B.TECH. 4 YEAR PROGRAMME

COMPUTER SCIENCE & ENGINEERING

SYLLABUS 2019-20
(1st, 2nd,3rd, 4th, 5th & 6thSemester)

Detailed Syllabus for B.Tech. CSE

B.Tech. –CSE (First Semester)

MTH 101 Engineering Mathematics I

Calculus of Functions of One Variable: Linear and Quadratic approximations, Error estimates, Taylor's Theorem, Infinite series, Tests of convergence, Absolute and Conditional convergence, Taylor and Maclaurin series.
Calculus of Functions of Several Variables: Partial derivatives, Chain rules, Implicit differentiation, Gradient, Directional derivatives, Total differential, Tangent planes and Normal's, Maxima, Minima and Saddle points, Constrained maxima and minima, Curve sketching, Geometric applications of Integrals, Double Integrals, Applications to areas and volumes, Change of variables.
Ordinary Differential Equation: Differential Equation of First Order and Higher Degree, Linear Differential Equation. with Constant Coefficient of Higher Order, Cauchy's Differential Equation, Method of Variation of Parameter, Simultaneous Differential Equation.
Graph Theory: Introduction, terminology, representation, isomorphism, connectivity, Wars hall's algorithm, Euler and Hamilton path, and shortest path tree.

REFERENCES:

1. Higher Engineering Mathematics : - B.S. Grewal
2. Advanced Engineering Mathematics : - H.K. Das
3. Differential calculus :- Schaum's series
4. Graph Theory with Applications :- Narsingh Dev
5. Higher Engineering Mathematics : - B. V. Ramana

PHY 101 Engineering Physics-I

Part A:

Electrostatic: Coulomb's Law, Electric field & electrostatic potential, Work and Energy in electrostatic field, Gauss law & its applications, Curl of E, Laplace's and Poisson's equations, Dipoles & multipoles, Force and torque on dipoles, Polarization, Bound charges & electric displacement.

Magnetostatics: Electric Current, Magnetic field & Current density, Ampere's law & its applications, Biot-Savart law, Curl and divergence of **B,** Magnetic dipoles, Magnetization, Magnetic susceptibility, Ferro-, para- and dia- magnetism, Faraday's law, Energy in magnetic field.

Electrodynamics: Lorentz force, Maxwell's equations. Poynting theorem, Electromagnetic potentials, Electromagnetic (EM) waves & their propagation in different media.

Part B:
Introduction to quantum mechanics, Planck"s theory, Thermal radiation (Black bodies, Stefen Boltzmann etc), Photoelectric effect, Compton effect, Dual nature of EM radiation, matter waves, de Broglie waves, wave-particle duality, Uncertainty principle, Heisenberg

microscope, Properties of matter (phase and group velocity). Schrodinger equation, probabilistic interpretation of wave function, admissibility conditions for wave function. One dimensional problems: particle in a box, potential well, potential barrier and quantum tunneling. Periodic potential in one dimension.

REFERENCES:

1. INTRODUCTION TO ELECTRODYNAMICS: D.J. GRIFFITHS
2. APPLIED ELECTRODYNAMICS THEORY:
   ANALYSIS, PROBLEMS AND APPLICATIONS: NAIR AND DEEPA
3. QUANTUM PHYSICS: EISBERG & RESNICK
4. CONCEPT OF MODERN PHYSICS: BEISER

CS 101 Fundamentals of Computer Programming

Concept of Programming Languages, A quick overview of OS-Windows/Linux, Writing, compiling and running the program on Linux/Windows, The Compiler, Program Builder, Debugging: types of errors and debugging techniques, Problem solving aspects, Introduction to Algorithms and flow charts, C programming Data structures , Variables, Variables names, I/O, The standard Input/output file, Formatted inputs/Output, Expressions and Operators, connectors, control statements, Functions: Scope of Function variable, Modifying function arguments, Pointers, Array, String, Structures and Unions, file handling, File redirection, file pointers, advantages of using multi files, Organization of data in each file, compiling multi-file programs, The Preprocessor, Library Functions and Low level programming.

Textbooks:

1. Balgurusamy,Programming in ANSI C,Mc Graw Hi11,2015
2. Rajaraman V.,COMPUTER PROGRAMMING IN C,Printice Hall of India, 2004.
3. The C Programming language, Kernigham & Ritchie
4. Herbert Schildt,C: The Complete Reference,Mc Graw Hill, 2004

EE 101 Fundamentals of Electrical & Electronics

D.C. Circuits and AC Fundamentals:
Ohm's law, Kirchoff's laws, Nodal Analysis, Mesh Analysis, Superposition Theorem, Source Transformations, Thevnin"s and Norton's Theorems, star/delta transformation, maximum power transfer theorem, transients.

A.C. Fundamentals: Single phase EMF generation, average and effective values of sinusoids, Solution of series and Parallel Circuits, power and power factor, Resonance in series and parallel circuits, steady state analysis for sinusoidal excitation: Sinusoids, Three phase connections: star and delta.

Magnetic Circuit:
Mmf, Magnetising force, Magnetic flux and flux density, permeability, Reluctance and permeance, B-H curve, Simple magnetic circuits, Hysteresis and eddy current loss.

Transformer:
Single-phase transformer Construction, principle of operation, EMF equation, phasor diagram on no-load and full-load, losses and efficiency, open and short circuit test, auto transformer.

D. C. Machines:
D. C. Generator: Construction, EMF equation, various types and characteristics
D. C. Motor: Principle, torque and speed formula, types and their characteristics, Speed control

Semiconductor Diode and BJT
Semiconductor Diode and its V-1 characteristics, Rectifier circuit, Various types of diodes, Zener diode, PIN Diode, Light emitting diode, gun diode ,Working principle, Transistors in CC, CE, and CB configurations, transistor biasing, V-I characteristics and load line concept with Quiescent point, Transistor H-parameter.

