DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

of

BACHELOR OF ENGINEERING

Computer science & Engineering

(Third Sem, Grading System)

(Session July- December 2017)

College of Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Bachelor of Engineering

Computer science & Engineering

List of Subject (Third Sem, Grading System)

Sub Code : MA220T **Sub Name :** Mathematics-III **4 Credits**

Unit I Functions of complex variables

Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for evaluation of real integrals.

Unit II Numerical Solution of Algebraic and Transcendental Equations

Errors & Approximations, Solution of Algebraic & Trancedental Equations (Regula Falsi , Newton-Raphson, Iterative, Secant Method), Solution of simultaneous linear equations by Gauss Elimination, Gauss Jordan, Crout's methods , Jacobi's and Gauss-Siedel Iterative methods

Unit III Interpolation, Numerical differentiation & Integration

Difference Operators, Interpolation (Newton Forward & Backward Formulae, Central Interpolation Formulae, Lagrange's and divided difference formulae), Numerical Differentiation and Numerical Integration.

Unit IV Functions of Complex Variables

Solution of Ordinary Differential Equations(Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method), Correlation and Regression, Curve Fitting (Method of Least Square).

Unit V Transformation

Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform. Z-transform .Testing of Hypothesis :Students t-test, Fisher's z-test, Chi-Square Method

References:

1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India.
2. B.S. Grewal: Higher Engineering Mathematics , Khanna Publication.
3. Engineering Mathematics By Samnta Pal and Bhutia, Oxford Publication
4. Ramana: Advance Engg. Mathematics, TMH New Delhi
5. Numerical Methods for Engineers by Steven C. Chapra, McGraw Hill Education
6. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
7. Numerical Methods By Shrimanta Pal, Oxford

Unit-1

Introduction to semiconductor physics: insulator, conductor, semiconductor and semiconductor types. Drift and diffusion carries, Hall Effects. **Review of PN junction diode**: PN junction diode in forward and reverse bias, temperature dependence of V-I characteristics, diode resistances, diode junction capacitance. Types of diodes: Zener Diode, Varactor Diode, Tunnel Diode, PIN Diode, Schottky Diode, LED and Photo Diodes, Switching characteristics of diode.

Unit-2

Bipolar junction transistor - Construction, basic operation, current components and equations, CB, CE and CC configuration, input and output characteristics, Early effect, Region of operations: active, cut-off and saturation region. BJT as an amplifier. Ebers-Moll model, Power dissipation in transistor ($P_{d,max}$ rating), Photo transistor. **Transistor biasing circuits and analysis:** Introduction, various biasing methods:Fixed bias,Self bias, Voltage Divider bias, Collector to base bias, Load-line analysis: DC and AC analysis, Operating Point and Bias Stabilization and Thermal Runaway. Transistor as a switch.

Unit-3

Small Signal analysis: Small signal Amplifier,Amplifier Bandwidth, Hybrid model, analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier, Boot-strapping Technique, Darlington amplifier and cas-code amplifier, Coupling methods in multistage amplifier, Low and high frequency response, Hybrid π model, Current Mirror circuits. **Large Signal analysis and Power Amplifiers:** Class A,Class B,Class AB,Class C,Class D, Transformer coupled and Push-Pull amplifier.

Unit-4

FET construction- JFET: Construction, n-channel and p-channel, transfer and drain characteristics, parameters, Equivalent model and voltage gain, analysis of FET in CG, CS and CD configuration. Enhancement and Depletion MOSFET drain and transfer Characteristics.

Unit-5

Uni-junction Transistor (UJT) and Thyristors:UJT: Principle of operation, characteristics, UJT relaxation oscillator, PNPN Diode and its characteristics, Silicon controlled rectifier: V-I characteristics, DIAC and TRIAC, Thyristors parameters and applications.

