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Proposed Syllabus - BCA

Semester - III

Subject Code	Title	Internal		External
		Term Work	Presentation /Seminar	
BCA301	Data and File Structure Using C	10	20	70
BCA302	Object Oriented Programming With C++	10	20	70
BCA303	Mathematical and Statistical Foundation of Computer Science	10	20	70
BCA304	SQL and PL/SQL	10	20	70
BCA305L	Practical based on BCA301 and BCA302	-	-	100
BCA306L	Practical based on BCA304	-	-	100

Semester - IV

Subject Code	Title	Internal		External
		Term Work	Presentation/ Seminar	
BCA401	Web Development using PHP	10	20	70
BCA402	System analysis and Design	10	20	70
BCA403	Advanced Windows Programming	10	20	70
BCA404	Operating System and UNIX	10	20	70
BCA405L	Practical based on BCA401 and BCA403	-	-	100
BCA406L	Practical based on BCA404	-	-	100

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TEACHING AND EXAMINATION SCHEME

Semester - III

| Sub Code | Subject | Teaching | | Examinations | | | | |
| | | Hrs Per Week | | Internal | | External | | |
		Theory	Practical	Presentation/ Seminar	Term Work	Theory	Practical/ Viva-Voce	Total
	Passing Marks			**7**	**4**	**25**	**35**	
BCA301	Data and File Structure Using C	5	3	20	10	70	-	100
BCA302	Object Oriented Programming With C++	4	3	20	10	70	-	100
BCA303	Mathematical and Statistical Foundation of Computer Science	5	-	20	10	70	-	100
BCA304	SQL and PL/SQL	4	3	20	10	70	-	100
BCA305L	Practical based on BCA301 and BCA302	-	Total 9 Practicals as mentioned above	-	-	-	100	100
BCA306L	Practical based on BCA304	-	Total 9 Practicals as mentioned above	-	-	-	100	100
	Presentations	3						
Total		21	9					

Semester - IV

Sub Code	Subject	Teaching		Examinations				
		Hrs Per Week		Internal		External		
		Theory	Practical	Presentation/ Seminar	Term Work	Theory	Practical/ Viva-Voce	Total
	Passing Marks			**7**	**4**	**25**	**35**	
BCA401	Web Development using PHP	4	3	20	10	70	-	100
BCA402	System analysis and Design	4	-	20	10	70	-	100
BCA403	Advanced Windows Programming	4	3	20	10	70	-	100
BCA404	Operating System and UNIX	5	3	20	10	70	-	100
BCA405L	Practical based on BCA401 and BCA403	-	Total 9 Practicals as mentioned above	-	-	-	100	100
BCA406L	Practical based on BCA404	-	Total 9 Practicals as mentioned above	-	-	-	100	100
	Presentations	3						
Total		20	9					

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BCA301 – DATA AND FILE STRUCTURE USING C

INTRODUCTION **(5%)**
Data Structure and its classification (Primitive, non-primitive: linear, non-linear)

ARRAYS: **(10%)**
Array concept (one dimension, two dimension), Memory representation of single dimension array & two dimension array (row major, column major), Operations for one dimension array (insertion, deletion, traversal), Sparse matrix, Memory representation of sparse matrix (vector notation), Representation of polynomial.

SEARCHING AND SORTING: **(15%)**
Sequential search, Binary search, Comparison in terms of efficiency, Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Comparison in terms of their efficiency.

STACKS AND QUEUES: **(25%)**
Properties of stacks, Stack representation using array, Stack operations (push, pop, peep, and change), and applications of stack (recursion, expression: infix, postfix and prefix with their conversions)
Properties of queues, Circular queue, Priority queue, Double ended queue, Queue representation using array, Queue operations (insert, delete), Applications of queue

LINKED LISTS: **(15%)**
Singly linked lists, Doubly linked list, Circular linked list, Header linked list, Operations of linked list (insertion, deletion, traversal, split, join), Application of linked list, Representation of polynomial, Implementation of stack and queue.

