# Third Semester

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<th>Period Per Week</th>
<th>Distribution of Marks</th>
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### Rajiv Gandhi Technological University, Bhopal (MP)

**B.E. (CS) Computer Science Engineering**

Revised syllabus and Scheme of Examination effective from July 2007

#### FOURTH SEMESTER

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COURSE CONTENTS

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**Unit 1** Functions of Complex Variables: Analytic functions, Harmonic Conjugate, Cauchy - Riemann Equations, Line integral, Cauchy's theorem, Cauchy's Integral formula, Singular points, Poles and Residues, Residue theorem, Evaluation of Real Integral, Bilinear Transformation.

**Unit 2** Numerical Analysis: Difference operators, Errors and Approximations, Interpolation, Inverse interpolation, Numerical differentiation, Numerical Integration by using Simpson's method, Weddel's rule and Gauss legendre open quadrate formula.

**Unit 3** Solutions of algebraic and transcendental equations( Regular False, Newton-Raphson, Iterative, Graffe’s root squaring methods), Solutions of simultaneous algebraic equations, Solutions of ordinary differential equations ( Tailor's Series, Picard’s Method, Modified Euler's method, Runge Kutta Method, Predictor-Corrector Method), Solution of Partial differential equation.

**Unit 4** Introduction to optimization by linear programming, only two variable problems solution by graphical and simplex method, concept of degeneracy and duality; simple three variable transport and assignment problems and modeling into LPP.

**Unit 5** Introduction to Q theory and Markovian process, time independent property of exponential distribution, solution of only M/M/1 (∞/∞/FCFS) Queues; introduction to design of experiments, factorial design, sampling methods, Taguchi Loss Function, robust design methods, variance reduction and six (±3)σ outliers in quality.

**References:**
2. Ramana BV; Higher Engineering Mathematics; TMH
4. Taha H; Operations Research an Introduction; PHI
5. Ross; Taguchi techniques for Quality engineering, TMH
6. Spiegel; Theory and problems of probability and statistics; TMH
7. Chandrasekharaih DS; Engineering Maths Part II & III; Prism Books Pvt.
8. Johnson; Miller and Freund's Probability and statistics for Engineers; PHI.
9. Jaggi, Mathur; Engineering Mathematics; Khanna Publisher.
Unit 1 Energy: linkage with development, world energy scenario, fossil fuel resource- estimates and duration, India's energy scenario; Finite/ depleting energy resources, coal, oil, gas, nuclear fission, promises and present status of nuclear fusion energy; Renewable energy, solar, hydro, wind, biomass, ocean, tidal, wave and geothermal. Synergy between energy and environment, global environment issues, greenhouse gas emission, global warming, green energy solutions.

Unit 2 Society and environment: exponential growth in population, environmentally optimum sustainable population, free access resources and the tragedy of commons; environment problems and impact of P.A.T (Population, Affluence and Technology), environmentally beneficial and harmful technologies; environment impact assessment policies and auditing interaction between environment, life support systems and socio-culture system.

Unit 3 Ecosystem: definition, concepts, structure, realm of ecology, lithosphere, hydrosphere, biosphere, atmosphere-troposphere-stratosphere; energy balance to earth, matter and nutrient recycling in ecosystems; nitrogen, oxygen, carbon and water cycles, food producers, consumers and decomposers, food chains; biodiversity, threat and conservation of biodiversity. Worldviews and environmentally sustainable economic growth, introduction to Design For Environment (DFE), product lifecycle assessment for environment and ISO 14000; triple bottom-line of economic, environment and social performance; environmental ethics, its world impact and challenges.

Unit 4 (a) Air pollution-primary, secondary; chemical and photochemical reactions, effects of CO, NO, CH and particulates, acid rain, Ozone depletion; monitoring and control of pollutants
(b) Noise pollution-sources and control measures.
(c) Water pollution, analysis and management, heavy metals- and nuclear pollutions; industrial pollution from paper, pharmacy, distillery, tannery, fertilizer, food processing and small scale industries.

Unit 5 Ethics and moral values, ethical situations, objectives of ethics and its study, role morality and conflicts; values, policies and Organization Culture; Non-professional, quasi- and hard-professionals; preventive, personal, common and professional ethics; different ethical value criteria like utilitarian, virtue, right and duty ethics with discussion on the case of priority for improvement of urban (high traffic) or rural (low traffic) intersections causing equal number of fatalities; codes of ethics and their limitations; Institute of engineers code for corporate member, IEEE and ACM professional-code.

References:
1. Miller G. T Jr; Living in the environment; Cengage Publisher.
2. Cunningham W; Principles of Environmental Science; TMH
3. Harris CE, Prichard MS, Rabins MJ, Engineering Ethics; Cengage Pub.
4. Martin; Ethics in Engineering; TMH
5. Govindrajan, Natrajan, Santikumar; Engineering Ethics; PHI pub.
6. Rana SVS;Essentials of ecology and environment; PHI Pub.
7. Gerard Kiely, Environmental Engineering; TMH
8. Khan BH; Non Conventional energy resources; TMH Pub.
9. Raynold G.W. “Ethics in Information Technology; Cengage
# Course Contents

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<td>BM/CS/EI 303</td>
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**Unit I**
Number systems & codes, Binary arithmetic, Boolean algebra and switching function. Minimization of switching function, Concept of prime implicant, Karnaugh map method, Quine & McCluskey's method, Cases with don't care terms, Multiple output switching function.