References:

1. Millman and Halkias: Integrated electronics, TMH.
2. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, Pearson Education.
3. Sedra and Smith: Microelectronics, Oxford Press.
4. Anil K. Maini, VarshaAgarwal: Electronic Devices and Circuits, Wiley Publications.
5. Rashid: Electronic Devices and Circuits, Cengage learning.
6. Salivahanan: Electronic Circuits Analysis and Design, TMH.
7. Kumar and Jain: Electronic Devices and Circuits, PHI.
8. David A. Bell Electronic Devices and Circuits Oxford University press.

PRACTICAL LIST:

1. To determine and analyze the V-I characteristics of PN Junction diode and Zener diode.
2. To determine input and output characteristics of transistor amplifiers in CE, CB &CC configurations.
3. To determine the frequency response of transistor CE amplifier, direct coupled and RC coupled amplifier.
4. To determine characteristics of UJT as relaxation Oscillator.
5. To determine Drain and Transfer Characteristics of JFET Amplifier.
6. To determine Drain and Transfer Characteristics of MOSFET Amplifier.
7. To determine characteristics of class A and B power amplifiers.
8. To determine characteristics of class C and AB power amplifiers.

Unit-1

Review of Logic gates and binary operations- AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR Implementations of Logic Functions using gates, NAND–NOR implementations – Multi level gate implementations- Multi output gate implementations. Introduction to number systems and binary operations. **Boolean postulates and laws** – De-Morgan's Theorem - Principle of Duality, Boolean function, Canonical and standard forms,Minimization of Boolean functions, Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS),Karnaugh map Minimization, Don't care conditions, Quine-McCluskey method of minimization.

Unit-2

Combinational logic circuits: Half adder – Full Adder – Half subtractor - Full subtractor– Parallel binary adder, parallel binary Subtractor – Fast Adder - Carry Look Ahead adder– Serial. Adder/Subtractor - BCD adder – Binary Multiplier – Binary Divider - Multiplexer/De-multiplexer – decoder - encoder – parity checker – parity generators –code converters - Magnitude Comparator.

Unit-3

Sequential logic circuits: Latches, Flip-flops - SR, JK, D, T, and Master-Slave, Characteristic table and equation–Application table – Edge triggering – Level Triggering – Realization of one flip flop using other flip flops – serial adder/subtractor.

Unit-4

Registers and Counters: Asynchronous Ripple or serial counter. Asynchronous Up/Down counter – Synchronous counters – Synchronous Up/Down counters – Programmable counters – Design of Synchronous counters: state diagram-State table –State minimization –State assignment - Excitation table and maps-Circuit. Implementation -Modulo–n counter, Registers – shift registers - Universal shift registers. Shift register counters – Ring counter – Shift counters - Sequence generators.

Unit-5

Logic Families: Introduction to different logic families and their characteristics ,RTL,DTL,TTL, ECL, IIL,TTL inverter – circuit description and operation, CMOS inverter – circuit description and operation, other TTL and CMOS gates, **Memories** – ROM - ROM organization - PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization Static RAM, Dynamic RAM, Programmable Logic Array (PLA) - Programmable Array Logic (PAL).

References:

1. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
2. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition,TMH, 2003.
3. Anil K. Maini, Digital electronics Principles and Integrated circuits Wiley India Pvt. Ltd.
4. Anand kumar- fundamental of digital circuit. 3rd edition.PHI.
5. John. F. Wakerly, Digital Design, Principles and Practices, Pearson Prentice Hall

Sub Code: CS222P **Sub Name:** Digital circuits & Design **1 Credits**

PRACTICAL LIST:

1. Signal sampling and reconstruction.
2. Generation and detection of amplitude modulation.
3. Generation and detection of Frequency modulation.
4. Pulse code modulation & Demodulation.
5. Delta modulation & Demodulation.
6. BFSK modulation & Demodulation.
7. BPSK modulation & Demodulation.
8. Time division multiplexing and Demultiplexing.
9. Line coading and decoading technique.
10. Ampitude shift keying (ASK). Frequency shift keying Technique (FSK), & Phase shift keying(PSK) using Matlab.