Textbooks:

1. Toro, Del V., Electrical Engineering Fundamentals, Printice Hall of India, 1994.
2. Millman, Jacob and Halkias, Christos C., Integrated Electronics: Analog and Digital Circuits and Systems, Mc Graw Hill, 2004
3. Boylestad, Robert L., and Nashelsky, Louis, Electronics Device and Circuit Theory, Ninth Edition, Printice Hall of India, 2005

HUM 101 Effective Communication and soft skills

Concept of communication, communication cycle, barriers of communication, verbal v/s non-verbal communication, 7 Cs of Communication, Concept of word formation, introduction to colloquial language, Common Errors in Writing**,** Writing Practices: Reading and comprehension, Summary Writing, Business Letter Writing (Inquiry, Complaint)**,** Critical thinking and analysis, Technical writing (definition and description), Listening Comprehension: Pronunciation Intonation Stress and Rhythm, Public speaking; Non-verbal aspects of speaking: Accent, Pronunciation, Intonation etc, Preparation of Curriculum Vitae/Resume; Interviews; Essentials of Group Discussions /Presentation.

IT 101 Engineering Workshop

E1: Study of Cathode Ray Oscilloscope (CRO) – Measuring Voltage and Current
E2: Study of Function Generator – Configure Output for Varying Signals
E3: Study of Digital Multi-Meter – AC/DC Voltage, Current, Resistance, Parameters of Diode & Transistor
E4: Study of Programmable DC Power Supply – Ripple and Noise, Setting Resolution and Accuracy
E5: Introduction and identification of basic electronic components.
E6: Calculation and verification of equivalent resistance using bread board and multi-meter.
E7: Calculation and verification of equivalent capacitance using bread board and multi-meter.
E8: Testing of pn junction diode and LED using multimeter.
E9: Testing of pnp and npn transistor using multimeter.
E10: Design and construction of half wave and full wave rectifiers.

Detailed Syllabus for B.Tech. CSE

B.Tech. –CSE (Second Semester)

MTH 102 Engineering Mathematics II

Linear Algebra: Review of Matrices Algebra, Solution of Matrices Equation, Row reduced Echelon form,Vector spaces, subspaces, basis, Orthogonal basis, Gram-Schmidt, orthogonalization, Linear Operators, Matrix representation, Rank, Solution of Linear equations using matrices (invertibility, null space etc.), Eigenvalues, eigenvectors.

Complex Analysis: Functions of a Complex Variable, Analytical functions, Cauchy-Reimann equations, Elementary functions, Contour integrals, Cauchy's Theorem, Residue Theorem, Power series, Taylor and Laurent series, zeros, poles, essential singularities, evaluation of integrals.

Vector Calculus: Vector fields, Divergence and Curl, Line Integrals, Green's Theorem, Surface Integrals, Divergence Theorem, Stoke's Theorem and applications.

Partial Differential Equation: Linear & Non-Linear P.D.E of First Order, Homogeneous & Non-Homogeneous Linear P.D.E with constant coefficient of Higher Order, Separation of Variables.

REFERENCES:

1. Higher Engineering Mathematics : - B.S. Grewal
2. Advanced Engineering Mathematics : - H.K. Das
3. Linear Algebra :- Schaum’s series
4. Complex Analysis :- Schaum’s series
5. Higher Engineering Mathematics : - B. V. Ramana

PHY 102 Engineering Physics II

Laser and Fiber Optics:

Laser: Stimulated and Spontaneous processes, Einstein’s A & B Coefficients, Transition probabilities, Characteristics of laser, Optical Resonators, Principles and Working of Ruby and He-Ne laser with energy level diagram and applications.

Fiber Optics: Fundamental idea about optical fiber, Types of fibers, Acceptance angle & cone, Numerical Aperture, V-number, Propagation of Light through step index fiber, Pulse dispersion, Attenuation, Loses and applications.

Solid State and Semi Conductor Physics:

Semi Conductor Physics: Effective mass**,** Energy bands in solids, Electron and hole mobility, Fermi level for intrinsic and extrinsic semiconductors, Zenor diode, PN junction transistor, Transistor parameters, Photo diode, solar cell and Hall effect.

Superconductivity: Meissner effect, Type I and Type II superconductors, Dielectric polarization and Dielectric losses.

Wave Optics:
Interference: Interference in Thin Films (due to reflected and transmitted light), Newton's ring and Michelson's Interferometer.
Diffraction: Diffraction at single, double and n-slit

Applied Nuclear Physics: Properties of Nucleus, Nuclear Forces, Fission & Fusion, Particle accelerators (Cyclotron and Betatron), Geiger- Muller (GM) Counter.

Theory of Relativity: Frame of reference, Postulates of Special Theory of Relativity, Lorentz Transformation, Length Contraction, Time Dilation, Einstein's Mass Energy Relation.

REFERENCES:

1. OPTICS: GHATAK
2. PRINCIPLES OF OPTICS: BRIJLAL SUBRAMANYAM
3. CONCEPT OF MODERN PHYSICS: BEISER
4. ENGINEERING PHYSICS: M.N. AVADHANULU and P.G. KSHIRSAGAR
5. MODERN PHYSICS: MANI & MEHTA

EG 101 Engineering Graphics

Lines, Lettering, Sketching, Principle of Dimensioning, Orthographic Projection: Projection of Points, Lines, Planes, Auxiliary Views, Projection of Solids, Sections of Solids, Intersections of solids and development of lateral surfaces of simple solids, Isometric Projections, Oblique and Perspective Projection.

CS 102 Data Structures and Algorithms

Notion of Algorithm, Space and Time Complexity, Analyzing algorithms Static & Dynamic Memory Management, Arrays, Stacks, Queues, Linked Lists Trees, Binary Trees, Tree Traversals, Applications of Binary Trees Graphs and their representations, Graph Traversal Algorithms, Minimum Spanning Tree, Shortest Paths

Searching Algorithms: Sequential Search, Binary Search

Sorting Algorithms: Quick sort, Merge sort, insertion sort, Selection sort, Heap & Heap sort Binary Search Tree, Balanced Tree, AVL Tree Files

Indexing: Hashing,

Tree Indexing: B-tree

Basic Algorithm Design Paradigms: Divide & Conquer, Greedy method, Dynamic Programming, Back tracking, Branch and Bound [Discussion with the help of some example which are already discussed].