**Unit II**
Introduction to logic gates, Universal gate, Half adder, Half subtractor, Full adder, Full subtractor circuits, Series & parallel addition, BCD adders, Look-ahead carry generator.

**Unit III**
Linear wave shaping circuits, Bistable, Monostable & Astable multivibrator, Schmitt trigger circuits & Schmitt-Nand gates. Logic families: RTL, DTL, All types of TTL circuits, ECL, I2L, PMOS, NMOS & CMOS logic, Gated flip-flops and gated multivibrator, Interfacing between TTL to MOS.

**Unit IV**
Decoders, Encoders, Multiplexers, Demultiplexers, Introduction to various semiconductor memories & designing with ROM and PLA. Introduction to Shift Registers, Counters, Synchronous & asynchronous counters, Designing of Combinational circuits like code converters.

**Unit V**
Introduction of Analog to Digital & Digital to Analog converters, sample & hold circuits and V-F converters.

**References:**
1. M. Mano; "Digital Logic & Computer Design"; PHI.
2. Malvino & Leach; "Digital Principles & Applications"; TMH
3. W.H. Gotham; "Digital Electronics"; PHI.
4. Millman & Taub; "Pulse, Digital & Switching Waveforms"; TMH
5. Jain RP; Modern digital Electronics; TMH
6. R.J. Tocci, "Digital Systems Principles & Applications".

**List of experiment (Expandable)**
1. To study and test of operation of all logic gates for various IC’s (IC#7400, IC#7403, IC#7408, IC#7432, IC#7486).
2. Verification of Demorgan’s theorem.
3. To construct of half adder and full adder
4. To construct of half subtractor and full subtractor circuits
5. Verification of versatility of NAND gate.
6. Verification of versatility of NOR gate.
7. Designing and verification of property of full adder.
8. Design a BCD to excess-3 code converter.
9. Design a Multiplexer/ Demultiplexer.
Unit I  Semiconductor device, theory of P-N junction, temperature dependence and breakdown characteristics, junction capacitances. Zener diode, Varactor diode, PIN diode, LED, Photo diode, Transistors BJT, FET, MOSFET, types, working principal, characteristics, and region of operation, load line biasing method. Transistor as an amplifier, gain, bandwidth, frequency response, h-parameters equivalent, type of amplifier.

Unit II  Feedback amplifier, negative feedback, voltage-series, voltage shunt, current series and current shunt feedback, Sinusoidal oscillators, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers, their efficiency and power Dissipation.

Unit III  Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time, transistor as switch, Multivibrators, Bistable, Monostable, Astable multivibrators. Clippers and clampsers, Differential amplifier, calculation of differential, common mode gain and CMRR using h-parameters, Darlington pair, Boot strapping technique. Cascade and cascode amplifier.

Unit IV  Operational amplifier characteristics, slew rate, full power bandwidth, offset voltage, bias current, application, inverting, non-inverting amplifier, summer, averager, differentiator, integrator, differential amplifier, instrumentation amplifier, log and antilog amplifier, voltage to current and current to voltage converters, comparators Schmitt trigger, active filters, 555 timer and its application.

Unit V  Regulated power supplies., Series and shunt regulators, current limiting circuits, Introduction to IC voltage regulators, fixed and adjustable switching regulators, SMPS, UPS

References:
2. Gayakwad; OP-amp and linear Integrated Circuits; Pearson Education
3. Salivahanan; Electronic devices and circuits; TMH
4. Salivahanan; Linear Integrated Circuits; TMH
5. Milliman Grabel; Microelectronics, TMH
6. Robert Boylestad & Nashetsky; Electronics Devices and circuit Theory; Pearson Ed.

List of Experiments (Expandable):
1. Diode and Transistor characteristics
2. Transistor Applications (Amplifier and switching)
3. OP-Amp and its Applications
4. 555 timer and its Applications

UNIT II Stack, Array Implementation of stack, Linked Representation of Stack, Application of stack: Conversion of Infix to Prefix and Postfix Expressions and Expression evaluation, Queue, Array and linked implementation of queues, Circular queues, D-queues and Priority Queues. Linked list, Implementation of Singly Linked List, Two-way Header List, Doubly linked list, Linked List in Array. Generalized linked list, Application: Garbage collection and compaction, Polynomial Arithmetic.


UNIT IV Internal and External sorting, Insertion Sort, Bubble Sort, selection sort Quick Sort, Merge Sort, Heap Sort, Radix sort. Searching & Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. Symbol Table, Static tree table, Dynamic Tree table.


Reference:
2. ISRD Group; Data structures using C; TMH
3. Lipschutz; Data structure (Schaum); TMH
6. Data Structures Trembley and Sorenson, TMH Publications
7. Pai; Data structure and algorithm; TMH
8. Introduction to Algorithm- Cormen, AWL

List of Experiments (expandable):
Programs in C relating to different theory units.
Course Contents

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UNIT-I 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


UNIT-III Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, 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


UNIT-V Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:
1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, “Programming In Java”; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
6. Cay Horstmann, Big JAVA, Wiely India.