Unit1: Introduction –Common operations on data structures, Types of data structures, Data structures & Programming, Linear Data Structures - Sequential representations - Arrays and Lists, Stacks, Queues and Dequeues, strings, Application. Linear Data Structures, Link Representation - Linear linked lists, circularly linked lists. Doubly linked lists, application. Program Design, Complexities, Time Complexity, order of Growth, Asymptotic Notation.

Unit 2: Sorting –Need for sorting , Types of sorting algorithm-Stable sorting Algorithm, Internal & External sorting algorithm , Outline and offline algorithm ,Sorting Techniques-Insertion , Shell , Selection ,Merge ,Quick sort, Radix sort ,bucket sort .

Unit 3: Advanced Data Structures-Hash tables ,Heaps , Complexity , Analysis of Heap Operations , Application of Heap , AVL tress , Insertion & Deletion in AVL tree , Red Black Trees , Properties of Red Black trees ,Insertion & Deletion in Red Black tree .

Unit 4: Augmenting Data structures – Augmenting a red black trees, Retrieving an element with a given rank , Determining the rank of element ,Data structure Maintenance ,An augmentation strategy ,Interval Trees.

Unit 5: File structures- Basic file operations, File organization –Sequential file organization, Indexed sequential file organization, Direct file organization. External merge sort, Multiway Merge sort, Tournament Tree , Replacement Selection .

REFERENCES:

[1]. Horowitz and Sahani, “Fundamentals of data Structures”,University Press

[2]. Trembley and Sorenson , “Data Structures”, TMH Publications

[3]..A. M. Tenenbaum, “Data Structures using C & C++”, Pearson Pub

[4]. Venkatesan , Rose, “Data Structures” Wiley India Pvt.Ltd

[5]. Pai; Data structure and algorithm , TMH Publications

[6]. T.H.Coreman,”Introduction to algorithm”,PHI.

PRACTICAL LIST:

1. Algorithm to search ab element using Linear search.
2. Algorithm to search ab element using Binary search.
3. Algorithm Matrix multiplication.
4. Algorithm to sort array using quick sort.
5. Algorithm to implement Binary search.
6. Algorithm to implement Linked list.
7. Algorithm to implement Double Linked list.
8. Algorithm to implement Queue as Linked list.
9. Algorithm to implement Stack using Linked list.
10. Algorithm to implement Stack as Linked list.
11. Algorithm to convert an infix to postfix Expression.
12. Algorithm to evaluate postfix expression.
13. Algorithm to sort array using bubble sort.
14. Algorithm to sort array using Selection sort.
15. Algorithm to merge two sorted array.
16. Algorithm for tree traversal.

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Unit 1: Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction.

Unit 2: Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Unit 3: Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

Unit 4: Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs. Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices.

Unit 5: Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimonial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions.

References:

1. C.L.Liu, “Elements of Discrete Mathematics” Tata Mc Graw-Hill Edition.

2. Trembley, J.P & Manohar; “Discrete Mathematical Structure with Application CS”, McGraw Hill.

3. Kenneth H. Rosen, “Discrete Mathematics and its applications”, McGraw Hill.

4. Bisht, “Discrete Mathematics”,Oxford University Press

5. Biswal,”Discrete Mathematics & Graph Theory”, PHI

Unit-1
Introduction: Communication, definition and role of communication, Process of communication.

Unit-2
Importance of professional communication, Levels of communication, Types of communication, Challenges in communication.

Unit-3
Non –verbal communication – Body language, personal appearance, posture, gesture and hand movement, eye contact, facial expressions,

Unit-4
Paralinguistic features - proxemics, haptics, chronemics. Oral presentations.

Unit-5
Case studies on different case or topic.