Text/ References Book:

1. Horowitz, Sahni, Fundamentals of Data Structures, Computer Science Press-2013.
2. Cormen et al., Introduction to Algorithms, Second Edition, Printice Hall of India 2014.
3. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sartaj Sahni, Rajasekaran-Universities Press-2008.
4. Data Structures Using C And C++, 2 Edition, Augenstein Moshe j., Tenenbaum Aaron M., Langsam Yedidyah, Publisher: Prentice-Hall India-2009

HUM 102 Culture & Human Values

The syllabus comprises of excerpts from the writings of great masters like Swami Vivekananda, Mahatma Gandhi, Chanakya, Rabindranath Tagore, Dr. S. Radhakrishnan, H.E. Dr. APJ Kalam, Carl Sagan, Gurunanak Dev, Wordsworth, 0. Henry, Maupassant and many others. The wisdom of the philosophical texts would be brought to them through the Reading Material prepared specifically for the students. It is expected that their English communication and general awareness would improve through this discursive and interactive method.

IT 102 Programming Lab

AutoCAD:

Introduction to 3D Wireframe/Solid Modeling, Modeling of Primitive 3D Solids, Modeling of unique 3D Solids by Extrusion, Revolution, Sweeping and Lofting, 3D Operations and Solid Editing

Matlab:

Basics: Mathematics, Data Analysis, Programming, Graphics, Creating GUI
Toolboxes - Curve Fitting: Data fitting, Preprocessing data, post processing data, Using library functions for Data fitting, Symbolic Math: Calculus, Linear Algebra, Simplifications, Solutions of Equations, Matlab Compiler: Programs involving control statements, data structure etc., User defined functions, Simulink: building a model, run.

Detailed Syllabus for B.Tech. CSE

B.Tech. –CSE (Third Semester)

Course Name: Mathematics-III Code: MTH 211

Numerical Methods: Solution of algebraic and transcendental equations, Solution of linear Simultaneous Equations. Finite Differences, Interpolation formula for equal and unequal intervals, Central Difference formula, Inverse Interpolation,

Numerical Differentiation. Numerical Integration, Numerical solution of Ordinary & Partial Differential Equations.

Statistics: Curve fitting, Correlation and Regression Analysis Probability Statistics: Curve fitting, Correlation and Regression Analysis.

Discrete and Continuous Random Variables, Probability Density Functions. Theoretical Distributions, Binomial, Poisson Normal Distributions etc.

Hypothesis Testing: Testing of Statistical Hypothesis and its Significance (Chi-Square, t, z and F Tests).

Text/ Reference Books:

1. Numerical Analysis	S S Sastry
2. Numerical Analysis	B S Garewal
3. Numerical Analysis	Jain Ayenger Jain
4. Mathematical Statistics	M. Ray
5. Head first Statistics	Gujarati

Course Name: Discrete Structures Code: CSE 212

Sets, relations, and functions: Basic operations on sets, Cartesian products, disjoint union (sum), and power sets. Different types of relations, their compositions and inverses. Different types of functions, their compositions and inverses. Arbitrary union, intersection and product. Propositional Logic: Syntax and semantics, proof systems, satisfiability, validity, soundness, completeness, deduction theorem, etc. Decision problems of propositional logic. Introduction to first order logic and first order theory -- set theory, axiom of choice. Size of a set: Finite and infinite sets, countable and uncountables, Cantor's diagonal argument and power set theorem, non-computability of all number theoretic functions.

Partially ordered sets: Complete partial ordering, chain, lattice. Complete, distributive, modular, and complemented lattices. Boolean and pseudo-Boolean lattices. Different sublattices, monotone map and morphisms, quotient structures, filters. Tarski's fixed points theorem. Algebraic Structures: Algebraic structures with one binary operation -- semigroup, monoid and group. Congruence relation and quotient structures. Morphisms. Free and cyclic monoids and groups. Permutation group. Substructures, normal subgroup. Error correcting code. Algebric structures with two binary operations- ring, integral domain and field. Boolean algebra and Boolean ring.

Introduction to Counting: Basic counting techniques -- inclusion and exclusion, pigeon-hole principle, permutation, combination, summations. Introduction to recurrence relation and generating function. Introduction to Graph: Graphs and their basic properties -- degree, path, cycle, subgraph, isomorphism, Eulerian and Hamiltonian walk, graph colouring, planar graph, trees.

Text/ Reference Books:

1. Element of Discrete Mathematics By C. L. Liu.
2. Discrete Mathematics by Rosen

Course Name: Digital Logic and Design Code: CSE 213

Number system & Boolean algebra, number systems: Binary, Arithmetic, octal, Hexadecimal & radix conversion. Binary codes: BCD, excess three, gray display ASCII, EBDCIC, Parity check codes, code conversion, Boolean algebra: theorems, Introduction to logic gates, NAND,NOR realization, Boolean laws & theorems. Simplification of Boolean expression, sum of product & product of sum forms, concept of min terms & max terms, minimization techniques, karnaugh's MAP method, Tabulation method.

Combinational circuits & flip flops half adder, full adder, substractor, BCD adder, multiplexer & demultiplexer, encoder & decoder ckts. FLIP-FLOPS: RS, clocked RS, T, D. JK, master slave JK. Sequential ckts, elements of sequential switching ckts, synchronous & asynchronous systems, binary ripple, counter, BCD counter, up-down counter, Shift Registers, series parallel shift registers shift left & shift right operation, Johnson & ring counter.

Design of sequential ckts. State diagram, state table, state assignment, characterizing equation & definition of synchronous sequential machines, Mealy & More model machines, state table & transition diagram, Introduction to logic families, RTL, DTL, TTL, ECL, NMOS, NCMOS, logic, etc.

Text/ Reference Books:

1. Digital logic and computer design by Moris Mano
2. Digital principles & application A.Paul Malvino & Donald. P. Leach

Digital Electronics - Lab Experiments

1. Experiment to study and implement all the logic gates and to verify their outputs.
2. Experiment to study and implement NAND gate as universal gate.
3. Experiment to study and implement NOR gate as universal gate.
4. Experiment to study and implement XOR gate.
5. Experiment to study and implement binary code conversion to grey code conversion.
6. Experiment to study and implement grey code to binary code conversion.
7. Experiment to study and implement HALF-ADDER circuit.
8. Experiment to study and implement FULL-ADDER circuit.