List of Program to be perform (Expandable)
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 CONSTRUCTOR
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.
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**Unit I Computer Basics and CPU:** Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer. 8085 microprocessor organization

**Unit-II Control Unit Organization:** Hardwired control unit, Micro and nano programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming,

Arithmetic and Logic Unit: Arithmetic Processor, Addition, subtraction, multiplication and division, Floating point and decimal arithmetic and arithmetic units, design of arithmetic unit.

**Unit-III Input Output Organization:** Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor, 8085 I/O structure, 8085 instruction set and basic programming. Data transfer – Serial / parallel, synchronous/asynchronous, simplex/half duplex and full duplex.

**Unit-IV Memory organization:** Memory Maps, Memory Hierarchy, Cache Memory - Organization and mappings. Associative memory, Virtual memory, Memory Management Hardware.

**Unit V Multiprocessors:** Pipeline and Vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter-processor communication.

**References:**
1. Morris Mano: Computer System Architecture, PHI.
2. Tanenbaum: Structured Computer Organization, Pearson Education
4. Gaonkar: Microprocessor Architecture, Programming, Applications with 8085; Penram Int.
5. William Stallings: Computer Organization and Architecture, PHI
6. ISRD group; Computer orgOrganization; TMH
7. Carter: Computer Architecture (Schaum); TMH
8. Carl Hamacher: Computer Organization, TMH
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<tr>
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<th>Code</th>
<th>Credits-4C</th>
<th>Theory Paper</th>
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**Unit-I** 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-II** 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-III** 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-IV** 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.


**References:**

4. Lipschutz; Discrete mathematics (Schaum); TMH
5. Deo, Narsingh, “Graph Theory With application to Engineering and Computer Science.”, PHI.
7. S k Sarkar “Discrete Mathematics”, S. Chand Pub
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<td>CS 403</td>
<td>L T P Max.</td>
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**Unit I** Abstract data types, Objects and classes, Attributes and Methods, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions. Object lifetime, Static and dynamic objects, global and local objects, Meta-class, Modeling the real world objects.

**Unit II** Relationships between classes, Association of objects, Types of Association, Recursive Association, Multiplicities, Navigability, Named association, Aggregation of objects. Types of Aggregation, Delegation, Modeling Association and Aggregation.

**Unit III** Inheritance and Polymorphism, Types of polymorphism, Static and dynamic polymorphism, Operator and Method overloading, Inherited methods, Redefined methods, the protected interface, Abstract methods and classes, Public and protected properties, Private operations, Disinheritance, Multiple inheritance.

**Unit IV** Container Classes, Container types, typical functions and iterator methods, Heterogeneous containers, Persistent objects, stream, and files, Object oriented programming languages.

**Unit V** Study of C++/Java as Object-oriented programming language.

**References:**
1. David Parsons; Object oriented programming with C++; BPB publication
2. Object oriented programming in C++ by Robert Lafore: Galgotia
3. Balagurusamy; Object oriented programming with C++; TMH
5. Hubbard; Programming in C++ (Schaum); TMH
6. Mastering C++ by Venugopal, TMH

**List of experiments (Expandable):**
Programming assignments may be given to students so that they can better understand the concepts of object oriented programming such as objects, classes, class-relationships, association, aggregation, inheritance, polymorphism etc.
<table>
<thead>
<tr>
<th>Category</th>
<th>Title</th>
<th>Code</th>
<th>Credits-6C</th>
<th>Theory Papers</th>
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</thead>
<tbody>
<tr>
<td>Departmental</td>
<td>Analysis &amp; Design of Algorithm</td>
<td>CS/IT-404</td>
<td>L T P</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3 hrs.</td>
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<tr>
<td>Core DC-7</td>
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<td>3 1 2</td>
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</table>

**Unit I** 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 II** 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, etc.

**Unit III** Concept of dynamic programming, problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm, etc.

**Unit IV** Backtracking concept and its examples like 8 queen’s problem, Hamiltonian cycle, Graph coloring problem etc. 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 V** 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

**List of Experiments (expandable):**
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.
Course Contents

<table>
<thead>
<tr>
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<th>Code</th>
<th>Credit-6C</th>
<th>Theory Paper</th>
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<tr>
<td>DID-1</td>
<td>Analog and Digital Communication</td>
<td>BM/CS/EE/IT 405</td>
<td>L 3 T1 P2</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3hrs.</td>
</tr>
</tbody>
</table>

**Unit-I**  
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 density (Parseval’s theorem), Power density of periodic gate and impulse function, impulse response of a system, convolutions, convolution with impulse function, causal and non causal system impulse response of ideal low pass filter, Correlation & Auto correlation.

**Unit-II**  
Base band signal, need of modulation, Introduction of modulations techniques, 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 Transmission Angle modulation, Frequency and phase modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Bandwidth comparison of modulation techniques.

**Unit-III**  
Sampling of signal, sampling theorem for low pass and Band pass signal, Pulse amplitude modulation (PAM), Time division, multiplexing (TDM). Channel Bandwidth for PAM-TDM signal Type of sampling instantaneous, Natural and flat top, Aperture effect, Introduction to pulse position and pulse duration modulations, Digital signal, Quantization, Quantization error, Pulse code modulation, signal to noise ratio, Companding, Data rate and Baud rate, Bit rate, multiplexed PCM signal, Differential PCM (DPCM), Delta Modulation (DM) and Adaptive Delta Modulation (ADM), comparison of various systems.