References:

1. Business Communication, Mc Graw Hill Education, Matthukutty M. Monippally.
2. Effective Business Communication , Mc Graw Hill Education, Neera Jain, Shoma Mukherji.
3. Technical Communication , Cengage , P. Subba Rao, B. Anita Kumar, C. Hima Bindu.
4. Business Correspondence & Report Writing , Mc graw Hills. , R.C. Sharma & Krishna Mohan .
5. Technical Communication – Principles & Practice , Oxford , Meenakshi Raman.
6. Business Communication- Mc graw Hills , Peter Cordom.
7. Communication Skills , Oxford , Sanjay Kumar & Pushpa TMH.
8. Effective Technical Communication, M. Ashraf Rizvi ,Mc Graw Hill Education.

PRACTICAL LIST:

Language Lab II

Module 1 : Reading comprehension

Module 2 : Role plays

Module 3 : Debate

Module 4 : Group discussion

Module 5 : Resume writing

Module 6 : Interview skills

Module 7 : Body language

Module 8 : Oral presentations

Sub Code HU221P Sub Name: Idea Generation 2 Credits

The purpose of the subject Idea Generation student design business ideas and involve in coming up with many ideas in a group discussion, selecting the best idea or ideas, working to create a plan to implement the idea, and then actually taking that idea and putting it into practice. The idea can be tangible, something you can touch or see, or intangible, something symbolic or cultural. In this subject students figure out solutions to any number of difficult challenges faces by the industries or companies.

The purpose of the subject is students learn through subject expert in different areas and fields. Expert understands how student learn. Experts are skilled instructional designers and are able to create interaction-rich learning experiences that support a given outcome. In the corporate world, a learning expert should also have an understanding of the business needs of a given learning experience and design it in a way that supports those needs. Students benefit from the expert to create a good critical thinking related to the subjects as well as business needs.

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of

BACHELOR OF ENGINEERING

Computer science & Engineering

(Fourth Sem, Grading System)

(Session July- December 2017)

College of Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Bachelor of Engineering

Computer science & Engineering

List of Subject (Fourth Sem , Grading System)

Sub Code : CS225 Sub Name : Computer system organization 4 Credits

Unit 1:Basic Structure of Computer: Structure of Desktop Computers, CPU: General Register Organization- Memory Register, Instruction Register, Control Word, Stack Organization, Instruction Format, ALU, I/O System, bus,CPU and Memory Program Counter, Bus Structure, Register Transfer Language- Bus and Memory Transfer, addressing modes.

Unit 2: Control Unit Organization: Basic Concept of Instruction, Instruction Types, Micro Instruction Formats, Fetch and Execution cycle, Hardwired control unit, Micro-programmed Control unit- microprogram sequencer Control Memory, Sequencing and Execution of Micro Instruction.

Unit 3:Computer Arithmetic: Addition and Subtraction, Tools Compliment Representation, Signed Addition and Subtraction, Multiplication and division, Booths Algorithm, Division Operation, Floating Point Arithmetic Operation. design of Arithmetic unit

Unit 4: I/O Organization: I/O Interface – PCI Bus, SCSI Bus, USB, Data Transfer: Serial, Parallel, Synchronous, Asynchronous Modes of Data Transfer, Direct Memory Access (DMA), I/O Processor.

Unit 5: Memory Organization: Main memory- RAM, ROM, Secondary Memory – Magnetic Tape, Disk, Optical Storage, Cache Memory: Cache Structure and Design, Mapping Scheme, Replacement Algorithm, Improving Cache Performance, Virtual Memory, memory management hardware

Unit 6: Multiprocessors: Characteristics of Multiprocessor, Structure of Multiprocessor- Inter-processor Arbitration, Inter-Processor Communication and Synchronization. Memory in Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing, RISC And CISC, Study of Multicore Processor – Intel, AMD.

