship, Semiconductor materials used in opto-electronic devices and Modern semiconductor devices and integrated circuits- GaAs, Si, Ge, GaAsP.

Unit 2  (7 hrs)

Semiconductor Diodes: Semiconductor p-n junction and Ohmic contacts, Depletion region, Barrier potential, Forward and reverse biased diode operation, V-I characteristic equation of diode, Volt equivalent of temperature, Temperature dependence of V-I characteristics, DC load line. Forward and reverse dynamic resistance, Small signal and large signal diode models. Ratings and specification of Diodes from data sheets, Diode Applications - Clippers, Clampers and Multipliers limitations and uses, brief overview of following types of diodes, their characteristics and applications–Switching, Power, Tunnel, Shockley, p-i-n.

Unit 3  (7 hrs)

Field Effect Transistors: An overview of different types of FETs viz. JFET, MOSFET, MESFET, Peculiarities of these types and their application areas, JFET: JFET construction, Symbol, Basic operation, V-I Characteristics, Transfer Characteristics (Shockley's Equation), Cut-off & Pinch-off voltages, Transconductance, Input resistance & Capacitance. Drain to Source resistance, Universal JFET bias curve. Biasing arrangements for JFET – Biasing against device variation, biasing for zero current drift. JFET as voltage controlled current source. Ratings and specifications of JFET from data sheet JFET Amplifiers: CS, CD, CG amplifiers, Their analysis using small signal JFET model.
Unit 4  (7 hrs)

**MOSFETs:** An overview of following MOSFET types - D-MOSFET, E-MOSFET in detail. D and E-MOSFET characteristics & parameters, non ideal voltage current characteristics viz. Finite output resistance, body effect, sub threshold conduction, breakdown effects and temperature effects. MOSFET Biasing. N-MOS, P-MOS and CMOS devices. Handling precautions for CMOS devices.

Unit 5  (7 hrs)

**Bipolar Junction Transistor:** Small signal low frequency h-parameter model. Other small signal models, Derivations for CE configuration for AI, Ri, Ro, Avs, AIS in terms of h-parameters, Comparison of performance parameters with CB and CC configurations. Need for multistage amplifiers and suitability of CE, CC and CB configurations in multistage amplifiers: cascade configuration, Large signal AF (power) BJT amplifiers: Block schematic of AF amplifier, Classes of power amplifiers – Class A, Class B, Class AB, An overview and applications of Class C and Class D amplifiers. Comparison of these configurations, Distortions in amplifiers, concept of Total Harmonic Distortion (THD), An overview of different types of BJTs – Small signal and large signal low frequency types, Switching/RF, Heterojunction types, Peculiarities of these types and their application areas.

Unit 6  (8 hrs)

**Frequency Response of BJT , FET Amplifiers and Feedback Amplifiers:** Concept of frequency response, Square wave testing of amplifiers, Miller’s theorem, Effect of coupling, bypass, junction and stray capacitances on frequency response for BJT and FET amplifiers. N stage cascade amplifier, Concept of GBW, (No derivations), High frequency, small signal BJT amplifiers: Behavior of transistor at high frequencies, Modified T equivalent circuit, High frequency hybrid CE amplifier model, CE short circuit current gains for T and hybrid CE models, Definitions and derivations for $f_u$, $f_b$ and $f_T$, Amplifier bandwidth taking into account source and load resistances.

**Feedback Amplifiers And Oscillators:** Classification of amplifiers based on feedback topology, (Voltage, Current, Transconductance and Transresistance amplifiers), Effect of negative feedback on various performance parameters of an amplifier, Analysis of one circuit for each Feedback topology.

**Text Books:**

**Reference Books:**
ET 202 Digital System Design

Teaching Scheme:
Lectures: 3 hrs/week

Examination Scheme:
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam - 50

Objectives:
1. To make students to analyze, design and evaluate digital circuits of medium complexity that are based on SSI, MSI and programmable logic devices.
2. To make students familiar with VHDL for modeling of digital systems: this includes necessary concepts of VHDL and different style of modeling.

Unit 1 (8 hrs)

Unit 2 (6 hrs)
Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple, Synchronous counters, Shift registers, State Diagram, State Table, Algorithmic State Machines charts.