9. Experiment to study and implement HALF –subtractor circuit.
10. Experiment to study and implement JK-Flip Flop.
11. Experiment to study about the working of multiplexer and its operation as a logic level generator.
12. Study of logic gates using ICs and discrete components.
13. Verify 8:1 MUX and 1:8 DEMUX
14. Study of RAM using IC 7489
15. Study of CMOS Inverter
16. Interface CMOS to TTL and vice versa
17. Study of FFs – RS, D, T and JK
18. Study of decade counter IC 7490
19. Study of 4-bit ripple counter IC 7493
20. Study of shift register IC 74194/195
21. Study of 4-bit comparator IC – 7485
22. Working project made by the student at the end of Lab.

Course Name: Principles of Programming Languages Code: CSE 214

The Role of Programming Languages: Why Study Programming Languages, Towards Higher-Level languages, Programming paradigms, Programming environments Language Description: Syntactic structure, language Translation Issues: Programming language Syntax, Stages in translation, Formal translation Models. Encapsulation ,classes, hierarchies of classes, inheritance, polymorphism, abstract classes. Identifying objects and classes, representation of objects, Object oriented programming languages, class declarations, object declaration.

Inherited methods, redefined methods, the protected interface, abstract base classes. Public and protected properties, private operations disinheritance, multiple inheritance. Overview of C++ as object oriented programming language, loops, decision, structures and functions, arrays and pointers, virtual function. Statements, Types, Procedure Activations Object-Oriented Programming: Grouping of Data and Operations, object oriented programming Functional Programming: Elements, Programming in a typed language, Programming with lists.

Text books:

1. "Programming Languages: Design and Implementations", Terrance W. Pratt, Marvin V. Zelkowitz, T.V.Gopal,Fourth ed.,Prentice Hall.
2. "Programming languages: Concepts and Constucts", Ravi Sethi, Second Ed.,Pearson.
3. "Types and programming Languages", Benjamin C. Pierce. The MIT Press Cambridge, Massachusetts London, England
4. Object Oriented Programming in C++ by Robert Lafore

Course Name: Design and Analysis of Algorithms Code: CSE 215

Concepts of algorithm, asymptotic complexity, examples of analysis use of recurrence relation in analysis of algorithms, master method, removal of recursion, heap and heap sort. Divide and conquer technique, analysis and design of algorithms base on this technique for

binary search, Sorting techniques: merge sort, quick sort, selection problem etc., Matrix multiplication.
Study of greedy strategy, solutions based on greedy strategy for knapsack problem, scheduling problem, minimum spanning trees, shortest paths optimal merge patterns. Concept of dynamic programming and problems based on this approach such as 01 knapsack problem, multi-stage graphs, shortest paths, Traveling sales-person problem, reliability design problem.
Graph traversal: depth first search, breadth first search, bi-connected components. Backtracking concept and its examples likes 8 queen's problem, Hamiltonian cycle problem, introduction to branch & bound and its examples like 8 piece puzzle problem traveling sales-person problem.
Binary search trees, height balanced trees, AVL trees, 2-3 trees, B-trees hashing. Introduction to lower-bound theory introduction to NP-Complete, and NP Hard problems, examples of NP complete problem like Hamiltonian path and circuits, eulerian paths and circuits etc.

Text/ Reference Books:

1. Computer Algorithms: Horowitz by Sartaj Shani & Sanguthevar Rajasekaran
2. Design and Analysis of Computer Algorithms by V. Aho, J. E. Hopcroft, and J. D. Ullman .
3. Introduction to Algorithms by Cormen, Leiserson & Rivest

Course Name: Computer Workshop Code: CSE 216

JAVA

Introduction to Java programming, Object-oriented programming with Java Classes and Objects Fields and Methods, Constructors, Inheritance , Exception handling, The Object class, Working with types: Wrapper classes Enumeration interface, Packages , Applets, Basics of AWT and Swing Layout Managers, Threads Synchronization, The I/O, Basic concepts of networking Working with URLs, Concepts of URLs, Sockets, Database connectivity with JDBC

Python

Introduction, Conditional Statements, Looping, Control Statements, String Manipulation Lists , Tuple, Dictionaries, Functions, Modules, Input-Output, Exception Handling, OOPs concept, Regular expressions, CGI, Database, Networking (Socket, Socket Module, Methods, Client and server Internet modules), Multithreading, GUI Programming, Sending email.

Text/ Reference Books:

1. Core Python Programming by R. Nageswara Rao
2. How to program Java by Details and Details
3. Java the Complete Reference by Herbert Schildt

Detailed Syllabus for B.Tech. CSE

B.Tech. –CSE (Fourth Semester)

Course Name: Analog & Digital Communication Code: CSE 221

Basic blocks in a communication system: transmitter, channel and receiver; baseband and passband signals and their representations; concept of modulation and demodulation. Continuous wave (CW) modulation: AM, DSB/SC, SSB, VSB, methods of generation; Demodulation techniques of CW modulation: coherent and non-coherent; Nonlinear modulation techniques: FM and PM, narrowband FM, wideband FM, methods of generation; FM spectrum; Demodulation techniques for FM; Frequency Division Multiplexing (FDM); Radio transmitters and receivers. Performance of analog modulation schemes in AWGN : CNR, post-demodulation SNR and figure of merit for AM, DSB/SC, SSB, FM, threshold effect in FM, pre-emphasis and de-emphasis in FM, FMFB. Noise in receivers; Noise figures; Radio link design.

Signal analysis and analog modulation: Analog signal, digital, convolution correlation, autocorrelation, of analog modulation, amplitude and angle modulation, spectral analysis and relation, noise source, band pass noise, noise performance of AM and FM signal. Pulse Modulation: Natural sampling, flat top sampling, sampling theorem, PAM, bandwidth, pulse time modulation method of generation and detection of PAM, and PPM, time division multiplexing, Noise in pulse modulation system.

Pulse code modulation: Quantization of signal, quantization errors, PCM, PCM system, comp multiplexing PCM system, differential PCM, delta modulation, adaptive delta modulation, noise in PCM system. Information theory and Coding: Unit of information, entropy, Joint and conditional entropy, information rate mutual nformation, channel capacity of BSC, BEC and binary channel theorem Shannon Harte'y theorem, bandwidth S/N trade off, average length of code control coding, Hamming distance block code, convolution code.

Digital Communication: Differential phase shift keying (DPSK), quadrature phase shift k (QPSK), M- ray PSK, Binary frequency shift keying (BESK), comparison of DPSK QPSK, M-ray FSK, duo binary encoding, base band signal reception, probability of optimum filter, matched filter.