References:

1. Morris Mano , "Computer System Organization " PHI

2. Alan Clements: "Computer Organization and Architecture", Cengage Learning

3. Subrata Ghosal: "Computer Architecture and Organization", Pearson

4. William stalling ,"Computer Architecture and Organization" PHI

5. M. Usha, T.S. Shrikant: "Computer System Architecture and Organization", Willey India

6. Chaudhuri, P.Pal: "Computer Organization and Design", PHI

7. Sarangi: "Computer Organization and Architecture",Mc- Graw Hills

Practical List:

1) Study of Multiplexer and Demultiplexer

2. Study of Half Adder and Subtractor

3. Study of Full Adder and Subtractor

4. WAP to add two 8 bit numbers and store the result at memory location 2000

5. WAP to multiply two 8 bit numbers stored at memory location 2000 and 2001 and stores the result at memory location 2000 and 2001.

6) WAP to add two 16-bit numbers. Store the result at memory address starting from 2000.
7)WAP which tests if any bit is '0' in a data byte specified at an address 2000. If it is so, 00 would be stored at address 2001 and if not so then FF should be stored at the same address.

8) Assume that 3 bytes of data are stored at consecutive memory addresses of the data memory starting at 2000. Write a program which loads register C with (2000), i.e. with data contained at memory address 2000, D with (2001), E with (2002) and A with (2001).

9) Sixteen bytes of data are specified at consecutive data-memory locations starting at 2000. Write a program which increments the value of all sixteen bytes by 01.

10) WAP to add t 10 bytes stored at memory location starting from 3000. Store the result at memory location 300A.

Unit-1: signal analysis .The students familiarize with various techniques for amplitude modulation and demodulation of analog signals Signal Analysis: Time domain and frequency domain representation of signal, Fourier Transform and its properties, Transform of Gate, Periodic gate, Impulse periodic impulse sine and cosine wave, Concept of energy density and power, Power density of periodic.

Unit 2: Amplitude Modulation: Introduction of modulations techniques and its applications, Amplitude modulation, Equation and its frequency domain representation, Bandwidth, Power distribution. AM suppressed carrier waveform equation and frequency domain representation Generation (Balance/Chopper modulator) and synchronous detection technique, errors in synchronous detection. Introduction to SSB and VSB.

Unit 3:Angle Modulation Modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Bandwidth comparison of modulation techniques.

Unit 4:Signal Sampling & Analog Pulse Communication Sampling of signal, sampling theorem for low pass and Band pass signal, PAM, TDM. Channel Bandwidth for PAM-TDM signal, Type of sampling instantaneous (Natural and Flat Top), Aperture effect, PPM, PDM.

Unit 5:Digital Communication Digital signal Quantization, Quantization error, PCM, S/N Ratio, Companding, Data Rate, Baud Rate, Bit Rate, Multiplexed PCM signal, DPCM), DM, ADM). Digital modulations techniques, ASK, BPSK, DPSK, offset and non-offset QPSK, M-Ary PSK, BFSK, M-Ary FSK, QAM).

References:

1. Singh & Sapre, Communication System, TMH

2. B.P. Lathi & Zhi Ding, Modern Digital and Analog Communication System, 4rth Edition, Oxford University Press.

3. Taub & Shilling, Communication System, TMH

4. George Kennedy & Davis, Electronic Communication System, 4rth Edition, TMH.

5. Abhay Gandhi, Analog & Digital Communication: Theory & Lab Work, Cengage Learning, India.

Practical List:

1. Study of sampling process and signal reconstruction and aliasing.
2. Study of PAM PPM and PDM
3. Study of PCM transmitter and receiver.
4. Time division multiplexing (TDM) and De multiplexing
5. Study of ASK PSK and FSK transmitter and receiver.

UNIT 1: Automata: Basic machine, FSM , Transition graph, Transition matrix, Deterministic and nondeterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata. Regular Sets and Regular Grammars: Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Myhill- Nerode theorem Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT 2: Context –Free Grammars: Introduction to CFG, Regular Grammars, Derivation trees and Ambiguity, Simplification of Context free grammars, Normal Forms (Chomsky Normal Form and Greibach Normal forms).