TREES: **(30%)**
Definition, Binary trees and its properties, Binary search tree, Representation of tree using array and linked list, Operations on binary trees (creation, traversal: preorder, post order, inorder, converse preorder, converse inorder, converse postorder, search, deletion), Applications of binary trees, Threaded binary tree, Heap tree, B-trees, AVL trees, Expression tree, Forests (introduction), Conversion of forest into binary tree, Heap sort.

Text Books:
- Classical Data Structure, D. Samanta, PHI
- Data Structures, schaum's Outlines,Adapted by G A PAI

Reference Books:
- Data Management and File Structure, Mary, E. S. Loomis, PHI
- Data Structures using C, M. Radhakrishnan & V. Srinivasan

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BCA302 – OBJECT ORIENTED PROGRAMMING WITH C++

PRINCIPLES OF OBJECT ORIENTED PROGRAMMING **(10%)**
Procedure – oriented programming, Object oriented programming paradigm, Basic concepts of object oriented Programming, Benefits of object oriented programming, Application of object oriented programming, What is c++?, Application of c++, Input/output operators, Structure of c++ program

TOKENS, EXPRESSIONS AND CONTROL STATEMENTS **(10%)**
Tokens : keywords, identifiers, basic data types, userdefined types, derived data types, symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables
Operators in C++: scope resolution operator, member referencing operator, memory management operator, manipulators, type cast operator.
Expression : Expression and their types, special assignment operator, implicit conversions, operator precedence
Conditional control structure: simple if, if…else, if…else if ladder, nested if, switch etc.
Looping control structure: for, while , do…while

FUNCTIONS IN C++ **(10%)**
The main function, Function prototype, Call by reference, Return by reference, Inline function, Default arguments, Const arguments, Functions overloading

CLASSES AND OBJECTS **(15%)**
C structures revisited, Specifying a class, Defining member functions, nesting of Member functions, private member function, making outside function inline, Arrays within a class, Memory allocation for objects, Static data member, Static member functions, Arrays of objects, Objects as function arguments, Friendly functions, Returning objects, Const member function, Pointer to members

CONSTRUCTOR AND DESTRUCTOR **(10%)**
Characteristics of constructor, Parameterized constructor, Multiple constructor in a class, Constructor with default argument, Copy constructor, Dynamic initialization of objects, Constructing two dimensional array, Dynamic constructor, Destructors

OPERATOR OVERLOADING AND TYPE CONVERSION **(15%)**
Concept of operator overloading, Over loading unary and binary operators, Overloading of operators using friend Function, Manipulation of string using operators, Rules for operator overloading, Type conversions.

INHERITANCE **(10%)**

Defining derived classes, Types of inheritance (Single, Multiple, Multi-level, Hierarchical, Hybrid), Virtual base class & Abstract class, Constructors in derived class, Nesting of classes.

POINTER, VIRTUAL FUNCTIONS AND POLYMORPHISM **(5%)**

Pointer to Object, Pointer to derived class, this pointer, Rules for virtual function, Virtual function and pure virtual function.

WORKING WITH FILES **(15%)**

File stream classes, Opening and closing a file, Error handling, File modes, File pointers, Sequential I/O operations, Updating a file (Random access), Command line arguments

Text Books:
- Object Oriented Programming in C++ - E.Balagurusamy, BPB

Reference Books:
- Mastering C++ - Venugopal
- Object Oriented Programmin in C++ - Robaret Laphore
- Let us C++ - Yashvant Kanitkar, BPB

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BCA303 – MATHEMATICAL AND STATISTICAL FOUNDATION OF COMPUTER SCIENCE

PART : I

CONNECTIVES   **(10%)**
Introduction, Objectives, Statements, Connectives, Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Equivalence of formulae and well-formed formulae, Two state devices, Gate and module, Two level networks, NOR and NAND gates.