Text/ Reference Books:

1. Modern Digital and Analog Communication Systems — B.P.Lathi
2. Communication Systems — Simon Haykins
3. Communication Systems — A. B. Carlson
4. Analog & Digital Communication — R.P. Singh & Sapre
5. Communication Engineering — Rao

<u>Analog Communication Lab Experiments</u>

1) Double side band AM Generation.
2) Double side band AM Reception.
3) Single side band AM Generation.

4) Receiver Characteristics (Selectivity, Sensitivity, Fadelity).
5) Frequency Modulation using Reactance Modulator.
6) Frequency Modulation using Varactor Modulator.
7) Quadrature Detector.
8) Operation of Phased locked loop Detector.
9) Operation of Foster – Seeley loop Detector.
10) Operation of Ratio Detector.

Course Name: Computer Organization and Architecture Code:CSE 222

Introduction to computer organizations and architecture, computer system components, bus organized computer, memory address register, data register, program counter, accumulator, instruction register. Instructions fetch. Decoding and execution. Instruction formats and addressing modes, instruction set design issues, micro operations. Register transfer language. Control unit organization. Instruction sequencing, instruction interpretation. Hardwired control and micro programmed control organization, control memory, address sequencing, microinstruction formats, micro program sequencer, microprogramming, microinstruction encoding, horizontal and vertical micro instructing.

Arithmetic and logic unit design. Addition and subtraction algorithm. Multiplication algorithm. Division algorithm. Floating point arithmetic. Processor. Configuration, instruction pipelining, branch handling, CISC and RISC architecture features, superscalar architecture. Input- output organization, programmed I.O. I/O addressing , I/O instruction. Synchronizations. I/O interfacing, standard I/O interfaces interrupt mechanism, DMA I/O processors and data communication.

Memory organization and multiprocessing basic concepts and terminology. Memory hierarchy, semiconductor memories (RAM ROM) virtual memory. Cache memory, Associative memory, memory allocation and management policies, structure of multiprocessor.

Text/ Reference Books:

1. Computer Organization and Architecture Design and Performance by Willam Stalling
2. Computer Architecture and Organization by John P. Hayes
3. Computer Architecture and Organization by M. Morris Mano

Course Name: Software Engineering Code: CSE 223

The Software Product and Software Process Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics. Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case

Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

Software Design: Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics. Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing, Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit, Testing Frameworks, Integration Testing, System Testing and other Specialized, Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured Software Engineering.

Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasilibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.

Text/ Reference Books:

1. Software Engineering by Roger S Pressman
2. Software Engineering by Lan Sommerville

Course Name: Database Management System Code: CSE 224

Introduction to DBMS concepts and architecture: file organization techniques, database approach v/s traditional file accessing approach, advantages of database systems, data models, schemas and instances, database languages and interface, initial conceptual design of database, DBMS Architecture database system utilities, data independence, functions of DBA and designer.

Entities attributes, entity types, value sets, key attributes, relationships, defining the E-R design of database. Relational data models: Domains, tuples, attributes, relations, characteristics of relations, key attributes of relations, relational database, schemas, integrity constraints, update operations on relations. Hierarchical data model: Hierarchical database structures, Integrity constraints, data definition and manipulation in hierarchical model. Network data model: Records, record types and data items, set types and set instances, constraint on set membership, representation of set instances, special types of sets, DBTG proposal and implementation.

Relational algebra and relational calculus**:** Relational algebra operations like select, project, join, division, outer join, outer union etc., insertion, deletion and modification anomalies. Data definition in SQL, queries, update statements and views in SQL. QUEL and QBE, data and storage definition, data retrival queries and update statements etc.

Introduction to normalization, normal forms, functional dependency, decomposition, dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies, inclusion and template dependencies. Distributed databases, protection, security and integrity constraints, concurrent operations on databases, recovery, transaction processing, database machines. Comparison of various database models, comparison of some existing DBMS.

Text/ Reference Books :

1. Fundamentals of Database System by Navathe
2. Fundamentals of Database System by Korth
3. Database Management System by Raghu Ramakrishnan

Course Name: Formal Language and Automata Theory Code: CSE 225

Introduction to theory of Computation and Finite Automata: Mathematical Preliminaries & Notation : Sets, functions and relations, Graphs and Trees, Proof Techniques, Basic concepts, Languages, Grammars, automata, deterministic finite accepters, Deterministic accepters and Transition Graphs, Languages, Non deterministic finite accepters, definition of a NDFA, Equivalence of DFA and NDFA, Reduction of the Number of states in finite automata. Grammars and Languages: Regular expression, Regular Grammar, Regular languages, closure properties of Regular languages, Context free grammars, Simplification of Context free grammars and Normal forms, Properties of context free languages.

Push – Down Automata: Non deterministic push down automata: Definition of a push down automata, The language accepted by a push down automata, Push down automata and context free languages, Push down automata for context free languages, CFG's for PDA, Deterministic Push down automata and Deterministic Context free languages, Grammars and Deterministic context free languages. Turing Machines**:** The Standard Turing Machine: Definition of a Turing Machine, Turing Machines as language accepters, and Turing Machines as Transducers. Combining Turing Machines for complicated tasks, Turing thesis, other models of Turing Machines.

Limits of algorithmic computation, Computability and Decidability, the Turing Machine Halting Problem, Reducing one Undecidable Problem to another, Undecidable Problems for Recursively Enumerable languages, The post correspondence problem: Indecidable problems for context free languages, Recursive function, Primitives recursive functions, Ackermanris functions, recursive functions, Post Systems : Rewriting systems : Matrix grammars, Markov Algorithms.

Text/ Reference Books:

1. Introduction to languages & the theory of Computation by John C. Martin.
2. An Introduction to Formal Languages and Automata by Peter Linz.
3. Introduction Automata Theory Languages and Computation by J.E. Hopcroft & J.D. Ullman.

Course Name: Entrepreneurship Development Code: CSE 226

Entrepreneurship Development – Concept and Importance, function of Enterpriser, Goal determination – Problems Challenges and solutions.

Project Proposal- Need and Objects; Nature of organization, Production Management; Financial Management; Marketing Management; Consumer Management.

Role of Regulatory Institutions; Role of Development Organizations; Self Employment Oriented Schemes; Various grant schemes.
a. Production management; b. Marketing management – Sales and the art of selling, understanding the market and market policy; Consumer management, time management.

