

SNDT Women's University

(Sndt.digitaluniversity.ac)

Syllabus – BCA



**SNDT Women's University
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Mumbai 400 020**

Revised – 2008

BCA SYLLABUS

<u>Sub.Code</u>	<u>SEMESTER – I (First Year)</u>	<u>L</u>	<u>P</u>	<u>T</u>	<u>M</u>
1001	Communication skills	4	-	2	100
1002	Discrete Structures and Graph Theory	4	-	2	100
1003	Introduction to Logic circuits and Digital Design	3	3	-	100
1004	Problem solving using 'C'	3	3		100
1005	Introduction to Operating System	4	-	2	100
1006	Principles and Practice of Accounting	4	-	2	100
<u>SEMESTER – II</u>		<u>L</u>	<u>P</u>	<u>T</u>	<u>M</u>
2001	Business Correspondence and Oral Communication	4	-	2	100
2002	Calculus	4	-	2	100
2003	Computer Organization and Architecture	4	-	2	100
2004	Unix Operating System	3	3	-	100
2005	Advanced 'C'	3	3	-	100
2006	Accounting and Financial Management	4	-	2	100

- L: Lecture per week
- P: Practical per week
- T: Tutorials per week
- M: Total marks.

Detailed Syllabus for the First Semester

1001. Communication Skill .

Description: The syllabus in the first year will cover fourteen short stories from the book Let's Go Home and Other stories.

1. *A Shadow*
2. *A Meeting pool*
3. *Green Parrot in a cage*
4. *The Portraits of a lady*
5. *Let's Go Home*
6. *Circus cat Alley cat*
7. *The Terrorist*
8. *Death of a Hero*
9. *Distant Drums*
10. *The White Dove*
11. *Glory at Twilight*
12. *The Zamindar of Pallipuram*
13. *The Homecoming*
14. *The cow of the Barricades*
15. *Presentations*

Reference:

1. Meenakshi Mukherjee, Let's Go Home And Other Stories An Anthology Of Indian Stories in English , Orient Longmans.

1002: Discrete Structures and Graph theory

Sets Theory
Permutations and combinations,
Binomial Theorem and Mathematical Induction
Relations and Recurrence relations
Functions
Properties of Integers
Graph theory

Reference:

Kolman, Busby and Ross, "Discrete mathematical Structures and graph theory"

1003 Introduction to logic circuits and Digital Design

Digital Logical Circuits
Boolean algebra
Truth tables
Combinational circuits
Flip-flops, Registers
Counters
Multiplexers and Decoders
Arithmetic Circuits
Computer Arithmetic
Number systems and character codes
Integer representation

Integer Arithmetic
Floating-point representation
Floating-point arithmetic

References:

1. "Modern Digital Electronics": Jain

Content analysis

No.	Topic/Content Analysis
Unit 1	Digital Logic Circuit
	Introduction of Digital Signals Logic Gates Universal Gates Implementation of universal gates Truth table
Unit 2	Boolean Algebra
	De Morgan's Theorems Boolean Laws Simplifications using Laws Minterm (SOP) Maxterm (POS) K-maps(4 units) using (SOP & POS)
Unit 3	Combinational circuit & Code conversion BCD-Binary, Binary-BCD, Binary-Grey Gray-Binary, BCD-Excess 3, Excess 3-BCD Using (x-map/Gates), Half adder, Full adder Half subtractor, Full subtractor
Unit 4	Combinational circuit using MSI

	<p>Block diagram of Mux (n: 1) with Truth Table Mux(2:1) using Logic gate Mux(4:1) using Logic gate</p> <p style="text-align: right;"><u>Truth Table Reduction</u></p> <p>- (16:1)-(8:1) - (8:1)-(4:1)</p> <p style="text-align: right;"><u>Mux tree / Mux cascading</u></p> <p>- (32:1) using 16:1 - (32:1) using 16:1 & 2:1 - (16:1) using 8:1</p> <p>Demux Block diagram(1:n) Demux (1:2) using gate Demux (1:4) using gate Implementation of Boolean function (Minterm/Maxterm) using MSI Dmux Tree/Cascading</p>
Unit 5	<p>Flip-Flop Definition of sequential circuit With block diagram 1 bit memory cell Truth Table, circuit diagram, - Excitation Table</p> <ul style="list-style-type: none"> ➤ SR flip flop ➤ JK flip flop ➤ Master slave JK flip flop ➤ D flip flop ➤ T flip flop <p>- Application of flip flop</p>
Unit 6	Register
	<p>Parallel register Shift register Application of Shift Register</p> <ul style="list-style-type: none"> - Delay line - Serial to parallel - Parallel to serial
Unit 7	Counters
	<p>Type of counters</p> <ul style="list-style-type: none"> - Synchronous - Asynchronous (ripple) <p>3bit & 4bit Ripple count with timing diagram 3bit & 4bit synchronous counter with time diagram Modulus of counter</p> <ul style="list-style-type: none"> - mod 10(decade counter) - mod 7

1004. Problem Solving Using 'C'

Concept of Problem Solving

Steps in Problem solving

Solving numerical problems.

What is Algorithm and Flowchart

Introduction to programming

History of 'C', 'C' primitives

Decision Control structures

Loop control structures

Case control structures

Functions

Recursion

C preprocessor

Arrays

Reference:

1. Y.P.Kanetkar ,“Let us 'C'”:

2. B. S. Gottfried, Schaum's Outline of Theory and Problems of Programming with C, Tata McGraw Hill, 1995.

3. Kerningham and Ritchie, The C Programming Language, Prentice Hall, 1991.

4. Ramkumar and Agrawal, Programming in ANSI C, Tata McGraw Hill, 1996.

1005. Introduction to Operating System

Introduction

Operating system service

File system, CPU Scheduling

Memory Management, Disk Scheduling,

Multiprocessing ,

Distributed Operating System , Deadlock

References:

1. Peterson, Silberschatz, Operating System Concepts, Addison Wesley, 1999

1006. Principles and Practice of Accountancy

Accounting term

Journals

Ledger

Cash Book

Bank Reconciliation Statement

Preparation of Trail Balance

Rectification of errors

Proprietors final Account

References :