Unit 3 (6hrs)
MSI devices like Comparators, Multiplexers, De-multiplexers, Encoder, Decoder, Driver & Multiplexed Display, ALU, Designing synchronous circuits like Pulse train generator, Pseudo Random Binary Sequence generator, Clock generation.

Unit 4 (8 hrs)
Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, MOS, CMOS families and their interfacing. Data sheets of IC74LS00, 74C00. Static & Dynamic RAM cell, ROM, PROM, EPROM, FLASH, Concept of PLDs like PAL, PLA, CPLDs, FPGA etc.

Unit 5 (10 hrs)
VLSI Design flow: Design entry-Schematic, FSM, HDL; Synthesis; Simulation, Overview of different modeling styles in VHDL, Data types and objects, Dataflow, Behavioral and Structural Modeling, VHDL constructs: Packages, Library, Configuration, Delays, Functions, Procedures, Attributes. Examples of VHDL codes for combinational and sequential.

Unit 6 (4 hrs)
Design for testability and estimation of digital system reliability: Testing, Bed-of-Nails
and in-circuit Testing, Scan Methods, failure rates, MTBF.

**Text Books:**

**Reference Books:**
ET 203 Signals and Systems

Teaching Scheme:
Lectures: 3 hrs/week

Examination Scheme:
100 marks: Assignments/Quiz - 20, Mid-Sem Exam - 30, End-Sem Exam - 50

Objectives:
1. To provide a comprehensive coverage of Signals and Systems.
2. To describe continuous time and discrete-time signals and systems, and proficiently use the various methods and approaches to solve problems with signals and systems prepared for upper-level courses in communication systems, control systems, and digital signal processing.

Review topics: (3 hrs)
Electrical Circuits as Systems, Revision of Basic Network Components and their properties, Mesh and Nodal Analysis, Kirchhoff’s Laws.

Unit 1 (4 hrs)
Introduction and Classification of Signals and Systems, Elementary Operations on Signals, Properties of System

Unit 2 (5 hrs)

Unit 3 (5 hrs)
Fourier Representation of the Signals: Signal Analysis - Discrete and Continuous, Periodic and Non-Periodic, and Synthesis In Fourier Domain, Properties of Fourier Representations, Application of Fourier Representations.

Unit 4 (5 hrs)

Unit 5 (5 hrs)
Unit 6  

(7 hrs)


Text Books:

Reference Books:
- D. Roy Choudhary, “Network Analysis & Synthesis”, Pearson Education.
ET 204  Network Synthesis and Analog Filters

Teaching Scheme:
Lectures : 3 hrs/week

Examination Scheme:
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam- 50

Objectives:
1. To make the students learn how to synthesize an electrical network from a given Impedance/admittance function.
2. To introduce the basic concepts in designing analog filters.

Review topics: (3 hrs)
Network Theorems (Superposition, Reciprocity, Thevenin’s, Norton’s, Maximum Power Transfer Theorem), Graph Theory.

Unit 1 (3 hrs)
Basic Resonance Concepts, Poles-Zeros For various Parameters in Resonance circuits.

Unit 2 (7 hrs)
Brief Over view of Attenuators, Two port parameters: Network functions, relationships between two port parameters, transfer function using two port parameters, interconnection of two-ports, incidental dissipation, and analysis of ladder networks.

Unit 3 (7 hrs)
Realizability theory and synthesis of one-port networks: Causality & stability, Hurwitz polynomials, positive real functions, elementary synthesis procedures, properties & synthesis of L-C, R-C, & R-L one-port circuits, synthesis of certain R-L-C functions.

Unit 4 (6 hrs)
Synthesis of two-port networks: Properties of transfer functions, zeros of transmission, synthesis of Y21 & Z21 with a 1 Ω termination, synthesis of constant resistance networks, Impedance and Frequency Denormalization to Required Values

Unit 5 (6 hrs)
Aspects of filter design problem, approximation problem in network theory, maximally flat low pass filter approximation (Butterworth), Chebyshev approximations.

Unit 6 (6 hrs)
Text Books:
- Franklin Kuo, “Network Analysis & Synthesis”, Wiley International.
- Govind Daryanani, “Analysis and Synthesis of Filters”.