Role of regulatory institutions-district industry centre, pollution control board, special study of electricity development and municipal corporation; Role of development organization, khadi & villages commission/Board; Self-employment-oriented schemes, Prime minister's employment schemes.

References:

- Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2013.
- Mathew J Manimala, "Enterprenuership theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005.
- Rajeev Roy, 'Entrepreneurship' 2nd Edition, Oxford University Press, 2011.

Detailed Syllabus for B.Tech. CSE

B.Tech. –CSE (Fifth Semester)

Course Name: Computer Networks Code: CSE-311

Introduction to networks and layered architecture: OSI, TCP/IP; Telecommunications and cellular networks overview; Examples of networks: Arpanet, Internet, Network Topologies WAN, LAN, MAN.

Physical Layer: Basics of communication; Physical media types and their important bandwidth and bit-error-rate characteristics; Wired and wireless media including copper cables, optical fibre and wireless and topology; Multiplexing-circuit switching and packet switching.

Data Link Layer: Framing;Error detection and correction techniques; Topologies; Wired LANs: Ethernet, Wireless LANs, Wireless WANs, Connecting LANs;Virtual-circuit networks, Performance analysis of networks.

Network layer: Network layer and addressing, IP version 4 and 6;Packet delivery, forwarding and routing protocols including distance-vector and link-state approaches; Interior and exterior gateway protocol concepts; Example protocols: OSPF, RIP, BGP.
Transmission layer:Reliable end-to-end transmission protocols-TCP and UDP.
ApplicationLayer: Protocols such as DNS, SMTP, FTP, HTTP, POP, IMAP etc.

Text/ Reference Books:

1. W. Stallings, Data and Computer Communications, 6th edition, Prentice Hall, 2000.
2. A. S. Tannenbaum, Computer Networks, 4th edition, Prentice Hall, 2003.
3. F. Halsall, Data Communications, Computer Networks and Open Systems, 4th edition, Addison-Wesley, 1996.
4. Walrand and Varaiya, High Performance Communication Networks, Morgan Kaufman, 1996.
5. D. E. Comer, Internet working with TCP/IP: Principles, Protocols, Architecture, 3rd edition, Prentice Hall, 2000. 6. W. R. Stevens, TCP/IP Illustrated Vol. I, Addison Wesley, 1994.

Course Name: Digital Image Processing Code: CSE 312

Introduction to Image Processing Systems, Digital Image Fundamentals:- Image model, Relationship between Pixels, Imaging geometry, Camera model, Image Sensing and Acquisition, Sampling and quantization, Image Enhancement and in spatial Domain: Point processing, Neighborhood Processing, High pass filtering, High boost filtering, zooming. Image Enhancement based on Histogram modeling, Image Enhancement in frequency domain: 1D& 2D Fourier transform, Low pass frequency domain filter, High pass frequency domain filters, Homomorphic filtering, Image Segmentation, Detection of discontinuation by point detection, line detection, edge detection, Edge linking and boundary detection Local analysis, global by graph, theoretic techniques, Thresh-holding, Morphology, Representation

and description, Discrete image transform, Image Compression, Wavelet transformation, Image geometry, Image restoration.

Text/ Reference Books:

1. Digital Image Processing Gonzalez & Wood
2. Digital Image Processing A.K. Jain .Image Processing Dhananjay K.

Course Name: Micro-Processors and Micro-Controllers Code: CSE 313

Microprocessors (8085) - internal architecture, Instruction set and assembly language programming. Introduction to 8086 microprocessor, internal architecture, pin description, memory segmentation, addressing modes, instruction set and assembly language programming.
Basic Interfacing devices: Memory interfacing, 8255, 8253, 8259, 8257, 8251, Interfacing A/D and D/A converters, Case studies of microprocessor based systems. Salient features of advanced microprocessors: 80286,386,486, Pentium.
Introduction to 8051 microcontrollers, its architecture, pin description, I/O configuration, interrupts, addressing modes, an overview of 8051 instruction set, Microcontroller applications.

Text/ Reference Books:

1. 8085 Microprocessor — Ramesh Goenkar, Prentice Hall
2. Microprocessor and Interfacing — D. V. Hall
3. The 8051 Microcontroller — Kenneth J Aya
4. THE INTEL MICROPROCESSORS — BARRY B. BREY, Pearson Prentice Hall

Micro Processor & Micro Controller-Lab

1. Write C program to interface stepper motor.
2. Write C program to interface DC motor.
3. Write C program to interface traffic light controller.
4. Write C program to interface Elevator.
5. Write C program to interface ADC-DAC controller.
6. Write C program to interface temperature controller.
7. Write C program to interface DAC controller.
8. Write a program to add two 8-bit BCD numbers.
9. Write a program to add ‘n’ 8-bit BCD numbers.
10. Write a program to add two ‘n’ byte BCD numbers.
11. Write a program to perform 8-bit binary subtraction.
12. Write a program to perform 8-bit binary subtraction by 1’s compliment method.
13. Write a program to perform 8-bit binary subtraction by 2’s compliment method.
14. Write a program to perform 8-bit binary subtraction by 9’s compliment method.
15. Write a program to perform 8-bit binary subtraction by 10’s compliment method.
16. Write a program to perform two ‘n’ byte binary subtractions.

Course Name: Compiler Design Code: CSE-314

Introduction to language translators and overview of the compilation process.

Lexical analysis (scanner): specification of tokens, token recognition, conflict resolution, regular expression, scanner generator (lex, flex).

Syntax Analysis (parser): Context-free language and grammar, push-down automata, LL(1) grammar and top-down parsing, operator grammar, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc,bison).

Semantic Analysis: Attribute grammar, syntax directed definition, evaluation and flow of attribute in a syntax tree.

Symbol Table: Its structure, symbol attributes and management.

Intermediate Code Generation: Translation of different language features, different types of intermediate forms.

Code Improvement (optimization): Analysis: control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc. Architecture dependent code improvement: loop optimization etc.