1. Choudhari and Chopade, Book-Keeping & Accountancy, Sheth Publications, 1998

2. Kishnadwala, Book-Keeping & Accountancy, Manisha Prakashan, 1983.

Semeter II
Detailed Syllabus for the Second Semester

2001. Business Correspondance and Oral Communication

1. *Letters-format of letters*
2. *Principles of letter writing*
3. *Sales Writing*
4. *Credit Writing*
5. *Collection letters*
6. *Job Applications*
7. *Resumes*
8. *Letters of Complaint*
9. *Ability to describe objects*
10. *Ability to describe situations*
11. *Preparing Summaries*
12. *Debates*
13. *Essay Writing*
14. *Reports making*
15. *Note making*
16. *Presentations*

Reference:

RC Sharma and Krishna Mohan , “Business Correspondence and report writing” ,3rd Edition, Tata Mc-Graww Hill.

2002. Calculus

- Functions and their graph*
- Sequences*
- Limits and continuity*
- Differentiation*
- Integration and its Application to area*

References :

1. *M. Spiegel, Schaum’s series, Vector Analysis, McGraw Hill, 1974.*
2. *M. Spiegel, Schaum’s outline of Advance calculus, Tata McGraw Hill, 1974.*
3. *G. B. Thomas & Finney, Calculas and Analytical Geometry, Narosa Publications, 1977*

2003: Computer Organization and Architecture

Objective: Having the knowledge of digital logic this course introduces the principles of computer organization and basic architecture concepts

Detailed Syllabus:

No.	Topic/Content Analysis
Unit 1	Computer Structures
	Computer components Computer functions <ul style="list-style-type: none"> - Basic instruction cycle - Fetch & Execute cycle - Interrupts - Interrupts & Instruction - Cycle - Multiple interrupts - I/o functions Interconnection structure Bus Interconnection structures <ul style="list-style-type: none"> - Bus structure - Multiple bus hierarchy - Element of Bus design
Unit 2	Character of memory system Memory hierarchy Semi conductor main memory <ul style="list-style-type: none"> - Basic concepts RAM <ul style="list-style-type: none"> - Static RAM - Dynamic RAM ROM <ul style="list-style-type: none"> - Types of ROM <ul style="list-style-type: none"> ➤ PROM ➤ EPROM ➤ EEPROM ➤ FLASH MEMORY Organization <ul style="list-style-type: none"> - Module organization Cache Memory <ul style="list-style-type: none"> - Principle - Elements of cache design <ul style="list-style-type: none"> ➤ Size ➤ Mapping ➤ Replacement ➤ Write policies ➤ Block size Error detecting & correcting code
Unit 3	External Memory
	Magnetic disk

	<ul style="list-style-type: none"> - Data organization and - Format - Char - Disk access time <p>Optical Memory</p> <ul style="list-style-type: none"> - CD-Roms - Worm - Erasable optical disk - DVD <p>Magnetic tape</p> <p>Difference between disk & tape & DVD</p>
Unit 4	<p>Input/Output</p> <p>Introduction</p> <ul style="list-style-type: none"> - Access of I/O devices - I/O Modules <ul style="list-style-type: none"> ➤ Functions ➤ Structures <p>Programmed I/O</p> <ul style="list-style-type: none"> - Overview - I/O Commands - I/O Instruction - Flowcharts <p>Interrupt driven I/O</p> <ul style="list-style-type: none"> - Interrupt processing - Design Issues <p>Direct Memory Access</p> <ul style="list-style-type: none"> - Drawbacks of Programmed & interrupt I/O -DMA Functions - I/O channels & Processes <ul style="list-style-type: none"> ➤ Evolution of I/O Function ➤ Characteristics of I/O channels.
Unit 5	Basic Concept in advance Architecture
	CISC &RISC introduction, Flynn Taxonomy

References:

- 1.. “Computer Organisation and Architecture”: William Stallings
3. “Computer System Architecture”: Morris Mano

2004 *Unix Operating system*

Introduction to UNIX Operating System

File System,

Using the shell, Command line, Redirection, Looping,

Bundle, Filters

Editors{ Vi, Sed, Awk}

Shell Programming

Reference

1. *Sumitabha Das, “ Unix Operating system”*

2. *P.Koparkar, Unix For You, Tata McGraw-Hill*

2005 *Advance “C”*

Pointers,

Dynamic Memory Management,

Structures and Unions,

File Handling

Introduction to graphics

Algorithms

Two-dimensional Viewing

References:

1. *Advance “C’ by Schaum series*

2. *“C” Programming by Kanetkar*

2006. *Accounting and Financial Management*

Company Final Accounts :

Preparation of Cost sheet

Marginal Costing

Standard Costing

Ratio Analysis :

Fund Flow Statement :

References :

1. *Choudhari and Chopade, Book-Keeping & Accountancy, Sheth Publications, 1998*
2. *Kishnawala, Book-Keeping & Accountancy, Manisha Prakashan, 1983.*

<u>Sub.Code</u>	<u>SEMESTER – III (Second Year)</u>	L	P	T	M
3001	Business Communication	4	-	2	100
3002	Modern Algebra and Logic	4	-	2	100
3003	Introduction to microprocessor	4	-	2	100
3004	Structured System Analysis and Design	4	-	2	100
3005	Data Structures	3	3	-	100
3006	Database Management System – I	3	3	-	100
<u>SEMESTER – IV</u>		L	P	T	M
4001	Technical Writing	4	-	2	100
4002	Linear Algebra and Boolean Algebra	4	-	2	100
4003	Environmental Science	4	-	2	100
4004	Visual Programming	3	3	-	100
4005	File Structures	3	-	3	100
4006	Database Management System - II	3	3	-	100

- L: Lecture per week
- P: Practical per week
- T: Tutorials per week
- M: Total marks.

Semester III (Second Year B.C.A.)

3001: Business Communication

Description: The objective of this paper is to familiarize students with the functioning of an organization and its structure.