Reference Books:
- Van Valkenberg, “Network Analysis”, Pearson Education.
ET 205  Electronic Devices and Circuits Laboratory

Teaching Scheme:  
Lectures : 2 hrs/week

Examination Scheme:  
100 marks: Practical - 50, 
   Term work - 50.

List of Practicals:

1. Study of different Diode Application Circuits - Clipping, Clamping Circuits.
2. Study of Multiplier Circuits, Regulation & Effect of frequency.
3. Input and Output Characteristics of JFET.  
   Study of \( V_p, g_m, V_{GS} \) (off), from characteristics.
4. Build and Test JFET CS amplifier.  
   Find performance parameters for JFET amplifier -- \( Av, Ri, Ro \) & Bandwidth
5. Input and Output Characteristics of BJT CE amplifier.  
   Find \( h \) parameters from characteristics. Evaluate & compare parameters w.r.t practical Amplifier.
6. Build and Test BJT in CE configuration.  
   Find performance parameters for BJT CE amplifier -- \( Av, Avs, A_i, Ri, Ro \).
7. Comparison of CE, CC, CB configurations for - \( Av, Ri, Ro \).
8. Study of Power Amplifiers - Class A, Class B efficiency calculations and comparison.
9. Frequency response -- For BJT and FET single stage amplifiers  
   Effect of unbypassed \( R_e \) and \( R_s \), effect of coupling and bypass capacitors.
10. Study of Feedback Amplifiers. (Compare performance of voltage shunt and current series circuit under no & full feedback conditions)
ET 206  Digital System Design Laboratory

Teaching Scheme:
Lectures : 2 hrs/week

Examination Scheme:
100 marks: Practical - 50,
Term work - 50.

List of Practicals:

1. Simplification and implementation of a Boolean function using k-map technique e.g. code converter.
2. Binary and BCD adders and Subtractors using gates and IC’s.
3. Comparator using IC 7485 and Parity generator and checker using X-OR gate.
4. Multiplexers, Encoders, Demultiplexers and decoders
5. Study of characteristics of typical TTL and CMOS IC’s like fan out, noise margin, propagation delay.
6. Counters
   a. Study of synchronous and asynchronous counter using JK FF ICs.
   b. Study of counter ICs like 7490/93 and 74192/193.
7. Design and implementations of non sequential counter using D FF or JK FF ICs
8. Study of shift registers IC 7495 for different modes. Design of pulse train generator using shift register and decoder circuit.
9. Study of timer circuits and clock generators using IC 74123 or equivalent and IC 7413 respectively.
10. Understanding VLSI Design flow using EDA tools.
11. Study of sample VHDL codes of a few above mentioned circuits.

**Writing VHDL codes of simple combinational and sequential circuits, Simulation and synthesis of the written codes using the EDA tool**
ET 207  Network Synthesis and Analog Filters Lab

Teaching Scheme:
Lectures : 2 hrs/week

Examination Scheme:
100 marks: Practical - 50,
Term work - 50.

List of Practicals:

1. Series Resonance and Parallel Resonance.
2. Two-port network parameters: determination of z, y & h-parameters
3. Characteristic impedance and propagation constant for symmetrical networks.
4. Filters-I: Low-pass & high-pass filter.
5. Filters-II: Band-pass & band-stop filter.
6. Attenuators: T-type & ladder type attenuators.
7. Generation of signals using MATLAB.
ET 208  Analog Communication Systems

Teaching Scheme:  
Lectures : 3 hrs/week  

Examination Scheme:  
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam- 50

Objectives:  
1. To obtain familiarity and gain knowledge about various analog communication techniques including different modulation schemes, time-domain and frequency domain multiplexing, noise analysis and information theory.

Unit 1  
Amplitude Modulation: Elements of electronic communication systems, Need for modulation, channel, noise, frequency spectrum, time and frequency domains, Review of Fourier analysis, Amplitude Modulation (AM), DSB-SC, SSB, VSB and ISB transmissions, mathematical Analysis, modulation index, frequency spectrum, power requirement of these systems, frequency division multiplexing.

Unit 2  
Angle Modulation: Frequency Modulation (FM), mathematical Analysis, modulation index, frequency spectrum, power requirement of FM, narrowband & wideband FM, noise triangle in FM, pre-emphasis and de-emphasis techniques, phase modulation, power contents of the carrier & the sidebands in angle modulation, noise reduction characteristics of angle modulation, generation of FM signals, comparison between AM & FM.