NORMAL FORMS AND THE THEORY OF INFERENCES   **(10%)**
Introduction, Disjunctive normal forms, Conjunctive normal forms, Principal disjunctive forms, Principal conjunctive forms, Valid inferences using truth table and direct method of proof, Rules of inference (rule p, t and cp), Implications, Equivalence, Consistency of premises and indirect method of proof

MATRICES and GRAPH THEORY   **(20%)**
Algebraic operations (Multiplication) computations of inverse, Rank of matrix, Solution of simultaneous Linear equations, Cramer's Rule, Gauss elimination method, Matrix inversion method. Introduction to Graph, abstract definition of graph, Isomorphism, mtrix representation of graphs, Path, Reachability, Connectedness, Node base,

PART : II

NORMALIZED FLOATTING POINT AND ERRORS   **(5%)**
Different types of errors in numeric computation, Floating point numbers, Normalize floating point representation

NUMERICAL SOLUTION OF NON-LINEAR EQUATIONS   **(15%)**
Introduction and application of non linear equations, methods of finding solution of non linear equations, Bisection method, False position method, Secant method, Newton-Raphson method

PROBABILITY   **(15%)**
Introduction and various related terms of probability, Conditional probability, Baye's Rule, Application of Baye's rule

INTERPOLATION AND CURVE FITTING: **(25%)**
Introduction and applications of Interpolation, Inverse interpolation, Extrapolation, Finite Differences, Newton's Forward Difference(Without proof), Backward difference(Without proof), Divided difference interpolation formulas (Without proof), Lagrange's interpolation formula, Lagrange's inverse interpolation method of least square, Fitting of straight line, polynomial, Geometric curve and exponential curve

Text Books:
- Computer Oriented Numerical Methods, Salaria,Khanna Publication
- Statistics and Solution By V. K. Kapoor
- Discrete Mathematics, Schaun's Series

Refeerence Books:
- Computer Oriented Numerical Methods By V. Rajaraman, PHI
- Numerical Methods, E. Balagurusamy, TMH
- Discrete Mathematical Structure (Third Edition), Bernard Kolman, Robert C. Busby, Sharon Roass, Prentice Hall Of India Pvt. Ltd.

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BCA304 – SQL AND PL/SQL

SQL, SQL*PLUS **(10%)**
Introduction to SQL, SQL Commands and Datatypes, Introduction to SQL*Plus, SQL*Plus formatting commands, Operator and Expression, SQL v/s SQL*Plus

MANAGING TABLES AND DATA **(30%)**
Creating and Altering tables (Including constraints), Data Manipulation Command like Insert, update, delete, SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN,ANY, ALL, BETWEEN, EXISTS, LIKE, Joins, subquery, Built in functions

OTHER ORACLE DATABASE OBJECTS **(20%)**
View, Sequence, Synonyms, Database Links, Index, Cluster , Snapshot

DATA CONTROL AND TRANSACTION CONTROL COMMAND **(15%)**
Grant, Revoke, Role, Creating Users, What is transaction?, Starting and Ending of Transaction, Commit, Rollback, Savepoint

INTRODUCTION TO PL/SQL **(25%)**
SQL v/s PL/SQL, PL/SQL Block Structure, Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.), %TYPE and %ROWTYPE, Using Cursor(Implicit, Explicit)

Text Books:
- SQL,PL/SQL The programming - Lang.Of Oracle Ivan Bayross - BPB

Reference Books:
- 1. Using Oracle 8i - Page, Hughes - QUE & PHI Publications
- 2. Oracle 8I The Complete Reference - George Koch, Kevin Loney -Oracle Press and Tata MacGraw-Hill

BCA305L – PRACTICAL LAB

Practical will be based on BCA301 and BCA302

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BCA306L – PRACTICAL LAB

Practical will be based on BCA304

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BCA401 – WEB DEVELOPMENT USING PHP