Detailed Syllabus:

- 1) Basics of Communication
- 2) Models of Communication
- 3) Nature and scope of communication in organizational settings
- 4) Objectives and functions of communication
- 5) Formal Communication (Upward, Downward, Horizontal, Diagonal)
- 6) Informal Communication
- 7) Oral and Written Communication
- 8) Non-verbal Communication
- 9) Barriers to Communication
- 10) Principles of Communication
- 11) Listening
- 12) Mass Communication
- 13) Interpersonal Communication (Johari Windows)

Reference Books :

- 1) Communication: C.S. Rayudu, Himalaya Publications
- 2) Communication Skill for Effective Management: Dr. Anjali Ghanekar, Everest Publishing House
- 3) Developing Communication Skills: Krishna Mohan & Meera Banerji, Macmillan
- 4) Effective Business Communications, Murphy, Herta A., Peck Charles, McGraw Hill
- 5) Effective Communication: Balan & Rayudu
- 6) Effective Communication, Urmila Rai & S.M. Rai, Himalaya Publications

3002: Modern Algebra and Logic

Objectives: This course is designed to begin the student's development in the area of abstract algebra and mathematical reasoning.

Detailed Syllabus:

3002: Modern Algebra and Logic

Objectives: This course is designed to begin the student's development in the area of abstract algebra and mathematical reasoning.

Detailed Syllabus:

No	Topic
1	Semigroup (Definition + Problem)

2 **Monoid** (Definition + Problem)

3

Groups

- a) Definition + problems on finite and infinite group
- b) Properties of groups
- c) Abelian Groups (Definition + Theorems + Problems)
- d) Order of a group and order of an element (Definition + Theorems + Problems)
- e) Subgroups and Cosets (Definition + Theorems+ Problems)
- f) Cyclic Groups (Definition +Theorems + Problems)
- g) Normal Subgroups (Definition + Theorems+ Problems)
- h) Homomorphism of groups (Definition +Theorems + Problems)
- i) Isomorphism of groups (Definition +Theorems + Problems)

4

Rings

- a) Definition + Problems
- b) Rings with and without zero divisors
- c) Elementary Properties of Rings
- d) Integral Domain (Definition + Theorems + Problems)
- e) Field (Definition + Theorems+ Problems)
- f) Subring and Subfield (Definition + Theorem +Problems)
- g) Ideals(Definition + Theorems+ Problems)
- h) Homomorphism of Rings
- i) Isomorphism of Rings

5

Logic

- a) Statement-Definition
- b) Logical Connectives
- c) Truth tables, Statement forms and their truth tables
- d) Tautology and Contradiction
- e) Converse, Inverse, Contrapositive of logical statements
- f) Logical Equivalence
- g) Quantifiers-Universal and Exestential and negation of statements

LIST OF REFERENCE BOOKS

- 1) Discrete Mathematical Structures and Graph Theory by Kolman , Busby and Ross
- 2) Algebra by Artin
- 3) Topics in Algebra by Herstein
- 4) Applied Discrete Structures for Computer Science by Alan Doerr, Levasseur

3003: Introduction to Microprocessors

Objective:

- 1) Introduction to Microprocessors is to give information for working of microprocessors.
- 2) Pin diagrams of different pins to understand internal architecture of microprocessors.
- 3) Programming of microprocessors give the knowledge of how high level programming work with assembly language.

Detailed Syllabus:

Introduction to Microprocessors

History and overview

Growth of microprocessor technology from SSI, MSI, LSI to VLSI
Current global trends, RISC architecture
Intel microprocessors-8085 to Pentium-II performance and feature comparisons
8085 Microprocessor
Internal architecture, Pin-out, memory addressing schemes, system bus structure, Data, address and control bus, multiplexing and de-multiplexing.

Interrupts:

Introduction, purpose of interrupts, Interrupt vectors, 8259-internal organization, pin out, Single and cascaded operation

I/O Interface

Typical I/O interface, serial communication
8251 A UART : Internal organization and functioning
8237 DMA : organization and functioning

Memory

Type of memory
ROM-PROM, EPROM, EEPROM, (Flash ROM Concept)
RAM-SRAM, DRAM, EDO, ECC, SDRAM
Packaging-DIP, SIMM, DIMM
Addressing, memory map, address decoding

Programming

Addressing modes, data movement, arithmetic and logic instructions, control instructions, Overview of 8086/8088

Overview of 80286, 80386, 80486, Pentium, Pentium II, PentiumIII

References:

1. R.S. Gaonkar, "Microprocessor Architecture, programming and Applications with the 8085/8080A", Wiley Eastern Ltd. 2., 1995
2. "Inside the PC": Peter Norton (Sixth Edition), January 2005
3. "Microprocessor System-The 8086/8088 Family" : Yu-Cheng Liu & Glen A. Gibson
4. "The Intel Microprocessor : 8086/8088 , 80286, 80386, Pentium, Pentium Pro. Pentium-II & III" : Barry Brey (Fourth Edition)

3004: Structured System Analysis and Design

Objective: Knowledgeable in the theory of 'structured' systems analysis and conversant in its terminology students get experienced in the production of Systems Requirements and Design specifications; they become capable of evaluating alternative physical implementations of a system and familiar with CASE and other technologies relevant to systems analysis;

No.	Syllabus Topic
1	<u>Definition of system</u>
2	<u>System investigation</u> a) Characteristics of system b) Elements of system c) Types of system d) Business information system e) Categories of Information system
3.	<u>Feasibility Analysis</u> a) Types of Feasibility b) Definition of Feasibility c) 8 steps of Feasibility Analysis d) Feasibility Report Fact Finding Techniques
4.	Role of System Analyst a) Skills required b) Role of System Analyst
5.	System Development Life cycle All phases
6	Requirement Analysis and a) Basics of requirement analysis b) Role of user in requirement analysis
7	Introduction to Structured System Analysis
8	Tools of Analysis a) Comparison of youdon & sarson method(DFD) b) DFD c) DD d) Structured chart/FDD e) Module Specification Structured English Decision Table Decision Tree
9.	Prototyping a) Definition, b) Need c) Advantages d) Disadvantages e) Prototype Model
10.	Development of Applications Input form-screen /output design Menu design
11.	Module Testing, System Testing, Implementation, User training

References :

1. System Analysis and Design by Senn.
2. System Analysis and Design by Awad
3. Workbook on System Analysis and Design by Vinod Kumar Garg

3005: Data Structures

Objective: This course will provide a solid introduction to the topic of data management and will discuss, in detail, the data structures necessary for achieving its efficiency objectives.