Unit 3  
Radio Receivers: Basic receiver (TRF), Super heterodyne receiver, performance parameters for receiver such as sensitivity, selectivity, fidelity, image frequency rejection etc., AM detectors, FM discriminators, AGC technique, double-spotting effect.

Unit 4  
Television Systems: Operating principles, composite video signal, blanking & synchronizing pulses, block schematic of TV transmitter & receiver, Color transmission & reception principles, TV standards such as CCIR-B, NTSC, PAL, SECAM

Unit 5  
Noise: Sources of noise, shot noise, thermal noise, noise calculations, equivalent noise bandwidth and noise figure of an amplifier, effective noise temperature, calculation of noise figure for cascaded stages.

Unit 6  

**Acoustics:** Introduction to acoustic transducers, microphone and loud speakers, construction, types, characteristics and applications, Block schematic of Public address system, High quality audio such as stereophonic, dolby, surround, 3-D etc.

**Text Books:**

**Reference Books:**
ET 209 Micro-controllers and Applications

Teaching Scheme:
Lectures: 3 hrs/week
Tutorial: 1 hr/week

Examination Scheme:
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam- 50

Objectives:
1. To make students familiar with the basic blocks of microprocessor and microcontroller device in general.
2. To provide comprehensive knowledge of the architecture, features and interfacing with peripherals of 8085 microprocessor and 8051 microcontroller.
3. To use assembly and high level languages to interface the microcontrollers to various applications.

Unit 1 (8 hrs)
8085 programming model, Addressing modes, Data transfer operations, Arithmetic operations, Logic operations, Branch operations, Assembly Language programming, 8085 Microprocessor architecture, Machine cycles and bus timings, Memory and I/O interfacing, Stack, Subroutine, Call and return instructions, Interrupts, Multiple interrupt and priorities, Restart as software instruction.

Unit 2 (8 hrs)
Programmable Interfacing devices, 8255A programmable Parallel interface, 8279 programmable Keyboard/Display interface, 8254 programmable Interval Timer, 8259A programmable Interrupt Controller, Direct Memory Access (DMA), 8237 DMA Controller, Serial I/O and Data communication, Standards in serial I/Os, The 8085-serial I/O lines, 8251A programmable communication interfacing.

Unit 3 (6 hrs)
8051 PROCESSOR ARCHITECTURE AND INSTRUCTION SET: The CPU, Addressing modes, external addressing, Interrupt handling, Instruction execution, Instruction set – data movement; arithmetic; bit operators; branch, Software development tools like assemblers; simulators; cross-compilers, O/P file formats.

Unit 4 (6 hrs)
PIC MICROCONTROLLERS AND INSTRUCTION SET: PIC Micro-controllers – overview; features, PIC 16c6x/7x – architecture, file selection register, Memory organization, Addressing modes, Instruction set, Interrupt handling.

Unit 5 (8 hrs)
PIC 16C6x/7x – Reset, low power operations, oscillator connections, I/O ports – serial; parallel, Timers, Interrupts, ADC.

**Unit 6**

*Interfacing & Microcontroller Applications:* LEDs, Push Buttons, Relays, Latch connections, Keyboard, Seven Segment and LCD displays interfacing, I2C bus operation, Serial EEPROM. Software development tools.

**Text Books:**

**Reference Books:**
- Technical references on [www.microchip.com](http://www.microchip.com)
ET 210 Integrated Circuits and Applications

Teaching Scheme:
Lectures : 3 hrs/week

Examination Scheme:
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam- 50

Objectives:
1. To make students to analyze, design and evaluate simple circuits like amplifiers using op-amps, waveform generating circuits.
2. To make students familiar with voltage regulators, ADC, DAC, PLL and multipliers.

Unit 1  (8 hrs)

Unit 2  (8 hrs)
Circuits with resistive feedback: Concept of feedback & their types, Inverting & non inverting configurations, current to voltage converters, voltage to current converters, summing amplifier, difference amplifier, instrumentation amplifier.