**Unit-IV**  
Digital modulations techniques, Generation, detection, equation and Bandwidth of amplitude shift keying (ASK) Binary Phase Shift keying (BPSK), Differential phase shift keying (DPSK), offset and non offset quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift Keying (BSFK), M-Ary FSK Quadrature Amplitude modulation (QAM), MODEM, Introduction to probability of error.

**Unit-V**  
Information theory and coding- Information, entropies (Marginal and conditional), Model of a communication system, Mathematical representation of source, channel and receiver characteristics, Mutual information, channel capacity efficiency of noise free channel Binary symmetric channel (BSC) Binary erasure channel (BEC), Repetition of signal, NM symmetric Binary channel, Shannon theorem, Shanon-Hartley theorem (S/N-BW trade off) Source encoding code properties; Shanon, Fano and Huffman coding methods and their efficiency error control coding, Minimum Hamming distance, Linear Block Code, Cyclic code and convolution codes. Line Encoding: Manchester coding, RZ, NRZ coding.

**References:**  
1. Singh & Sapre, Communication System, TMH  
2. Taub & shilling, Communication System, TMH  
3. Hsu: Analog and digital communication(Schaum); TMH  
4. B.P. Lathi, Modern Digital and analog communication system,  
5. Simon Haykins, Communication System. John Willy  
6. Wayne Tomasi, Electronic Communication system.  
List of Experiments (Expandable)

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.
6. Study of AM modulation and Demodulation techniques (Transmitter and Receiver) Calculate of parameters
7. Study of FM modulation and demodulation (Transmitter and Receiver) & Calculation of parameters
8. To construct and verify pre emphasis and de-emphasis and plot the wave forms.
9. Study of super heterodyne receiver and characteristics of ratio radio receiver.
10. To construct frequency multiplier circuit and to observe the waveform
11. Study of AVC and AFC.
UNIT I Introduction  

UNIT II Basic Features Of C#  
Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures.  
Advanced Features Of C# Interfaces, Arrays, Indexers and Collections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

UNIT III 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, validations controls, rich controls.  
Windows Forms: All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

UNIT IV 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 view controls, ado .net data readers, SQL data source control, object data source control, site map data source.


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
5. XML Bible by Elliott Rusty Harold ,
6. ASP .Net Complete Reference by McDonald, TMH.
7. ADO .Net Complete Reference by Odey, TMH

List of Experiments/ program (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 SMPT 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#
12. Working with Forms using ASP .Net
13. Data Sources access through ADO.Net,
14. Working with Data readers , Transactions
15. Creating Web Application.
## Course of Study and Scheme of Examination
**B.E. Computer Science & Engineering (Proposed Scheme)**

### SEMESTER – V

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Category</th>
<th>BOS Code</th>
<th>Course Code (Old)</th>
<th>Course Code (New)</th>
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<td>CS-5512</td>
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<td>Computer Graphics &amp; Multimedia</td>
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**Minimum Pass Marks**

(A) Theory: 35 Percent
(B) Practical: 50 Percent

**Duration:**

(C) Duration of Theory Paper 3 hrs.
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 501 Data Communication

Course Contents

<table>
<thead>
<tr>
<th>Category of Course</th>
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<th>Credit-6C</th>
<th>Theory Paper (ES)</th>
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<td>Departmental Core</td>
<td>Data Communication</td>
<td>CS 501</td>
<td>L T P</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3hrs.</td>
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</table>

Branch: Computer Science and Engineering V Semester
Course: CS 501 Data Communication

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in Data Communication. In this subject we discuss various principles, standards for communication over different type of Communication Media.

PREREQUISITE :-
The students should have general idea about the analog and digital communication.

UNIT :-I
Introduction to data communication: Components , data representation ,data flow and basic model ,data representation ,Serial & Parallel transmission , Modes of data transmission , Encoding:Unipolar,Polar ,Bipolar line & block codes ,Data compression ,Frequency dependant codes, Run length encoding ,Relative encoding ,LZ Compression ,Image and multimedia compression. Review of analog & digital transmission methods, Nyquist Theorem .

UNIT:-2

UNIT:-3

UNIT:-4
Transmission Media: Transmission line characterestics, distortions, Crosstalk, Guided Media: Twisted Pair, Baseband & Broadband Coaxial.

UNIT:-5

Transmission Errors: Content Error, flow integrity error, methods of error control, Error detection, Error correction, Bit error rate, Error detection methods: Parity checking, Checksum Error Detection, Cyclic Redundancy Check, Hamming code, Interleaved codes, Block Parity, Convolution code, Hardware Implementation, Checksum.

Suggested Reading:

1. Gupta Prakash C., "Data communication", PHI Learning
2. Tomasi, "Introduction to Data Communication & Networking, Pearson Education
3. Forouzan, "Data communication", TATA McGraw
4. Godbole, "Data Communication & Network", TMH
5. Miller, "Data Network and Communication", Cengage Delmar Learning
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 502 Operating System

<table>
<thead>
<tr>
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<td>Duration-3 hrs.</td>
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Branch: Computer Science and Engineering V Semester
Course: CS 502 Operating System

RATIONALE:
The purpose of this subject is to cover the underlying concepts Operating System. This syllabus provides a comprehensive introduction of Operating System, Process Management, Memory Management, File Management and I/O management.