Detailed Syllabus:

UNIT-I

The concept of data structure, Abstract data structure, Analysis of Algorithm, The concept of List Introduction to stack & primitive operation on stack, Stack as an abstract data type, Multiple Stack, Stacks application: Infix, post fix, Prefix and Recursion, Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular queue, Dequeue, Priority queue, Applications of queue

UNIT-II

Introduction to the Linked List of Stacks, Basic operations on linked list, Stacks and queues as a circular linked list, Header nodes, Doubly Linked List, Circular Linked List, Stacks & Queues as a Circular Linked List, Application of Linked List.

UNIT-III

TREES - Basic Terminology, Binary Trees, Tree Representations as Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Application of Binary tree, Threaded binary tree, Binary tree representation of trees.

UNIT-IV

Sequential Searching, Binary search, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Comparison of sorting methods

UNIT-V

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search, Spanning Trees, minimum spanning Tree, Shortest path algorithm

Reference Books:

1. "Data Management and File Structures" Mary E. S. Loomis, Prentice Hall, 2nd ed. edition (January 1989)
2. "Introduction to data management and file data structure and program design". Robert L. Kruse, 1984.
3. "An Introduction to data structures with applications" : Jean-Paul Trembly and Paul G. Sorensen, 2nd edition, 1984.
4. Data Structures and Algorithms" : Aho, Hopcroft and Ullman, 1983.

3006:Subject: Database Management System -I

Objective: This is an introductory course in database and file management systems. It will help students to develop an understanding of the role of data modeling, file management and database systems in information systems

Detailed Syllabus:

Data, Information, Database, Database system, Database management system, Database system Vs traditional file system, Application of DBMS, Characteristics of DBMS, Users of DBMS, Advantage of DBMS, Database, Administrator, Functions of DBA, Data Abstraction administration (three schema architecture), Instances and schema, Data independence, Database system structure/ overall architecture of DBMS

Data Definition Language(DDL), Data Manipulation language(DML)

Relational Algebra, Relational Calculus

Data model (Introduction)

Model

Data model

1. Categories of Model
2. High/ conceptual
3. Physical
4. Representation
 - a. Overview of Network
 - b. Overview of Hierarchical

Overview of Relational Database Design

Overview of Database Design, E-R diagram, Entity, Entity set, Entity types, Logical, Physical, Strong, Weak, Attributes, Composite Vs Simple, Single Values Vs Multi valued, Stored Vs Derived, Null values, Complex attributes, Key attributes, Value set (Domain) of attribute, Relationship, Relationship degree, Role name, Constraints on Relationship, Cardinality Ratio (1:1, 1:m, m:1, m:n), Participation Constraints and Existence Dependencies (Total/ Partial) E-R Notations(Symbols)

Extended feature:

a) Generalization, Specialization ,b) Aggregation

Conversion of ER to table

Relational Data Model:

Domain, Attribute, Tuples, Relations constraint, Domain constraint, Entity integrity, Referential integrity, Key

Normalization:

Overview of Normalization, Functional dependency (2NF), 1NF, 2NF, 3NF

Problems on Normalization (upto 3NF), Boyce – Codd Normal Form

Multivalued Dependency (4NF), 5NF (introduction)

Structured query language

Introduction, Features of SQL, Components – DDL, DML, DCL

Data types in SQL

Commands

Create, Desc, Insert, Select, Delete, Update, Alter, Rename

Aggregate functions

Average, Min, Max, Count, Count (*), Greatest, Least, Sum

Character functions

Lower, Upper, Instr, Ltrim, Rtrim, Rpad, Lpad, Substar, Length

Numeric functions

Abs, Power, Round, Ceil, Floor, Sqrt, Trunc, Mod, Sign
Join queries

Declarative constraint

Primary key, Null, Check, Default, Not null, Foreign key

SQL

Transaction control command

Commit, Roll back, Save point

Views

Create, Drop, Advantage & disadvantage of view, Uses of view

Triggers (introduction)

Concept, How they are used, Parts of trigger, Types of Trigger

Security specifications.

Grant, Revoke

References :

1. "Fundamentals Of Database Systems": Elmarsi and Navathe.
2. "Database System Concepts" : Korth, Siberschatz
3. "Oracle – the complete reference", Bayross, Ivan: BPB Publications
4. "Upgrade to oracle 8", Datapro Infoworld Ltd.

Semester IV (Second Year B.C.A.)

4001: Technical Writing

Objective:

The objective of this paper is to expose students to various forms of technical writing and to give them sufficient practice in technical writing. It aims to hone their existing writing skills and make them aware of the different nuances of the technical aspects of writing. It also aims in developing their awareness of the special techniques of technical writing, including- Research paper, software documentation, project proposals etc.

Detailed Syllabus:

- 1) Technical Communication
 - Definition of Technical Comm.
 - Need for Technical Comm.
 - Importance of Technical Comm.
 - Attributes of Technical Comm.
- 2) Role of Technical Author
- 3) Process of Technical Writing
- 4) Technical Publications
 - User Manuals
 - Troubleshooting guides
 - Reference Manuals etc.
- 5) Presentations
 - Factors to be considered before making a presentation (Who, Why, Where, When, How)
 - Psychological Preparation
 - Preparing Written Material
 - Preparing Visual Aids
 - Making the Presentation
 - Factors affecting the Presentation
 - Speaking Faults
- 6) Essay Writing
 - Types of essays
 - Structure/Parts of an essay
 - Principles of Essay Writing
- 7) Technical Leaflets
 - Objective
 - Components of Technical Leaflets
 - Components of Technical Leaflets
 - Preparing a Technical Leaflet
- 8) Technical Specifications & Descriptions
 - Requirement Specifications
 - Functional Specifications
 - Design Specifications
 - Test Specifications