Unit 3  (8 hrs)
Non linear circuits: Voltage comparators, comparator applications, Schmitt triggers, precision rectifiers, analog switches, peak detectors, sample & hold circuits, Integrators & differentiators, log/antilog amplifiers.

Unit 4  (6 hrs)
Signal Generators: Sine wave generators, Multi vibrators, Monolithic timers, Triangular wave generators, Saw tooth generators, V to F and F to V converters, function generator.

Unit 5  (6 hrs)

Unit 6  (6 hrs)
Phase Locked Loops & multipliers: Block diagram of PLL free running frequency, lock range, capture range and Sample circuits for each block. Applications of PLL - Frequency synthesizer, FM demodulator, AM demodulator, FSK demodulator. Analog multiplier, Multiplier
IC.

**Text Books:**
- D.Roy Choudhary, Shail Jain, “Linear Integrated Circuits”, New Age Int.

**Reference Books:**
ET 211  DATA STRUCTURES AND ALGORITHMS

Teaching Scheme:
Lectures : 3 hrs/week

Examination Scheme:
100 marks: Assignments/Quiz -20, Mid-Sem Exam – 30, End-Sem Exam- 50

Objectives:
- Study the representation and use of primitive data types and built in data structures.
- Study how the data structures are allocated and used in memory.
- Study common applications of each of the data structures.
- Implement the user defined data structures in a high level language

Unit 1  
(4 hrs)

Introduction: Data, Data types, Object, Data Structure and Abstract Data types (ADT), Concept of Linear and Non-linear data Structures, Characteristics of an algorithm, analyzing programs, frequency count, Time and Space Complexity, Big 'O' and Ω' notation, best, average and worst cases. Arrays: Concept of Sequential Organization, arrays as ADT, Storage representation of array (row major and column major), Polynomial representation using arrays, Representation of sparse matrix, addition and transpose of sparse matrix, Time and space complexity analysis for simple and fast transpose for sparse matrix.

Unit 2  
(6hrs)

Stacks and Queues: Stack and Queue as ADT, Operations on stack and queue, circular queues, Application of stack for expression evaluation, expression conversion, and Recursion, Priority queue, Doubly Ended Queue, Multiple stacks and queues.

Unit 3  
(6hrs)

Linked Lists: Concept of linked organization, Singly linked list, doubly linked list, circular linked list, Operations on linked list Computation of length, traversal on linked list, Representation & manipulations of polynomials using linked lists, Generalized linked list (GLL), Representation of polynomial/ set using generalized linked list, Dynamic memory management: Garbage collection and Compaction, Strings: a case study.

Unit 4  
(8 hrs)

Trees & Graphs: Basic terminology, binary trees and its representation, binary tree traversals (recursive and non recursive), operations such as copy, equal on binary tree, binary tree representation of trees, Terminology and Representation of graphs using adjacency matrix, adjacency list, Traversals (Depth First and Breadth First), Connected components, spanning trees, Minimum spanning Trees, Kruskal's and Prim's algorithms for minimum spanning tree, Algorithm for shortest path (Single Source Shortest path), topological sorting.

Unit 5  
(6hrs)

Unit 6 (6 hrs)

Search: Importance of searching, Sequential, Binary Search, Sorting: Quick sort, merge sort, heap sort, shell sort, Radix sort, need of external sorting, Hashing: Hashing functions, chaining, overflow handling with and without chaining, open addressing: linear, quadratic probing, Files & Indexing: Sequential, linked and random organization of files, hashed indexes

Boot Process, boot sector, boot loaders, device driver initialization, Loading Linux services, Start up scripts, Loadable modules, Basic Commands, Understanding shells, Understanding shell variables, Understanding processes.

Text Books:

Reference Books:
ET 212  Analog Communication Systems Lab

Teaching Scheme:  Examination Scheme:
Lectures : 2 hrs/week  100 marks: Practical - 50,

Term work - 50.

List of Practicals:

1. Study of Fourier analysis & synthesis using hardware & software.
2. Study of DSB-FC Amplitude Modulation technique, modulation index measurements.
3. Study of DSB-SC and SSB AM techniques.
4. Study of FM generation techniques such as Varactor diode, reactance modulator, VCO.
5. Study of AM diode detector.
6. Study of FM detector such as slope detector, Foster-Seely Discriminator, Ratio detector.
7. Study of AM super-heterodyne receiver, observation of waveforms & measurement of voltages at various stages.
8. Standard tests on receiver such as sensitivity, selectivity and fidelity.
10. Study of spectrum analyzer for signals & communication system analysis.
ET 213 Micro-controllers and Applications Lab

Teaching Scheme:
Lectures: 2 hrs/week

Examination Scheme:
100 marks: Practical - 50,
Term work - 50.