PREREQUISITE:-
The students should have general idea about Operating System Concept, types of Operating System and their functionality.

Unit I
Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling. Types of Operating System: Bare machine, Batch Processing, Real Time, Multitasking & Multiprogramming, time-sharing system.

Unit II
File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization, sharing & implementation issues, Disk & Drum Scheduling, I/O devices organization, I/O devices organization, I/O buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations.
Device Driver: Path managements, Sub module, Procedure, Scheduler, Handler, Interrupt Service Routine. File system in Linux & Windows

Unit III
Process: Concept, Process Control Blocks(PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization.
Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Process Management in Linux.

Unit IV
Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Structure & implementation of Page table.
Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.
Unit V
Distributed operating system:-Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory(DSM), Basic Concept of Parallel Processing & Concurrent Programming

List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. Write a program to implement classical inter process communication problem(producer consumer).
7. Write a program to implement classical inter process communication problem(Reader Writers).
8. Write a program to implement classical inter process communication problem(Dining_Philosophers).
9. Write a program to implement & Compare various page replacement algorithm.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11. Write a program to implement Banker’s algorithms.
12. Write a program to implement Remote Proccedure Call(RPC).
13. Write a Devices Drivers for any Device or pheriperal.

Suggested Reading:
3. Tannanbaum, “Modern operating system”, PHI Learning
4. Dhamdhere, "Operating System",TMH.
5. Achyut S Godbole,“Operating System”, TMH.
Branch: Computer Science and Engineering V Semester
Course: CS 503 Data Base Management System

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in creating a Data Base System. These techniques can be used in Software Developments.

PREREQUISITE
The students should have a general idea about data base concept, data models and sql statements.

Unit I
DBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach, Advantages, of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Overall Database Structure, Functions of DBA and designer, ER data model:Entities and attributes, Entity types, Defining the E-R diagram, Concept of Generalization, Aggregation and Specialization. transforming ER diagram into the tables. Various other data models object oriented data Model, Network data model, and Relational data model, Comparison between the three types of models.

Unit II
Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Intension and Extension, Relational Query languages:SQL-DDL, DML, integrity constraints, Complex queries, various joins, indexing, triggers, assertions, Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union.
Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations.

Unit III
Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and losless join, problems with null valued and dangling tuples, multivalued dependencies.
Query Optimization: Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

Unit IV
Concurrency Control Techniques: - Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control, validation based protocol, multiple granularity. Multi version schemes, Recovery with concurrent transaction.
Introduction to Distributed databases, datamining, datawarehousing, Object Technology and DBMS , Comparative study of OODBMS Vs DBMS . Temporal, Deductive, Multimedia, Web & Mobile database.
Unit V
Introduction of ANSI SQL, anonymous block, nested anonymous block, branching and looping constructs in ANSI SQL. Cursor management: nested and parameterized cursors, Oracle exception handling mechanism. Stored procedures, in, out, in out type parameters, usage of parameters in procedures. User defined functions their limitations. Triggers, mutating errors, instead of triggers.

Suggested list of experiments: -
Lab Assignments:
1. Delete duplicate row from the table.
2. Display the alternate row from table.
3. Delete alternate row from table.
5. Find the third highest paid and third lowest paid salary.
6. Display the 3rd, 4th, 9th rows from table.
7. Display the ename, which is start with j, k, l or m.
8. Show all employees who were hired the first half of the month.
9. Display the three record in the first row and two records in the second row and one record in the third row in a single sql statements.
10. Write a sql statements for rollback commit and save points.
11. Write a pl/sql for select, insert, update and delete statements.
12. Write a pl/sql block to delete a record. If delete operation is successful return 1 else return 0.
13. Display name, hire date of all employees using cursors.
15. Write a database trigger which fires if you try to insert, update, or delete after 7’o’ clock.
16. Write a data base trigger, which acts just like primary key and does not allow duplicate values.
17. Create a data base trigger, which performs the action of the on delete cascade.
18. Write a data base trigger, which should not delete from emp table if the day is Sunday.
19. In this subject the students are supposed to prepare a small database application in complete semester like financial accounting system, Railway reservation system, institute timetable management system. Student record system, library management system etc. in RDBMS as follows:
   Section A:
   Solving the case studies using ER datamodel (design of the database)
   Section B:
   Implement a miniproject for the problem taken in section A.

Suggested Reading:-
1. Date C J, “An Introduction To Database System”, Pearson Educations
5. Atul Kahate , “Introduction to Database Management System”, Pearson Educations
6. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press,TMH.
7. Paneerselvam,”DataBase Management System”, PHI Learning
8. dev.mysql.com 9. www.postgresql.org
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 504 Computer Graphics & Multimedia

Course Contents

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<tr>
<th>Category of Course</th>
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<th>Course Code</th>
<th>Credit-6C</th>
<th>Theory Paper (ES)</th>
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<td>Departmental Core</td>
<td>DC-12</td>
<td>CS 5512/CS504</td>
<td>L T P</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3hrs.</td>
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Branch: Computer Science and Engineering V semester
Course: CS 5512/CS504 Computer Graphics & Multimedia

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in Computer Graphics, Animations & Multimedia.

PREREQUISITE:
The students should have general Idea about input/output devices, graphics, text, audio, video and animation. In addition, a familiarity with general mathematical transformations is required.