- Writing Technical Descriptions
 - Writing Processes and Procedures
- 9) Research Papers
- Objectives
 - Preparing a Research Paper
 - Format
 - Documentation
- 10) Technical Summaries
- Types of Technical Summaries
 - Importance of Summaries
 - Format of writing summaries
- 11) Project Proposals
- Objectives
 - Types of a proposal
 - Parts of a proposal
 - Writing the Proposal
- 12) Software Project Documentation
- Proposal
 - System Specifications
 - User Manual

REFERENCES:

- 1) Technical Writing – Process and Product: Sharon T. Gerson & Steven M. Gerson, Pearson Education Inc.
- 2) Technical Writing and Profession: Thomas N. Huckin & Leslie A. Olsen, Macmillan
- 3) Writing and Life: Don Knefel, CBS College Publishing
- 4) Business Correspondence and Report Writing: RC Sharma and Krishna Mohan, 3rd Edition, Tata McGraw Hill
- 5) Beginner’s Guide to Technical Writing: John Evans
- 6) Thirty Minutes before a presentation: Patrick Forsyth, Kogan Page India Pvt. Ltd.
- 7) Writing and Analyzing Effective Computer System Documentation: Ann Stuart, University of Evansville, Indiana
- 8) How to write a Computer Manual – A handbook of Software Documentation: Johnathan Price, The Benjamin/Cummings Publishing Company, California.
- 9) Technical Documentation, A.J. Marlow, NCC Blackwell

4002: Linear Algebra and Boolean Algebra

Objective:

- 1) Partially ordered sets including lattices and Boolean algebras are useful in set theory, algebra, sorting and searching and especially in the case of boolean algebras, in the construction of logical representations for computer circuits.
- 2) To teach students Linear transformations and Boolean algebra which is used not only in computers but also in other fields.

Detailed Syllabus:

Vector Spaces

Definition and Problems, General Properties of Vector Spaces, Vector Subspace, Linear Combination of Vectors and Linear Span of a set, Linear Dependence and Linear Independence of vectors, Basis

Linear Transformation

Linear Operator, Kernel of a linear transformation, General Properties of a linear transformation, Eigen values, eigen vector, Characteristic polynomial of a linear operator T and characteristic polynomial of a matrix, Conversion of a matrix to linear transformation and vice-versa, Cayley-Hamilton Theorem, Diagonalisable Operator

Lattices

- a) Poset, Bounded set, Hasse diagram
- b) Distributive, complemented Lattice and Boolean Lattice

Boolean Algebra

- a) Examples and basic theorems of boolean algebra
- b) Atoms of Boolean algebra
- c) Sum of product forms
- d) Logic circuit
- e) Boolean variable
- f) Boolean expressions

Logic gates-OR, AND, NOT, NOR, NAND gates

REFERENCES

- 1) Discrete Mathematical Structures and Graph Theory by Kolman, Busby and Ross
- 2) Algebra by Artin
- 3) Topics in Algebra by Herstein
- 4) Applied Discrete Structures for Computer Science by Alan Doerr, Levasseur

4003 Environment Science: Syllabus to be produced in short period.

4004: Visual Programming

Objective:

1. A Visual programming language (VPL) is any programming language that lets users specify programs by manipulating program elements graphically rather than by specifying them textually.
2. A VPL allows programming with visual expressions, spatial arrangements of text and graphic symbols.

Detailed Syllabus:

UNIT - I: Visual Basic Fundamentals

UNIT - II: Branching and Looping, Visual Basic Control Fundamentals

UNIT - III: Menus and Dialog Boxes

UNIT - IV: Procedures, Arrays

UNIT - V: Data Files

Visual Basic controls (list box, horizontal and vertical scrollbars, and option Buttons.), Variables and constants, If-Then-Else and nested if statements, For-Next, Do-While, and Do-Until loops, Validating data input by the user (use several methods), Create, Open and Close data files and understand the role of Visual Basic in building applications for data access, Visual Basic to access and update sequential and random data, Debugging techniques, Single and multi-dimensional arrays, Create menu options on a user interface, Create common dialog boxes, Develop error-handling routines, Define tasks and resolve problems by gathering, organizing, analyzing, and evaluating information needed to

REFERENCES:

“VISUAL BASIC “- GOTTFRIED BYRON S., Ed: 01, Tata McGraw Hill 2nd edition

4005: File Structures

Objective:

1. File structure is the concept for basics of software application which is used to store data in external memory. Executing programming language, getting the result leads the loss of data in the main memory when program gets closed, Need the File Structure concept to avoid it

Detailed Syllabus:

No	Topics
1.	Introduction of files and concept of record
2.	Primitives operations Open,close,update,append,allocate,Read_next,Read_Direct Write_next,Write_direct,EOF,Error.
3.	Volatility of file ,Organization and access Types of Files Sequential Files Relative Files Direct Access Files Indexed Sequential Files
4.	File Functions a. Add a record b. Delete a record c. Read the records in any order d. Read all the records in a particular order e. Read a record having a particular key f. Update the current record
5.	File functions for Sequential files Add,Delete,Reorganization,Read all the records in any order, Read record with specific key value,Read all the records in a particular order
6.	Direct Access files Hashing Fucntions,Overflow files,Linear Probing, Chaining with/without replacement. Hash Table, Collision resolution Techniques. File Functions for Direct Access Files Add a record Delete a record Read the records in any order Read all the records in a particular order Read a record having a particular key Update the current record
7.	Indexed Sequential Files and functions (ISAM) ,concept of index,overflow. B-tree & Height balanced tree, B+ & B* trees, 2-3 trees, Counting binary trees

REFERENCES:

1. "Data Management and File Structures" Mary E. S. Loomis, Prentice Hall, 2nd ed. edition (January 1989)
2. "Introduction to data management and file data structure and program design". Robert L. Kruse, 1984.