PHP BASICS **(40%)**

Introduction to PHP:
PHP configuration in IIS &Apache Web server
PHP Variable: Static & global variable, GET & POST method
PHP Operator: Conditional Structure & Looping Structure,
Array
User Define Function: argument function, default argument, variable function, return function
Variable Length Argument Function: func_num_args, func_get_arg, func_get_args
Variable Function: Gettype, settype, isset, unset, strval, floatval, intval, print_r
String Function: Chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim trim, substr, strcmp, strcasecmp, strops,strrpos, strstr, stristr, str_replace, strrev, echo, print
Math Function: Abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand
Date Function: Date, getdate, setdate, Checkdate, time, mktime
Array Function: Count, list, in_array, current, next, previous, end, each, sort, rsort, assort, arsort, array_merge, array_reverse
Miscellaneous Function: define, constant, include, require, header, die
File handling Function: fopen, fread, fwrite, fclose, file_exists, is_readable, is_writable, fgets, fgetc, file, file_get_contents, file_putcontents, ftell, fseek, rewind, copy, unlink, rename, move_upload_file

PHP COMPONENTS **(40%)**
PHP GD Library
PHP Regular expression function
Cookies
Session
Server variable
Database Connectivity with MySQL (Using PhpMyAdmin)

ADVANCED PHP **(20%)**
PHP with OOPS: Class, constructor, inheritance, serialize objects
PHP with XML

Text and Reference Books:
- Beginning PHP5
- PHP Bible
- Professional PHP5
- PHP Manual

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BCA402 – SYSTEM ANALYSIS AND DESIGN

PART-I **(25%)**

INTRODUCTION TO SYSTEM ANALYSES AND DESIGN
Business Process Modeling, Information System Components, Types of Business Information Systems, Organizational Structure, System Development Techniques and Tools, Overview of Systems development Methodologies, The System Development Life Cycle, Information Technology Department, The System Analyst Position.

PRELIMINARY INVESTIGATION
The importance of strategic planning, A framework for system development, Information System Projects, Evaluation of system requests, Preliminary investigation overview, Steps in preliminary investigation

RQEUIREMENTS MODELING
System analysis phase overview, System development methods, Modeling tools and techniques, system requirements checklist, Scalability and total cost of ownership, Fact finding, Interviews, Other fact finding techniques, Documentation, Preview of data, Process and object modeling

PART-II **(30%)**

DATA AND PROCESS MODELING
Data flow diagrams, Data dictionary, Process Description tools, Logical vs. physical models

OBJECT MODELING
Object oriented terms and concepts, Relationships among objects and classes, Object modeling with the unified modeling language

TRANSITION TO SYSTEM DESIGN
Evaluating software alternatives, Steps in evaluating and purchasing software packages, Completion of system analysis, Transition to system design, Prototyping, Overview of system design, Designing and using codes

PART-III **(15%)**

USER INTERFACE, INPUT AND OUTPUT DESIGN
User interface design, Input design, Output design issues, Printed output

DATA DESIGN

Data design concepts, Data design terminology, Data relationships, Normalization, Steps in database design, Database models, Data storage, Data control

PART-IV (30%)

APPLICATION ARCHITECTURE

Design checklist, Planning the architecture, Client/server architecture, Impact of the internet, Processing methods, Network models, Modeling application architecture, System management and support, system design completion

APPLICATION DEVELOPMENT

Quality assurance, Overview of application development, Structured application development, Other application development tools, Coding, Object-oriented application development, Testing the application, Documentation, Management approval

Text Books:
- System Analyses And Design, 4th Edition, By Shelly/Cashman/Rosenblatt (Thomson)

Reference Books:
- System Analyses and Design, 3rd Edition, By Elias Awad (Galgotia Publications)

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BCA403 – ADVANCED WINDOWS PROGRAMMING

INTRODUCTION TO VB.NET **(10%)**
Overview of a .net framework: versioning and deployment, Memory management, Cross-Language integration, Metadata, IL diassembler, The IDE components like IDE menu, Toolbox, Solution explorer, Property window, Output window, Task list window.
Namespace and the imports keyword, the AssemblyInfo.vb file

BASICS OF VB.NET **(10%)**
Variables (declaration, types, conversion), Constants, Arrays, Variables as Objects, Operators, Flow control statements, Modular coding (subroutines, functions), Arguments, etc. appearance of forms, Loading and showing forms, Designing menus, Building dynamic forms at runtime, MDI application