Unit-I
Introduction to raster scan displays, Pixels, frame buffer, Vector & Character generation, random scan systems, Graphics Primitives, Display devices, Display file structure, Scan Conversion techniques, line drawing: simple DDA, Bresenham’s Algorithm, Circle Drawing Algorithms. Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

Unit-II

Unit-III

Unit-IV
Basic Illumination Model, Diffuse reflection, Specular reflection, Phong Shading Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV.

Unit –V
LIST OF PRACTICAL

1. A BRIEF STUDY OF VARIOUS TYPES OF INPUT AND OUTPUT DEVICES.
2. PROGRAM TO IMPLEMENT A LINE USING SLOPE INTERCEPT FORMULA.
3. PROGRAM TO IMPLEMENT LINE USING DDA ALGORITHM.
4. PROGRAM TO IMPLEMENT LINE USING BRESENHAM’S ALGORITHM.
5. PROGRAM TO IMPLEMENT CIRCLE USING MID POINT ALGORITHM.
6. PROGRAM TO IMPLEMENT TRANSLATION OF A LINE AND TRIANGLE
7. PROGRAM TO IMPLEMENT ROTATION OF A LINE AND TRIANGLE
8. PROGRAM TO IMPLEMENT SCALING TRANSFORMATION.
9. PROGRAM TO IMPLEMENT 3D ROTATION ABOUT AN ARBITRARY AXIS .
10. PROGRAM TO IMPLEMENT COHEN SUTHERLAND LINE CLIPPING .
11. PROGRAM TO IMPLEMENT SUTHERLAND HODGMAN POLYGON CLIPPING .
12. PROGRAM TO DRAW BEZIER CURVE.
13. PROGRAM TO DRAW B-SPLINE CURVE .

Suggested Reading:

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 505 Theory of Computation

<table>
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<td>Theory of Computation</td>
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<td>3 L 1 T 0</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3hrs.</td>
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Branch: Computer Science and Engineering V Semester
Course: CS 505 Theory of Computation

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in Theory of Computation. In this syllabus we cover finite automata, pushdown automata, Context free grammars and Turing machines.

PREREQUISITE:-
The students should have general idea about computing and mathematical concepts, Transition graph, Transition matrix.

UNIT 1:
Automata:
Basic machine, FSM, Transition graph, Transition matrix, Deterministic and non-deterministic FSM’s, Equivalence of DFA and N DFA, 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 satisfiability problems, vertex cover problem, Hamiltonian path problem, traveling salesman problem, Partition problem etc.

**Suggested Reading:**
5. Daniel I.A. Cohen, "Introduction to Computer Theory", Wiley India.
Branch: Computer Science and Engineering V Semester
Course: CS 5305/CS506 Computer Programming V (Unix/Linux-Lab).

RATIONALE:
The purpose of this subject is to cover the concepts, Installation Process, Hardware Requirements and features of Unix/Linux. Basic Commands & Shell Programming.

PREREQUISITE
The students should have general idea about computing fundamentals & operating system and at least one year of experience in programming.

Overview of Unix/Linux:

Use of Linux as web-server, file server, directory server, application server, DNS server, SMTP server, Firewall, Proxy server.

File System:

Process Control:

System Security:
Dynamic Host Configuration Protocol: -
Introduction, DHCP Leased Time, DHCP Scopes, DHCP IP Address, Allocation Types, Planning DHCP Deployment, DHCP Configuration files, Automatic Startup of DHCP Server, Configuration of DHCP Clients, Manually Configuring the DHCP.

Case Study: -
Installation of Linux, Customization of Linux, Installation of SAMBA, APACHE, TOMCAT, Send MAIL, Postfix, Implementation of DNS, LDAP services, Firewall, Proxy server

List of Experiments:-
1. To Study basic & User status Unix/Linux Commands.
2. Study & use of commands for performing arithmetic operations with Unix/Linux.
3. Create a file called wlcc.txt with some lines and display how many lines, words and characters are present in that file.
4. Append ten more simple lines to the wlcc.txt file created above and split the appended file into 3 parts. What will be the names of these split files? Display the contents of each of these files. How many lines will be there on the last file?
5. Given two files each of which contains names of students. Create a program to display only those names that are found on both the files.
6. Create a program to find out the inode number of any desired file.
7. Study & use of the Command for changing file permissions.
8. Write a pipeline of commands, which displays on the monitor as well as saves the information about the number of users using the system at present on a file called usere.ux.
9. Execute shell commands through vi editor.
10. Installation, Configuration & Customizations of Unix/Linux.
11. Write a shell script that accepts any number of arguments and prints them in the reverse order.
12. Write a shell script to find the smallest of three numbers that are read from the keyboard.
13. Write a shell script that reports the logging in of a specified user within one minute after he/she logs in. The script automatically terminates if the specified user does not login during a specified period of time.
14. Installation of SAMBA, APACHE, TOMCAT.
15. Implementation of DNS, LDAP services,
16. Study & installation of Firewall & Proxy server

Suggested Reading:
3. Sumitab Das,”Unix Concept & Application”,TMH
4. Gopalan, Shivaselvan,”Beginners Guide to Unix ” PHI Learning
6. Richard Peterson,”Linux Complete Reference”,TMH
7. Richard Peterson,”Unix Complete Reference”,TMH
# Course of Study and Scheme of Examination