4006: Subject: Database Management System - II

Objective:

Database Management has evolved from a specialized computer application to a central component of a modern computing environment and as a result, knowledge about database system has become an essential part of an education in Computer Science. While database are often created and maintained by information technology professionals, more often it today's business management professionals in all disciplines are designing and creating their own database applications. Virtually every area of management uses databases :

Detailed Syllabus:

Database Storage Structure and Access Methods

Concepts of Index. Characteristics of indexes.

Types of indexes.

Ordered (SAM), HASHED

Types of ISAM

Primary, Cluster, Secondary

Concept of Multilevel indexes

B+ tree & B tree

Concept of HASHING

Types of Hashing (Static, Dynamic)

Query Processing

Query, Steps of Processing Query, Translating SQL query into Relational Algebra, Query tree, Initial tree, Query equivalence, Query expression, Tree optimization, Cost estimation

Transaction Processing

Introduction, Definition of Transaction, Basic operations, Read, Write

Why Concurrency Control is needed

Lost update problem, Temporary update problem, Incorrect summary problem, Unrepeatable read

Transaction states

Active, Partially committed, Committed, Failed, Aborted

Properties of transaction

Atomicity, Consistency, Isolation, Durability

Schedules

History of transaction.

Recoverable and non-recoverable

Serializability of schedules.

Serial, Non serial, Conflict, Serializable, Users of serializability

Concurrency control

Locks, Types of locks, Binary, Shared/ exclusive(read/write), Lock tables & conversion of locks, Two phase locking protocol, Basic, Conservative, Strict Rigorous.

Dead lock detection & prevention methods.

Starvation.

Concurrency control based on time stamp Ordering.

Granularity of data item and multiple granular Locking.
 Data base recovery
 Why recovery is needed?
 Log based recovery.
 Deferred Database Modification.
 Immediate database modification.

REFERENCES

1. “Fundamentals Of Database Systems”: Elmarsi and Navathe.
2. “Database System Concepts” : Korth, Siberschatz

<u>Sub.Code</u>	<u>SEMESTER – V (Third Year)</u>	L	P	T	M
5001	Introduction to Statistical Methods & Numerical Methods	4	-	2	100
5002	Object Oriented Programming using C++	3	3	-	100
5003	Data Communication and Computer Networks	4	-	2	100
5004	Management Information system	3	3		100
5005	Introduction to Software Engineering	4	-	2	100
5006	Web Technology – I	3	3	-	100
<u>SEMESTER – VI</u>	L	P	T	M	
6001	JAVA Programming	3	3	-	100
6002	ERP	4	-	2	100
6003	System Software	4	2	-	100
6004	Web Technology – II	3	3	-	100
6005	Electives - Introduction to Artificial Intelligence / Animation / Open Source / Localization .	3	3	-	100
6006	Project	-	4	2	100

5001: Introduction to Statistical Methods & Numerical Methods

Roots of non-linear equations

- a) Bisection Method b) Regula-falsi Method c) Newton-Raphson Method

Direct solution of linear equation

- a) Matrix Inversion, b) Gauss-Elimination Method.

Interpolation

- a) Newton-Gregory Forward and Backward Formula
- b) Lagrange's Interpolation Formula for In equal Intervals
- c) Newton divided difference formula for unequal intervals

Numerical Integration

- a) Newton Cotes integration formula
- b) Trapezoidal Rule
- c) Simpson's 1/3 Rule
- d) Simpson's 3/8 Rule
- e) Error estimation for all above 3 methods

Numerical Differentiation

- i) Differentiating Newton's Forward and Backward formula

Numerical solution of Differential equation

- Taylor's Series, Euler's Method

Probability:

- Definition of Probability of any event
- Addition Theorem, Complementary event, Conditional probability
- Multiplication Theorem, Independent events for two and three events, Baye's Theorem

Random Variables

- Discrete and continuous random variable, probability distribution of a random variable,
- Moment about mean and arbitrary point, Mathematical Expectation, Variance, Joint and Marginal Probability

Theoretical Distributions

- a) Binomial, Poisson, Normal Distribution

Correlation:

- Types of correlation, Scatter Diagram, Karl-Pearson's Co-efficient, Bi-variate Frequency table

Regression

- Relation between correlation and regression

Reference:

- Statistic: S.C.Gupta "Fundamentals of statistics" Himalaya Publishing House, 6/e, 2004;
- Numerical Methods: V. Rajaraman "Computer oriented numerical methods (third edition) 1993
- Statistics for Management, Richard I Levin, Pearson Education / PHI, 17/e, 2000
- S.S. Shastri "Introductory methods of numerical analysis" Vol-2, PHI, SECOND edition, 1994

5002: Object Oriented Programming using C++

Introduction:

Evolution of OOP: Procedure Oriented, Programming, OOP Paradigm. Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.

Introduction to C++:

Identifier, Keywords, Constants, Operators, Type conversion, Variable declaration, expressions, statements, manipulators, Input and output statements, stream *I/O*, Conditional and Iterative statements, breaking control statements.

Storage Classes, Arrays, Structures, Unions, Bit fields, Enumerations and User defined types. Pointers, Multiple indirections. Pointer to functions. Functions, Scope Rules. Parameter Passing, Function returning references, Const functions, recursion, function overloading, Default Arguments, Const arguments, Pre-processor, Type casting

Classes and Objects:

Class Declaration and Class Definition, Defining member functions, making functions inline, nesting of member functions, Members access control, this pointer. Union as space saving classes. Object as functions arguments, array of objects, functions returning objects. Const member functions. Constructors, Destructors, Array of objects, Dynamic memory allocation using new and delete operators, Nested and container classes.

Inheritance, Types of inheritance, Types of base classes

Polymorphism, Operator overloading, Function overloading, Templates, Exception Handling
Files and streams: Classes for file stream operations, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, I/O with multiple objects, error handling, sequential and random access file processing, STL : Containers, Algorithms, Iterators, RTTI.

Text Book:

1. K.R Venugopal ‘Mastering C++’, Tata Mcgrawhill, 1997

References:

1. B.Stroustrup ‘C++ Programming Language’ (3rd Edition). Addison Wesley, 1997
2. B.chandra Narosa ‘A Treatise On Object Oriented programming using C++’- Publications, 1998
3. Herbert Schildt, “The Complete Reference CN”, Tata McGraw-Hili, 2001.