WINDOWS CONTROLS **(30%)**
TextBox control, ListBox control, CheckedListBox, ComboBox, Controls, ScrollBar and TrackBar Control, Common Dialog control, Color Dialog control, Open and Save as Dialog control, Print Dialog Box, RichTextBox control, Listview, TreeView control

OO FEATURES **(10%)**
Building class, encapsulation and abstraction, Inheritance, Polymorphism

BASIC FRAMEWORK CLASSES **(15%)**
Sorting and searching in array, Arraylist collection, Hash Table, SortedList class, Char class, String class, DateTime class, Time Span class, Directory class, File class, DirectoryInfo class, FileInfo class

DATABASE APPLICATION USING ADO.NET: **(20%)**
Architecture of ADO.NET, Creating a DataSet, Data binding, DataAdapter object,Command object and DataReader object

Error Handling and Debugging **(5%)**
Types of Errors, Exceptions and Structured Exception Handling, Debugging

Text Books:
- Mastering Visual Basic .NET by E Petroutsos, BPB

Reference Books:
- Visual Basic .NET Programming by Peter Aitken's, Dreamtech Press

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BCA404 – OPERATING SYSTEM AND UNIX

PART-I---**(70%)**

INTRODUCTION: **(5%)**
Operating system software, Types of operating system

PROCESS MANAGEMENT AND PROCESS SYNCHRONIZATION: **(20%)**
Process scheduling policies, Process scheduler, Scheduling algorithms(FCFS, SJN, Priority, SRT, RR), Parallel Processing, Process Synchronization, Test and set, WAIT and SIGNAL, Semaphores, Process Cooperation, Producer and Consumers, Readers and Writers

DEADLOCK: **(8%)**
Deadlocks, Conditions for deadlock, Deadlock modedling, Strategies for handling deadlocks, Starvation (The dining philosopher problem)

MEMORY MANAGEMENT: **(15%)**
Single-user contiguous scheme, Fixed partition, Dynamic partition , Allocation and deallocation methods, Relocatable dynamic partition, Paged memory allocation, Demand paging, Page replacement algorithms (FIFO, LRU), Paging, Segmentation, Virtual Memory

FILE MANAGEMENT **(10%)**
File manager, Interacting with file manager, Physical storage allocation, Data compression, Access methods, Access controls

DEVICE MANAGEMENT: **(10%)**
System Devices, Direct access storage devices, Component of the I/O subsystem, Communication among devices, management of I/O requests, Device handler seek strategies

PART-II---**(30%)**

LINUX/UNIX OPERATING SYSTEM

INTRODUCTION:
The UNIX operating system, LINUX and GNU, The UNIX architecture, Features of UNIX

UNDERSTANDING THE UNIX COMMAND:
Locating commands, Internal and external commands, Command structure, Flexibility of usage.

GENERAL PURPOSE UTILITIES:
man, cal, date, echo, printf, bc, script, passwd, who, uname, tty

THE FILE SYSTEM OF UNIX:
The parent-child relationship, Absolute and relative path names, The HOME variable, file attributes, compressing and archiving files, ls, pwd, mkdir, cd, rmdir, cat, cp, rm, mv, more, file, wc, od, cpm, comm., diff, gzip, gunzip, tar, zip and unzip, chmod, ln, unmask, find

THE SHELL
Working with Bourne shell and Bash shell Wild-card, Redirection, Pipes and tee(Any editor can be used to write shell script)

FILTERS
pr, head, tail, cut, paste, grep, egrep, sort, uniq, tr

SHELL PROGRAMMING
Shell scripts, read, Command line arguments, exit, exit status command, logical operators, Condition execution, evaluation of expression, case, expr computation, looping.

Text Books:
- Understanding Operating Systems Ida M. Flynn/Ann Mciver Mchoes, Thomson Learning
- UNIX Concepts and applications, Sumitabha Das, 3rd Edition TMH

Reference Books:
- Operating System Concepts, Silberschatz and Galvin, Addison Wesley

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BCA405L – PRACTICAL LAB

Practical will be based on BCA401 and BCA403.

BCA406L – PRACTICAL LAB

Practical will be based on BCA404.