UNIT 3: Pushdown Automata: Definition of PDA, Deterministic Pushdown Automata, PDA corresponding to given CFG, CFG corresponding to a given PDA. Context Free Languages: The pumping lemma for CFL's, Closure properties of CFL's, Decision problems involving CFL's.

UNIT 4: Turing Machines: Introduction, TM model, representation and languages acceptability of TM Design of TM,Universal TM & Other modification, Church's hypothesis, composite & iterated TM. Turing machine as enumerators.Properties of recursive & recursively enumerable languages,Universal Turing machine

UNIT 5: Tractable and Untractable Problems: P, NP, NP complete and NP hard problems, examples of these problems like satisfy ability problems, vertex cover problem, Hamiltonian path problem, traveling sales man problem, Partition problem etc.

References:

1. John E. Hopcroft, Jeffery Ullman,"Introduction to Automata theory, Langauges & computation" , Narosa Publishers.
2. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning
3. Michael Sipsev,"Theory of Computation",Cenage Learning
4. John C Martin, "Introdution to languages and theory of computation", McGraw Hill
5. Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India.
6. Kohavi,"Switching & Finite Automata Theory",TMH

Sub Code : CS-228 T **Sub Name : Analysis & Design of algorithm** **3Credits**

Unit 1: Algorithms, Designing algorithms, analyzing algorithms, asymptotic notations, heap and heap sort. Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, merge sort, quick sort, strassen's matrix multiplication.

Unit 2: Study of Greedy strategy, examples of greedy method like optimal merge patterns, Huffman coding, minimum spanning trees, knapsack problem, job sequencing with deadlines, single source shortest path algorithm

Unit 3: Concept of dynamic programming, problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc.

Unit 4: Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms.

Unit 5: Binary search trees, height balanced trees, 2-3 trees, B-trees, basic search and traversal techniques for trees and graphs (In order, preorder, postorder, DFS, BFS), NP-completeness.

References:

1. Coremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. Michael T Goodrich, Robarto Tamassia, Algorithm Design, Wiely India

Practical List:

1. Write a program for Iterative and Recursive Binary Search.
2. Write a program for Merge Sort.
3. Write a program for Quick Sort.
4. Write a program for Strassen's Matrix Multiplication.
5. Write a program for optimal merge patterns.
6. Write a program for Huffman coding.
7. Write a program for minimum spanning trees using Kruskal's algorithm.
8. Write a program for minimum spanning trees using Prim's algorithm.
9. Write a program for single sources shortest path algorithm.
10. Write a program for Floye-Warshal algorithm.
11. Write a program for traveling salesman problem.
12. Write a program for Hamiltonian cycle problem.

Unit-1

Atomic structure, molecules and general bonding principles, crystal system and structure, Miller indices, Bravais lattice, Bragg's law, crystal structure for metallic elements, structural imperfections, dielectric parameters, polarsation, static dielectric constant of solids, ferroelectric materials, piezoelectricity, compex dielectric constant, dipolar relaxation, Debye equation , dielectric loss, insulating materials and their properties, composite materials

Unit-2

Magnetism: fundamental concepts pertaining to magnetic fields, magnetic dipole movement of current loops, orbital magnetic dipole movement and angular momentum of simple atomic model, classification of magnetic materials, spin magnetic moment, paramagnetism, ferromagnetism, spontaneous magnetization and Curie-Weiss law, ferromagnetic domains, magnetic anisotropy, magnetostriction, antiferromagnetism, ferrites and its applications, magnetic resonance

Unit-3

Conductors: introduction, atomic interpretation of Ohm's law, relaxation time, collision time, mean free path , electron scattering, resistivity of metals, Linde's rule, Joule's law, thermal conductivity of metals, high conductivity materials, high resistivity materials, solder and electrical contact materials, carbon brushes, fuses, superconductivity-The free electron model, thermodynamics and properties of superconductors, meissner effect, classification of superconductors