**B.E. Computer Science & Engineering (Proposed Scheme)**

## SEMESTER – VI

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course Category</th>
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<th>Course Code (Old)</th>
<th>Course Code (New)</th>
<th>Subject Period Per Week</th>
<th>Distribution of Marks</th>
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<td>CS-6513</td>
<td>CS601</td>
<td>Micro Processor and Interfacing</td>
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<td>CS602</td>
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<td>CS603</td>
<td>Software Engineering &amp; Project managements</td>
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<td>CS-6707</td>
<td>CS607</td>
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<td>CS-6708</td>
<td>CS608</td>
<td>Seminar/Group Discussion etc.</td>
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**Minimum Pass Marks**

**Duration:**

- (A) Theory: 35 Percent
- (B) Practical: 50 Percent
- (C) Duration of Theory Paper 3 hrs.
Branch: Computer Science and Engineering VI Semester
Course: CS 601 Micro Processor and Interfacing

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in Micro Processor and Interfacing. In this subject we cover the unique issues associated with designing, testing, integrating, and implementing microcontroller/microprocessor-based embedded systems.

PREREQUISITE
The students should have acquired fundamental microcontroller-associated programming skills using both the C programming language and assembly language

UNIT –I

UNIT – II

Instruction set for Intel 8086, Introduction Intimation and data formats, Addressing modes, Status flags, Symbols and abbreviations, programming of microprocessors, Assembly language, high level language, areas of application of various languages, Stacks, Sub routines system, software, commands in assembly language, software Development, Debugging program, Modular programming, Structured programming, Top-down, Bottom- up design , MACRO microprogramming

UNIT-III
Assembly language programming with Examples like Addition of 8/16-bit Binary number, subtraction of 8/16 bit binary number, Address partitioning, addressing mode, type of addressing mode, memory and I/o interfacing, Data transfer schemes, Interfacing device and I/ O devices I/ O ports, Basic I/ O Interfacing MDS, Micro controllers, I/ O processor and co- processors ,Microcomputer Development system, Single chip micro computers, intel 8748 intel 8051, inter 8096, intel 8049/ intel 2920/2921, I/ O processor UPI-425, UPI-41,42, Co-processor, math processor math co-processor – 8087, 80287, 80387DX 803875x.
UNIT – IV
Bus Interface I/o port Addressing, decoding 8279, Programmable key board/display interface, 8254 Internal Timer, 16550 programmable communication interface A/D, 8259A Programmable Interrupt Controller, 8237 DMA Controller, Shared bus operation, disk Memory system Video display. ISA Bus, Extended ISA ( EISA) and VESA Local Buses, Peripheral Component Inter Connect (Pc I) Bus, Parallel Printer interface (LPT) Universal serial Bus (USB) Accelerated graphics port (AGP),Programmable Communication interfere 8251 VSART CRT Controller 8275, 6854, Floppy disk Controller 8272, I/o processor 8089.

UNIT – V
Memory Unit, RAM,SRAM, DRAM,ROM, PROM EPROM, EEPROM Nonvolatile RAM semiconductor Technology for memory, Shift register, Magnetic Memory, Tap, disc, main memory and secondary memory cache memory, program memory and Data Memory, Real and virtual memory Buses, memory Addressing capacity of CPU, processing speed of computer.

List of Experiments
1. Add a data byte located at offset 0500H in 2000H segment to another data byte available at 06000H in same segment and store the resulting 0700H in same segment?
2. Add the contents of memory location 2000H, offset 0500H to the contained of accumulator.
3. Write a program to find the average to two temperature name HI-TEMP and LO-TEMP and puts the result in the memory location AV-TEMP.
4. Find out the largest number from an unordered array of sixteen 8-bit numbers stored sequentially in the memory locations starting at offset 0500H in the segment 2000H
5. Move a byte string, 16 bytes long, from the offset 0200H to 0300H in the segment 7000H.
6. Write a program to add a profit factor to each element in a cost array and puts the result in a PRICES array, where profit factor is 15H and COST =20H, 28H, 15H, 26H, 19H, 27H, 16H, 29H.
7. Write a program to find out the number of positive numbers and negative numbers from a given series of signed numbers.
8. Write a program that performs the addition, subtraction, multiplications, division of the given operands. Perform BCD operation for addition and subtraction.
9. A Program to find out the number of even and odd numbers from a given series of 16 bit hexad4ecimal numbers.

Suggested Reading:
1. Douglas V Hall, “Microprocessors and interfacing – Programming & Hardware” TMH
4. Krishna Kant,”Microprocessors and Microcontrollers”, PHI Learning
6. R.S. Gaonkar ,”Microprocessors and interfacing”, TMH
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 602 Principles Of Programming Languages

<table>
<thead>
<tr>
<th>Category of Course</th>
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<th>Course Code</th>
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<th>Theory Paper (ES)</th>
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<td>Departmental Core DC-14</td>
<td>Principles Of Programming Languages</td>
<td>CS 6514/CS602</td>
<td>L T P</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3hrs.</td>
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Branch: Computer Science and Engineering VI Semester
Course: CS 602 Principles Of Programming Languages

RATIONALE:-
The purpose of this subject is to cover the underlying concepts and techniques used in Programming Languages. It provides general idea related to operating & Programming environment.