Text/ Reference Books:

1. Compilers: Principles, Techniques, and Tools, Alfred Aho, Monica Lam, Ravi Sethi, Jeffrey D. Ullman, Addison-Wesley, 2007
2. Modern compiler implementation in Java, Second Edition, Andrew W. Appel, Jens Palsberg, Cambridge University Press, 2002.
3. Computer Organization and Design: The Hardware/Software Interface, David Patterson and John Hennessy, Morgan Kaufmann, 1998

Course Name: Operating System Code: CSE-315

The Evolution of operating Systems (OS); Fundamental goals of operating systems overview of important features of OS operation. Overview of OS: multiprogramming, Batch, interactive, time sharing, distributed operating systems and real time systems; Concurrency and parallelism.

Process management and scheduling: Concept of process and process synchronization, process states, process state transitions, the process control block, operations on processes, suspend and resume, interrupt processing, mutual exclusion, the producer/consumer problem, the critical section problem, semaphores, classical problems in concurrency, inter process communication; Issues in user service and system performance.

Synchronization primitives and problems, deadlocks (essential topics: peterson's algorithm, monitors), detection and prevention of deadlocks, dynamic resource allocation.

Memory Management: Memory fragmentation and techniques for memory reuse paging, virtual memory management using paging, Segmentation, Distributed and Multiprocessor Systems.

File Management: File systems, implementation of file Operations. Protection of files.

Text/ Reference Books:

1. Modern Operating Systems, Andrew S Tanenbaum and Herbert Bos, Fourth Edition, Pearson Education, 2014.
2. Operating Systems Concepts, Abraham Silberschatz, Peter B. Galvin and Greg Gagne, Wiley, 2012.
3. Dhamdhere, D. M., Operating Systems---A concept-based approach, Second edition, McGraw-Hill Education India, New Delhi, 2006.
4. Stallings, W., Operating Systems---Internals and Design Principles,Fifth edition, Pearson Education, New York, 2005.

Detailed Syllabus for B.Tech. CSE

B.Tech. –CSE (Sixth Semester)

Course Name: Cryptography and Information Security Code: CSE 321

Overview of Information Security: confidentiality, integrity, and availability, User authentication, Information Security for Server Systems, Information Security for Client devices

Understanding the Threats: Malicious software (Viruses, trojans, rootkits, worms, botnets), Memory exploits (buffer overflow, heap overflow, integer overflow, format string).

Information Security and Cryptography, Mathematics of Cryptography, Ciphers: Substitution and Transposition, Symmetric Encryption and Message Confidentiality, Integrity of Data, Hash Function, Digital Signature.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Stream Cipher and Block Cipher, Random Number Generator, One-time Pad.

Groups, Rings, Fields, Modular Arithmetic, Euclid‘s Algorithm, Finite Fields Of Form GF (p) And GF (2n). Polynomial Arithmetic, Prime Numbers, Fermat‘s And Euler‘s Theorem, Testing For Primality, The Chinese Remainder Theorem, Discrete Logarithms.

Block Cipher Principles, Data Encryption Standard (DES), Multiple Encryption, Triple DES, Advanced Encryption Standard (AES), Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

Text/ Reference Books:

1. William Stallings and Lawrie Brown. 2014. Computer Security: Principles and Practice (3rd ed.). Prentice Hall Press, Upper Saddle River, NJ, USA.
2. Behrouz A. Forouzan. 2007. Cryptography &Amp; Network Security (1 ed.). McGraw-Hill, Inc., New York, NY, USA.
3. M. Stamp, ―Information Security: Principles and Practice,‖ 2st Edition, Wiley, ISBN: 0470626399, 2011.
4. M. E. Whitman and H. J. Mattord, ―Principles of Information Security,‖ 4st Edition, Course Technology, ISBN: 1111138214, 2011.
5. "Designing Security Architecture Solutions", Jay Ramachandran,Wiley.
6. "Web Application Security, A Beginner's Guide" Bryan Sullivan, Vincent Liu, McGraw Hill.

Course Name: Data Warehouse & Data Mining Code: CSE 322

Data Mining Concepts, Input, Instances, Attributes and Output, Knowledge Representation & Review of Graph Theory, Statistics, Supervised Learning Framework, concepts & hypothesis, Training & Learning, Boolean functions and formulae, Monomials, a learning

algorithm for monomials. Data Cleaning, Data Integration & Transformation, Data Reduction.

Associations, Maximal Frequent & Closed Frequent item sets, Covering Algorithms & Association Rules, Linear Models & Instance-Based Learning, Mining Association Rules from Transactional databases, Mining Association Rules from Relational databases & Warehouses, Correlation analysis & Constraint-based Association Mining.

Issues regarding Classification & Prediction, Classification by Decision Tree induction, Bayesian classification, Classification by Back Propagation, k-Nearest Neighbor Classifiers, Genetic algorithms, Rough Set & Fuzzy Set approaches. Types of data in Clustering Analysis, Categorization of Major Clustering methods, Hierarchical methods, Density-based methods, Grid-based methods, Model-based Clustering methods

Multidimensional analysis & Descriptive mining of Complex data objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Timeseries& Sequence data, Mining Text databases, Mining WWW

Data warehousing Components, Building Data warehouse, Mapping Data Warehouse to Multiprocessor Architecture, DBMS Schemas for Decision Support, Data Extraction, Transformation Tools, Metadata

Text/Reference Book:

1. Jiawei Han and MichelineKamber, ―Data Mining: Concepts and Techniques‖, Morgan Kaufmann Publishers.
2. Ian H. Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools and Techniques with Java implementations, Morgan Kaufmann Publishers.
3. D. Pyle, ―Data Preparation for Data Mining‖, Morgan Kaufmann.
4. Korth, Silbertz, Sudarshan, ―Database Concepts, McGraw Hill
5. Elmasri, Navathe, ―Fundamentals of Database Systems‖, Addision Wesley

Course Name: Distributed Systems Code: CSE 323

Basic Concepts of Distributed Systems: Computer architecture: CICS, RISC, Multi-core Computer networking: ISO/OSI Model Evolution of operating systems Introduction to distributed computing systems (DCS).

Distributed Coordination: Temporal ordering of events Lamport's logical clocks Vector clocks; Ordering of messages Physical clocks Global state detection, Distributed mutual exclusion algorithms Performance matrix.

Inter-process communication: Message passing communication Remote procedure call Transaction communication Group communication; Broadcast atomic protocols. Deadlocks in distributed systems, Load scheduling and balancing techniques.