Unit-4

Semiconductors: chemical bonds in Ge and Si, carrier density, extrinsic semiconductor, n-type , p-type semiconductor, Hall effect, mechanism of current flow, drift current, diffusion current, Einstein relation, materials for fabrication of semiconductor devices, fabrication technology, continuity equation, capacitance of junction barrier, junction transistors, thermistor, variastors

Unit-5

Optical properties of materials: introduction, electromagnetic radiation spectrum, refractive index, reflection, Birefringence, Translucency, colour centres, dispersion, absorption, excitons, photoelectric emission, electroluminescence , photoconductivity, photoelectric cells, lasers, ruby lasers, Nd-YAG laser, carbon dioxide laser, optical fibres, fibre materials, mechanism of refractive index variations, fabrication of fibre, fibre cables, solar cell, fuel cell, MHD generators.

References:

1. Banerjee-Electrical & Electronics Material,PHI.
2. S. O. Kasap-Priniciple of Electronics Material &Device,TMH.
3. Jones- Material Science for Electrical & Electronics Enginnering,Oxford.
4. V.Raghvan Material science&engineering,PHI.
5. J.Allison ElectronicsEnginnering, Material &Device,TMH.
6. Gilmore: Material Science, Cengage Learnings.
7. Gupta & Gupta Advance Electrical & Electronics Material,Wieley India.
8. James F.Shackelford-Introduction Material Science for Enginnering Pearson.
9. V.Rajendran - Material science,TMH.

Sub Code ES221T	Sub Name: System Engineering	4Credits

Unit-1

What is System Engineering, Origin, Examples of Systems requiring systems engineering, Systems Engineer Career Development Model, Perspectives of Syst
ems Engineering, Systems Domains, Systems Engineering Fields, System Engineering Approaches.

Unit-2

Structure of Complex Systems, System Building Blocks and Interfaces, Hierarchy of Complex Systems, System Building Blocks, The System Environment, Interfaces and Interactions, Complexity in Modern Systems.

Unit-3

Concept Development and Exploration, Originating a New System, Operations Analysis, Functional Analysis, Feasibility, System Operational Requirements, Implementation of Concept Exploration.

Unit-4

Engineering Development, Reducing Program Risks, Requirements Analysis, Functional Analysis and Design, Prototype Development as a Risk Mitigation Technique, Development Testing, Risk Reduction.

Unit-5

Integration and Evaluation, Integrating, Testing, And Evaluating The Total System, Test Planning And Preparation, System Integration, Developmental System Testing, Operational Test And Evaluation, Engineering For Production, Transition From Development To Production, Production Operations.

References:

1. Alexander Kossiakoff, William N Sweet, "System Engineering Principles and Practice, Wiley India
2. Blanchard Fabrycky, Systems engineering and analysis, Pearson
3. Dennis M. Buede, William D.Miller, "The Engineering Design of Systems: Models & Methods" Wiley India
4. Jeffrey L Whitten, Lonnie D Bentley, "System Analysis and Design Methods"
5. Richard Stevens, Peter Brook," System Engineering – Coping with complexity, Prentice Hall

Sub Code: HU223P	Sub Name: NSS/NCC	0 Credits

Objective of NSS/NCC:

Objective of NSS/NCC is to improve the Helping Nature in Social/ Develop Skills, Respect to each other, Communication and Convincing/ Understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on Qualifier

Programming System (a)(Java)

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector.

Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of aThread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI,Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming,Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives,

Multimedia: Applets and Application: Loading, Displaying and ScalingImages, Animating a Series of Images, Loading and playing Audio clips Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. E. Balaguruswamy, “Programming In Java”; TMH Publications

2. The Complete Reference: Herbert Schildt, TMH

3. Deitel & Deitel, ”JAVA, How to Program”; PHI, Pearson.

4. Cay Horstmann, Big JAVA, Wiley India.

5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall

List of Program :

1. Installation of J2SDK

2. Write a program to show Scope of Variables

3. Write a program to show Concept of CLASS in JAVA

4. Write a program to show Type Casting in JAVA

5. Write a program to show How Exception Handling is in JAVA

6. Write a Program to show Inheritance

7. Write a program to show Polymorphism

8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA

9. Write a program to show use and Advantages of CONTRUCTOR

10. Write a program to show Interfacing between two classes

11. Write a program to Add a Class to a Package

12. Write a program to show Life Cycle of a Thread

13. Write a program to demonstrate AWT.

14. Write a program to Hide a Class

15. Write a Program to show Data Base Connectivity Using JAVA

16. Write a Program to show "HELLO JAVA " in Explorer using Applet

17. Write a Program to show Connectivity using JDBC

18. Write a program to demonstrate multithreading using Java.

19. Write a program to demonstrate applet life cycle.

20. Write a program to demonstrate concept of servlet.

Programming System (b)(.NET)

Introduction .NET framework, features of .Net framework, architecture and component of .Net elements of .Net.Basic Features Of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, OperatorOverloading, Structures. Advanced Features Of C# Interfaces, Arrays, Indexers andCollections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, class library,overview of ASP.net control, understanding HTML controls, study of standard controls, validationscontrols, rich controls

Windows Forms: All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls Understanding and handling controls events, ADO.NET- Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader Data base controls:

Overview of data access data control, using grid view controls, using details view and frame viewcontrols, ado .net data readers, SQL data source control, object data source control, site map data source.

XML: Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. xml data source, using navigation controls, introduction of web parts, using java script, Web Services

References:

1. C# for Programmers by Harvey Deitel, Paul Deitel, Pearson Education

2. Balagurusamy; Programming in C#; TMH

3. Web Commerce Technology Handbook by Daniel Minoli, Emma Minoli , TMH

4. Web Programming by Chris Bates, Wiley

5. Alex Mackey, " Introduction.NET 4.5 ", Wiley India

6. ASP .Net Complete Reference by McDonald, TMH.

7. ADO .Net Complete Reference by Odey, TMH

List of programs (Expandable):

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:
9. Using the System .Net Web Client to Retrieve or Upload Data with C#
10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#
11. Working with Page using ASP .Net.
12. Working with Forms using ASP .Net
13. Data Sources access through ADO.Net,
14. Working with Data readers , Transactions
15. Creating Web Application.

Programming System (c) MATLAB

MATLAB: An Overview, Brief history of MATLAB, About MATLAB, Installation of MATLAB, Helpbrowser, Arranging the desktop, Basic functions of Matlab, Mostly used symbols in MATLAB,debugging in Matlab; Building MATLAB expressions: MATLAB datatype, command handling,MATLAB basics.

MATLAB Vector and Matrix: Scalar and vector, elementary features in a vector array, matrices, eigen values and eigen vectors, matrix operations, matrix operators, creating matrix arrangement, indexing array value, other operations, mathematical operations on array, array types

Graphics in MATLAB: 2D plots, parametric plots, contour lines and implicit plots, field plots, multiple graphics display function, 3D plots, multivariate data, data analysis.

MATLAB programming introduction to M-files, MATLAB editors, M files, scripts, functions, MATLAB error and correction, MATLAB debugger; Digital Image Processing with MATLAB (Image Processing).MATLAB in neural networks: About neural networks, Human and artificial neuron, Architecture of neural networks (feed-forward, feedback, network layers), The McCuulloch- Pitts Model of Neuron, The Perceptron, Transfer function, neural network toolbox, Actual model, applications of neural network.

REFERENCES:

1.S. Swapna Kumar, S V B Lenina: MATLAB – Easy way of learning, PHI Learning, 2016

2.Amos Gilat ," An Introduction with Applications ,4ed " , wiley India