PREREQUISITE:-
The students should have general idea about programming language. In addition, a familiarity with Elementary and Structured Data Types is needed for better understanding.

UNIT-I


UNIT-II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names ,Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Sequence control with Expressions, Conditional Statements, Loops, Exception handling.

UNIT-III

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, design issues for functions overloaded operators, co routines.

UNIT-IV

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, Static and Stack-Based Storage management. heap based storage management. Garbage Collection. object oriented programming in small talk, C++, Java, C#, PHP, Perl. Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.
UNIT – V

Exception handling, Exceptions, exception Propagation, Exception handler in C++ and Java. Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Functional Programming Languages: Introduction, fundamentals. Introduction to 4GL.

Suggested Reading:
5  Cavlo Ghezzi & Mehdi Jazayeri " Programming Languages Concepts", Willey India
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 603 Software Engineering & Project Managements

Course Contents

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<th>Category of Course</th>
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<td>Departmental Core</td>
<td>Software Engineering &amp; Project</td>
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<td>L T P</td>
<td>Max.Marks-100 Min.</td>
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<td>Management</td>
<td>CS603</td>
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<td>Marks-35 Duration-3 hrs.</td>
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Branch: Computer Science & Engineering VI Semester
Course: CS 6516/ CS603 Software Engineering & Project Management

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in Software Engineering & Project Management. Some of these techniques can be used in software design & its implementation.

PREREQUISITE:-
The students should have at least one year of experience in programming a high-level language and databases. In addition, a familiarity with software development life cycle will be useful in studying this subject.

Unit I: The Software Product and Software Process:

Unit II: 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

Unit III: Software Design

Unit IV: Software Analysis and Testing
Testing Tools. Introduction to Object-oriented analysis, design and comparison with structured software engg.

Unit V: 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.


Practical and Lab work
Lab work should include a running case study problem for which different deliverables at the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, NetBeans, and Visual Studio can be used.

Suggested Reading:
5. Richard H.Thayer,"Software Engineering & Project Managements",Willey India
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 604 Computer Networking

Course Contents

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<td>Departmental Core DC-15</td>
<td>Computer Networking</td>
<td>CS 6515/CS604</td>
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Branch: Computer Science & Engineering VI Semester.
Course: CS 6515/CS604 Computer Networking

RATIONALE:-
The purpose of this subject is to cover the underlying concepts and techniques used in Computer Networking. This syllabus provides a comprehensive introduction to computer network, network architecture and protocols.

PREREQUISITE:-
The students should have thorough exposure in Analog and Digital Communication and Data Communications. Knowledge of Topology and protocol will help in better understanding

Unit I


Examples of Networks: Telecommunication Network, Corporate Networks, Connection oriented network i.e., X.25, Frame relay & ATM, Wireless LAN 802.11, internet, Intranet, Extranet, SNA & DNA etc.

Unit II


Unit III

MAC Sub layer: Static & Dynamic channel allocation, Media access control for LAN & WAN. Classification of MAC Sub layer protocol, Study of various collision, Collision free & limited contention protocol i.e., ALOHA : pure, slotted , CSMA, CSMA/CD,CSMA/CA, Bit Map, Binary count down, BRAP, MLMA, Adaptive tree walk & urn protocol etc. IEEE 802 standards for LAN & MAN & their comparison. Ethernet: Cabling, Binary exponentials algorithms, performance fast Ethernet, Gigabit Ethernet, FDDI. Wireless LANs, Broadband Wireless, Bluetooth: Architecture, Application & Layering.
UNIT - IV


Unit V


List of Experiments

1. To study Communication Guiding system
2. To study various types of connectors.
3. To study of different type of LAN equipments.
4. Study and verification of standard Network topologies i.e. Star, Bus, Ring etc
5. LAN installations and their Configurations.
6. To implement various types of error correcting techniques.
7. To implement various types of framing methods.
8. To implement various types of DLL protocols.
9. To study & configure various types of router & Bridges.
10. To implement various types of routing algorithm.
11. To study of Tool Command Language(TCL).
15. Study & implementations of VoIP Concepts.
16. Implementation & Comparisons of various types of Cryptographic algorithms.

Suggested Reading:

6. Prakash C. Gupta, “Data Communications and Computer Networks”, PHI
7. Bertsekas & Gallager “Data Network” , PHI
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 605 Advance Computer Architecture

Course Contents

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<td>CS 605</td>
<td>L  T  P</td>
<td>Max.Marks-100 Min.Marks-35 Duration-3hrs.</td>
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Branch: Computer Science and Engineering VI Semester
Course: CS 605 Advance Computer Architecture

RATIONALE:
The purpose of this subject is to cover the underlying concepts and techniques used in Advance Computer Architecture. The Syllabus discusses principles of parallel algorithms design and different parallel programming models

PREREQUISITE
The students should have general Idea of Computer Organization. In addition, a familiarity with Memory organization, Computational models is required.

Unit-I
Flynn’s Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

Unit-II

Unit-III
Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling - score boarding and Tomosulo’s algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscaler pipeline design, Super pipeline processor design.

Unit-IV
Unit-V

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

Suggested Reading:

1. Kai Hwang, “Advanced computer architecture”, TMH.
2. J.P.Hayes, “computer Architecture and organization”; MGH.
6. Hwang and Briggs, “Computer Architecture and Parallel Processing”; MGH.