List of Practicals:

Based on 8085 µP:

1. Arranging the array of numbers.
2. String operations.
3. Multiplication by shift & add.
4. 8255 operations in various modes with some typical applications such as key-pad / LED bank / seven segment interfacing.
5. 8251 for serial communication.

Based on 8051 and PIC micro-controller mini-cards/kits by downloading the binary file in flash memory:

6. Assignment exploiting the various addressing modes for accessing internal as well as external memory and unconditional/conditional branch, loop control instructions.
7. Stack and Stack arithmetic operations, Subroutines and parameter passing via register, stack.
8. Timers and its applications.
10. Interfacing -
    - Push buttons, LEDs.
    - Key matrix.
    - Seven Segment and LCDs.
    - ADC.
    - Stepper motors
ET 214  Integrated Circuits and Applications Lab

Teaching Scheme:  
Lectures : 2 hrs/week

Examination Scheme:  
100 marks: Practical - 50,  
Term work - 50.

List of Practicals:

3. Design build and test Precision rectifier.
4. Design, Build and Test a Square wave generator using op-amp.
5. Study of function generator IC8038.
6. Design, build and test different types DAC & study ADC IC.
7. To study the operation of IC 565 as PLL (Measurement of lock range, capture range & one application.
8. Study of Multiplier IC.
ET 215  DATA STRUCTURES AND ALGORITHMS LABORATORY

Teaching Scheme:  Examination Scheme:
Lectures : 2 hrs/week  100 marks: Practical - 50,  Term work - 50.

Suggested List of Assignments ( Any EIGHT assignments from following):

1. Introduction and Overview: Linux components, distributions, Obtaining free software from the Internet, Installing Linux - Organizing disk layout, Selecting an installation method, Making the boot disk, Disk portioning, Defining mount points, Installing the software.

2. Take a 6 x 6 sparse matrix and perform simple transpose, fast transpose and matrix addition, Write the analysis of it.

3. Consider a data structure of type node consisting of info (may consists of multiple data information) and link field. Using the same implement create, insert, delete and display operations of singly linked list.

4. Consider a stacked pile of plates which operates in LIFO manner. Implement functions like adding (Pushing), removing (Popping) a plate to & from the pile of plates respectively. Displaying all the plates in the stack at any point of time.

5. Consider a railway reservation queue which serves as FIFO manner. Implement functions like adding (Insert) and removing (Delete) a customer to and from the queue respectively. Displaying all the customers in the queue at any point of time.


7. Consider a data structure of type node consisting of info (may consists of multiple data information) and two link fields (left and right). Using the same implement create, insert, delete and display operations of the linked list. Implement two such doubly linked list. Sort them after creation using pointer manipulation. Merge these two lists into one list so that the merged list is in sorted order. (No new node should be created.).

8. Represent polynomial as a linked list and write a menu driven program to perform addition, multiplication and evaluation.

9. Implement stack as an ADT. Use this ADT to perform expression conversion and evaluation. (Infix – Postfix, Infix-Prefix, Prefix-Infix, Prefix-Postfix, Postfix-Infix, and Postfix-Prefix).

10. Consider an array of integers or strings and implement the Merge sort, Quick Sort, Heap sort algorithms, etc.
11. Create a record of 20 students with attributes roll no, name, CGPA, branch. Search for roll no of a particular student in the student database using Binary search technique.

12. Construction of binary tree and performing traversals recursively and non-recursively.

13. Construct a binary search tree. Find height of the tree and print leaf nodes. Find mirror image, print original and mirror image using level-wise printing.

14. Perform Depth First Search and Breadth First Search traversals on a graph represented as adjacency list.

15. Generate minimum spanning tree using Prim’s algorithm for a graph represented as adjacency list or matrix.

16. Perform simple indexing on the student database (consider appropriate attributes) being stored in the file.