

BE IV SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-4001	Business Information System	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	20

Unit I:

Introduction to BIS: Data, Information & Representation of information –Features of Information, Types of information, Process of Generation of Information and Elements of Information System, Systems concept: Definition. Characteristics of a System: Organization, Interaction, Interdependence, Integration, Central Objective, Elements of a System, Types of Systems, Computer Peripherals and their characteristics to business information processing: disc, tape, CDs, Terminals, and Printers.

Unit II:

Data Representation and File management- File Structure, File Organization, and Access: Serial Organization, Sequential Organization, Indexed Sequential Organization and random Access logic.

Unit III:

Basic client server model. User interface, business logic, The System Development Life Cycle-Introduction, The System Development Life Cycle: Recognition of Need-What is the Problem? Feasibility Study, Analysis, Design, Implementation and Maintenance.

Unit IV:

Front end and business logic tools (like Visual Basic): Introduction to VB6.0, Visual Basic 6.0 Programming Environment, working with forms ,developing an application, Variables, Data Types and Modules, Operators, Procedures and Control Structures, Arrays ,working with Controls :Text Box Control ,Label Control ,Command button, Option button Control, List box and Combo Box Controls, Scrollbar Control, working with Control Arrays, Menus, Mouse Events, Dialog Boxes, Graphics: Graphical controls and Graphics methods, Multiple Document Interface(MDI).

Unit V:

Introduction of financial application: brief overview of accounting principles, use of excel as an example spreadsheet system for basic financial application, linking and embedded object: OLE Fundamentals, Using OLE Container control, computing in main frame environment like OS/400 : features and drawbacks of OS/400, tools for report generation (like rpg – features of report program generator)

Text Books

1. Muneesh Kumar, "Business Information Systems", Vikas Publication House.
2. Elias M. Awad, "System Analysis and Design", Galgotia Publications Pvt. Ltd.
3. Evangelos Petroustos, "Mastering Visual Basic 6.0", BPB Publications.
4. B. GovindRajalu, "IBM PC and Clones", 9th edition, Tata Mc Graw Hill Publishing Company Ltd.

Reference Books

1. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Publishing House.

BE IV SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-4002	Analysis & Design of Algorithm	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

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, Roberto Tamassia, Algorithm Design, Wiley 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.

BE IV SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-4003	Computer Organization & Architecture	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

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
3. J P Hayes, Computer Architecture and Organisations, Mc- Graw Hills, New Delhi
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

BE IV SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-4004	Analog & Digital Communication	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

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 (BFSK), 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, LinearBlock 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.
7. Martin S. Roden, Analog & Digital Communication System; Discovery Press.
8. Frank R. Dungan, Electronic Communication System, Thomson/Vikas.

BE IV SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-4005	Discrete Structure	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

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.

Unit V:

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices. Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multinomial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions,

References:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Lipschutz; Discrete mathematics (Schaum); TMH
5. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
6. Krishnamurthy V; "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
7. S k Sarkar "Discrete Mathematics", S. Chand Pub

BE IV SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-4006	Dot Net with C# and ASP	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	0	0	4	4	60	20

- 1. Introduction:** The Philosophy of Dot Net, Understanding the previous state of affairs, The Dot Net solution, Introducing the building blocks of the Dot Net platform (CLR, CTS & CLS), The Platform-Independent nature of Dot Net, Dot Net frame work Dot Net base classes, Versions of Dot Net, Windows Communication foundation, Widows Presentation foundation, Windows work flow and Windows Card Space.
- 2. Visual Studio Dot Net:** Working with Visual Studio Dot, Start Page, Solution Explorer, Server Explorer, Class view, Windows, Object browser, Code Window, Intellisense, Help facility – MSDN, Creating projects, Building application.
- 3. Data types & Console I/O:** Value types and Reference types Boxing and Unboxing, Data Type Conversion, Control Statements, Arrays, Jagged Arrays Classes Methods, 'value, ref, out' type parameters, Methods overloading.
- 4. Classes & Objects:** Definition and uses of Class, Object modifiers, Static Class Members, Constant & Read-only Data Members, Constructors and its types, indexer, Properties, Operator Overloading, Inheritance, Method Overriding, Virtual methods, Abstract Classes & methods, Sealed Classes, Interfaces.
- 5. Advance C# Programming Constructs:** Delegates, Events and Attributes, reflection, Lambdas, Errors and Exceptions, Threads: Usage, Thread Class, thread Priority. Dot Net Security: Code Access, Role Based, Managing Security Policies, Dot Net Remoting and Architecture, Localization & Globalization. LINQ.
- 6. Windows Application:** Event Driven Programming Model, Control Class, Standard Controls and Components, Forms, Form Life Cycle, Windows Application Deployment.
- 7. Data:** ADO.NET Overview, Using Database Connections, Command, Data Reader, Data Set Class, Data Grid Control, Data Binding, Programming with LINQ to Data Set & SQL.
- 8. Web Applications:** The Role of HTTP, HTML & Client Side Scripting, Webserver-IIS, The Life Cycle of an ASP.NET Web Page, The Role of the Web.config File, ASP.NET Web Controls, Themes, and Master Pages, ASP.NET State Management Techniques, Web Application Deployment, Web Services.

Reference Books:

1. Wrox Press – Professional C# 3rd Edition, Simon Robinson, Christian Nagel, Jay Glynn, Morgan Skinner, Karli Watson, Bill Evjen.
2. Pro C# 2008 and the .Net 3.5 Platform Fourth Edition, Andrew Troelsen.
3. Wrox Press – Beginning ASP.NET 3.5 : In C# and VB, Imar Spaanjaars.
4. Head First C#, 2E : A Learner's Guide to Real-World Programming with Visual C# and .Net (Head First Guides) by Andrew Stellman and Jennifer Greene.
5. Programming Microsoft LINQ (PRO-Developer) by Paolo Pialorsi and Macro Russo.