5003: Data Communication and Computer Networks

Fundamentals of communication

Types of Pulse module (Natural, Flat top, Pulse Width Modulation, Pulse position

Modulation), Phase modulation, Digital transmission, Advantages of analog over digital and digital over analog,

Synchronous and Asynchronous

Encoding techniques

Ways of Communication

Transmission impairments types

Transmission media:

Wired (physical): Twisted pair, Coaxial cable, Optical Fiber

Wireless: Terrestrial, Microwave,

Satellite microwaves: Broadcast radio, infrared, blue tooth

Multiplexing: TDM, TDMA, FDM

Static Channel allocation

Dynamic Channel Allocation

Switching Technique

Circuit, Packet, message Switching, Hybrid Switching

Transporting of Digital Information

Fundamentals of Networking:

Multiplexing – Frequency Division, Time Division

Channel Allocation – Static Allocation, Dynamic Allocation

Switching Techniques – Circuit switching, Message Switching, Packet switching and Hybrid switching

Transporting of Digital information – packaging, reassembling, Sequencing and

Identification of digital information.

Network Issues – Framing, Error control, Flow control, Routing, congestion

Type of services – Connection and Reliability

Layered approach for network models

Very brief overview of the OSI Model

Protocols v/s Interfaces

Concepts of Collisions, Slots, Carrier Sense

Medium access protocols: An overview of Aloha, Slotted Aloha, CSMA, CSMA/CD

TCP/IP Reference Model and working, Comparison of the OSI and TCP/IP reference model

Text Book:

W. Stallings “Data and Computer Communications”, 7th Edition, Prentice Hall, 2004

References:

1. **Forouzan**, "Data Communication and Networking," 3rd Edition, McGraw Hill, 2003
2. **A.S.Tannenbaum**, "Computer Networks", 4th edition Prentice Hall of India

5004: Management Information system

Introduction to Systems and Basic Systems Concepts. Types of Systems, the Systems Approach. Information Systems: Definition and Characteristics. Types of Information, Role of Information in Decision-Making. Sub-Systems of an Information system: EDP and MIS, management levels. EDP, MIS, DSS.

An overview of Management Information System: Definition and Characteristics, Components of MIS. Frame Work for Understanding MIS: Robert Anthony's Hierarchy of Management Activity, Information requirements and Levels of Management, Simon's Model of decision-Making, Structured Vs Unstructured decisions, Formal vs. Informal systems.

Developing Information System: Analysis and Design of Information System: Implementation and Evaluation, Pitfalls in MIS Development.

Functional MIS: A Study of Marketing, Personnel, Financial and Production MIS.

Text Book:

1. W.S. Jawadekar, "Management Information Systems," Tata McGraw Hill Publishing, 2004.

REFERENCES

1. V. Rajaraman, "Analysis & Design of Information System," PHI.
2. J. Kanter, "Management/Information Systems", PHI, 1996
3. Gordon B. Davis & M.H. Olson, "Management Information Systems: Conceptual Foundation, structure and Development" 1984.

5005: Introduction to Software Engineering

Introduction to software engineering:

Definition, need, software engineering methods, Tools, and procedures

Issues in software engineering

Automation issues, technology change, costing of software projects, scheduling of software projects, programming team organisation, programmer productivity quality assurance

Software evolution: Concepts of product life cycle,

Development life cycle models:

waterfall, spiral, iterative enhancement and phased development

Computer system engineering

Overview, various phases, analysis, design, development and implementation.

Software project planning : Overview, objectives, scope, resources

Cost Estimation Techniques, Metrics for software productivity and quality

Productivity metrics: direct and indirect methods, size and function oriented metrics

Decomposition techniques: LOC and FP estimation,

Effort Estimation: Overview, COCOMO, putnam, esterling models, automated Estimation tools.

Software Project Scheduling: Task definition and parallelism, effort distribution, scheduling

Methods: PERT and CPM

Software project plan outline

Software prototyping : Overview, steps, methods, tools, specification, guidelines

Requirement analysis methods: introduction, methods

Object oriented, data flow and data structure oriented, comparisons, application results, automated tools

Software design

Methods: iterative, top-down, bottom-up

Design representations: flow charts, pseudo code,

HIPO and techniques

Modular design: Overview, module coupling and cohesion, various types of coupling, merits and demerits, other approaches to programming, PDF

Software implementation: Issues, concept of programming support environment

Software testing Overview Various tests and methods: top-down, bottom-up, mixed

regression Debugging: definition, techniques and strategies, exhaustive testing, classification, cyclomatic complexity

Software reliability: Reliability theory and maths: definition

Software availability and repair: definition,

Models of cumulative errors and error rate

Reliability models: bug proportional (macro), MTTF, V-M, estimation of macro model constants

S-W Models

System integration:

Overview, integration of hardware and software components

Strategies software configuration management

Management activity, planning, monitoring

Controlling, resource management

Product assurance: overview, quality assurance

Software quality assurance: Introduction to ISO 9002, CMM, Six Sigma etc. criteria

definitions for software quality, various types, trade-offs, , verification and validation

Configuration management: identification, control, auditing, status accounting, , overview, definition, V and V life cycle.

Text Book:

1. Pressman "Software Engineering A Practitioner's Approach" McGraw-Hill, 5th Edition, 2005

References:

1. Shooman "Software Engineering Design, Reliability and Management" McGraw Hill 1983
2. Fairley "Software Engineering Concepts" McGraw--Hill Series, New York, 1985

5006: Web Technology – I

Introduction to web

HTTP:

Overview – HTTP Basics, Client request, Server response; HTTP Headers;

Session Management – Persistent connections, Cookies.

General concepts on web server:

Configuration and Administration; virtual hosting

General concepts of caching proxy server

Web security, Digital signatures, Digital Certificates, Encryption, and Authentication.

HTML: Structure of HTML Document – Meta tags, Links, Text, Lists, Tables, Inclusions (Objects, Images, and Multimedia contents);

Presentation of HTML document – Style sheets, Alignment, fonts, frames;

Interactive HTML document – Forms, Scripts (As scripting is included in part II, should not have space in part I).