Text/Reference Book:

1. Distributed Systems Concepts and Design, G. Coulouris, J. Dollimore, Addison Wesley

2. Distributed Operating Systems and Algorithms, Randy Chow, T. Johnson, Addison Wesley
3. Distributed Operating Systems, A.S. Tanenbaum, Prentice Hall

Course Name: Artificial Intelligence Code: CSE 324

Meaning and definition of artificial intelligence, Production systems: types, characteristics, study and comparison search techniques: BSF, DSF, hill climbing, best first search, A* algorithm, AO* algorithm etc, types of control strategies.

Knowledge representation: Problems faced, propositional and predicate logic, resolution and refutation, deduction, theorem proving. Reasoning: introduction, reasoning methods, Baye‘s theorem, Bayesian network, fuzzy logic.

Slot and filler structures: semantic networks, frames, conceptual dependency, scripts etc. Game playing and its techniques, planning techniques, study of blocks world problem in robotics, understanding, natural language processing and common sense.

Learning and its techniques, neural networks and its applications, expert systems.

Text/Reference Book:

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 2nd Ed, Prentice Hall, 2003;
2. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill

List of Electives Level -1 (Any One Subject for VI Semester)

Data Engineering & Computing Stream		Computer System Architecture Stream		Network Security & Algorithms Stream		Language, Theory & Communication Stream	
CSE501	Advances in Database Management System	CSE502	Computer Graphics & Multimedia	CSE503	Computer & Network Security	CSE504	Mobile & Wireless Communications

SYLLABUS OF ELECTIVES LEVEL-1

Course Name: Advances in Database Management System

Code: CSE 501

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation-Based Protocols – Multiple Granularity.

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of non-volatile storage-Advance Recovery systems- Remote Backup systems.

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- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Text/Reference Book:

1.Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition

2. Data base System Concepts, Silberschatz, Korth, McGraw hill, 5thedition.

Course Name: Computer Graphics & Multimedia Code: CSE 502

Introduction to raster & random graphics fundamentals, Display devices & comparison Point plotting, line drawing & circle drawing & their algorithm like DDA & Bressenhams, Video Basics- Graphics input/ output devices techniques, Mouse, tablets, stylus, light pen, valuators, digitizers, and plotter Devices independent graphics systems, positioning constraints, rubber band technique, dragging, inking& Painting,

Data Structure of Computer Graphics, 2-D Transformation, Clipping, Windowing, View port, 3-D transformation, clipping, viewing transformations, projection, curve generation methods. Graphics packages, segmented files, Geometric models, Picture Structure. Raster graphics, Character Displaying, Natural images Solid Area. Scan Conversion, Raster display hardware, Filling areas, aliasing & anti-aliasing Hidden surface elimination, Shading,

Application to Simple Engineering Problem. Multimedia : Characteristics of a multimedia presentation , Uses of Multimedia, Text –Types, Unicode Standard ,text Compression, Text file formats, Audio- Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats ,Audio Processing software ,Video-Video color spaces, Digital Video, Digital Video processing, Video file formats.

Text/Reference Book

1. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill
2. Donald Hearn and M.P. Becker "Computer Graphics" Pearson Pub.
3. Parekh "Principles of Multimedia" Tata McGraw Hill
4. Pakhira,"Computer Graphics, Multimedia & Animation",PHI learning
5. Andleigh, Thakral , "Multimedia System Design " PHI Learning

Course Name: Computer & Network Security Code: CSE-503

Overview of Information Security: confidentiality, integrity, and availability, User authentication, Information Security for Server Systems, Information Security for Client devices.
Understanding the Threats: Malicious software (Viruses, trojans, rootkits, worms, botnets), Memory exploits (buffer overflow, heap overflow, integer overflow, format string)

Introduction to Network Security: Network security needs. Threats to network security, kind of computer security, security policies, security mechanisms, attacks, security tools and basic cryptography, transposition/substitution, block cipher principles.

Introduction to Symmetric crypto primitives, Asymmetric crypto primitives, Data Encryption Standard (DES), Message Digests, Message Authentication and Hash Functions, Hash and Mac Algorithms, Principles of Public key cryptosystems, RSA, Selection of public and private keys.

Key distribution centers and certificate authorities, digital signature standard (DSS), kerberos, Real-time communication security, IPsec, Electronic mail security, Firewalls and web security, Intruders and viruses, trusted system, password management, zero knowledge protocols, malware – privacy, honey pot, defense programming, web application vulnerability, DHS, attack, semantic attack, DoS, DDoS, wireless attack, Intrusion detection system.

Text/Reference Book:

1. William Stallings and Lawrie Brown. 2014. Computer Security: Principles and Practice (3rd ed.). Prentice Hall Press, Upper Saddle River, NJ, USA
2. Behrouz A. Forouzan. 2007. Cryptography &Amp; Network Security (1 ed.). McGraw-Hill, Inc., New York, NY, USA.
3. Cryptography and Network Security, William Stallings
4. Introduction to Network Security, Krawetz, Cengage

Course Name: Mobile & Wireless Communications Code: CSE 504

Introduction to wireless communication systems, different generations of wireless networks. Cellular system design fundamentals, frequency reuse, handoff strategies, Interference and system capacity, Trunking and grade of service.

Mobile radio propagation: free space propagation model, Ground reflection propagation model, Long term fading, Small scale multipath propagation, Time dispersion parameters, Coherence bandwidth, Doppler spread and coherence time, types of small scale fading, Clarke's model for flat fading, level crossing and fading statistics.

Capacity in cellular systems, cell splitting and sectoring, cell-site antennas and mobile antenna, cochannel interference reduction, Frequency management and channel assignment.

Frequency division and time division multiple access. Global System for Mobile: System Architecture. GSM Radio subsystem. GSM: GSM Traffic Channel and Control Channel, Frame Structure.

Spread spectrum multiple access (Frequency Hopped Multiple Access and. Code Division Multiple Access). Different spreading codes.CDMA Digital Cellular system: different standards with detailed description of forward and reverse channels. Capacity of cellular systems.

Overview of Bluetooth and Android APIs

Text/Reference Book:

1. Mobile cellular telecommunication- W. C. Lee, McGraw-Hill
2. Wireless communication -T. S. Rappaport, Prentice Hall
3. Wireless communication – Simon Haykins, Pearson
4. Wireless Communications and Networking William Stallings