JAVA SCRIPT –JS Basic

Variables, If...Else, Switch, Operators,JS Popup Boxes

Functions, For Loop, While Loop, Break Loops, For...In, Events, Try...Catch, Throw ,on error. Special Text Objects, String, Date, Array, Boolean, Math, JS HTML DOM

JS Advanced , JS Browser,JS Cookies, JS Validation, JS Animation, JS Image Maps, JS Timing, JS Create Object.

Text Books:

1. HTML: Chuck Musciano and Bill Kennedy, O'Reilly and Associates "The Definitive Guide": 3rd Edition
2. David Flanagan "JavaScript: The Definitive Guide ", **O'Reilly - January 2002**
Kent and Multer "Official Netscape JavaScript 1.2 Programmer's Reference." Netscape-specific book by (© 1997, ISBN: 1566047579).

Sixth Semester

6001 :JAVA Programming

Data types and operators , Control statements , Classes and objects , Constructors and methods , Interfaces and packages , Method overloading and overriding , Inheritance , Exception handling ,Multithreading

The I/O classes

Networking

The Collections Framework

Applets

AWT and layout managers

Text Book:

1. Herb Schildt “Java 2 the Complete Reference J2se”, 5TH Edition , 2003

References:

1. “Java Enterprise in a Nutshell: A Desktop Quick Reference”: (Nutshell Handbook)
2. Elliot B. Koffman, “Problem Solving with Java”, Temple University Ursula Wolz, College of New Jersey, Copyright 1999, 848 pp. ISBN 0201357437.
3. Jan Skansholm, “Java from the Beginning”, Chalmers University of Technology, Sweden, Copyright 2000, 540 pp. ISBN 0201398125.

6002: ERP

1. Introduction to ERP

- An Overview
- Integrated management Information
- Seamless Integration
- Supply Chain Management
- Resource Management
- Integrated Data Modeling
- Scope
- Technology
- Benefits of ERP
- Evolution
- ERP and the Modern Enterprise

2. Business and ERP

Business Engineering

- Significance, Principles
- BRP ERP and IT
- Business Engineering with Information Technology
- ERP and Management Concerns

Business Modeling for ERP

3. ERP Implementation

- Role of Consultants, Vendors and User
- Customization, Precautions,
- ERP post implementation Options
- Methodologies and guidelines for ERP Implementations

4. ERP and Competitive Advantages

- Overview
- ERP AND THE Competitive Strategy

Text Book : V.K. Garg and N.K.Venkitakrishnan “ERP : Concepts and Planning” PHI , 1998

6003: System Software

Overview of all the components of a Programming system

Assemblers, Loaders & Linkers, Compilers and Interpreters, Macro processors & Macros.

Introduction to Assemblers

Single-Pass Assembler, Two-Pass Assembler

Assembly programming

Macro: Macro Call, Macro Expansion, Table Management Techniques

Loaders and Linkage Editors

Loading Schemes, Program Relocation

Linking Schemes, Process of linking

Linking of Program Overlays

Compilers:

Function; Process of Compilation;

Structure of the Compiler

Compiling Expressions

Compiler Data Structures

Syntactic specification of programming languages

Regular expressions,

Context free grammars

Derivations and parse trees,

Capabilities of context free grammars

Basic parsing techniques,

Syntax-directed Translation

Symbol Tables,

Run-time Storage management

Error Detection and Recovery

Introduction to code optimization, Garbage collection

Data flow analysis, Loop optimization, Code generation

Text Book:

1. Leland L. Beck, Addison Wesley, 1998 "System Software-An Introduction to system Programming (3rd Edition)"

Reference Book:

1. D. M. Dhamdhere "System Programming & Operating Systems (2nd Edition)"
2. AV Aho, R. Sethi, and JD Ullman. "Principles of Compiler Design", Addison-Wesley, Reading, MA, 1997.

6004: Web Technology – II

XML: Overview; Schemas – DTD (Document Type Definitions), XML Data, Namespaces; Document Object Model, XHTML

ASP Introduction, ASP Install, ASP Syntax, ASP Variables, ASP Procedures, ASP Forms, ASP Cookies, ASP Session, ASP Application, ASP Server, ASP Error, ASP File System, ASP Text Stream, ASP Drive, ASP File, ASP Folder, ASP Dictionary

Servlets

Servlet Basics

Handling the Client Request: Form Data, HTTP Request Headers

Generating the Server Response: HTTP Status Codes, HTTP Response Headers

Handling Cookies Session Tracking

JSP

Invoking Java Code with JSP Scripting Elements

Controlling the Structure of Generated Servlets: The JSP page Directive

Including Files and Applets in Java Server Pages

Using Java Beans Components in JSP Documents

References:

- 1) Eric T. Ray and Christopher R. Maken, O'Reilly and Associates "Learning XML"
- 2) James Goodwill "Pure JSP: Java Server Pages "(Sams, 2000)
- 3) Teach yourself Active server pages in 24 hrs.
 - 1) Larnie Pekowsky "Java Server Pages" (Addison-Wesley, 2000)
 - 2) Paul Tremblett Instant Java Server Pages (Osborne McGraw-Hill, 2000)
 - 3) Duane K. Fields and Mark A. Kolb "Web Development with Java Server Pages" "(Manning Publications, 2000)
 - 4) Marty Hall "Core Servlets and Java Server Pages "(Prentice Hall, 2000)

6005: Elective : Detailed syllabus will be shortly produces.

6006: Project

Project is of 100 marks. It can be external or internal to the college. A guide should be allotted to each students and a regular check should be carried out regarding the progress of the project work. The college should conduct a external exam with the help of some external examiner and allot marks to each student out of 60 as external marks and out of 40 as internal. A group of 2-3 students can work together.

The 40 marks internals are divided: 10 marks for synopsis, 30 internal assessments.

All Projects should be application products(having programming) following the Software Engineering Concepts.

Electives:

E1: Artificial Intelligence

E2: Computer Graphics

E3: Multimedia